MARIN COUNTY FREE LIBRARY
31111011359674

[P]raphy Until Now



JOHN SZARKOWSKI

$60

Photography Until Now

JOHN SZARKOWSKI

This new history of photography, published to accompany an anniversary exhibition at The Museum of Modern Art, takes its structure from a close examination of the interaction of technical change and artistic expression in a medium now just 150 years old. No other book on photography describes so clearly the development of the medium, and specifically the pictorial implications of a series of inventions that have shaped the art and craft of photography and the cultural role of the photographer. John Szarkowski, one of the most respected writers in the field, begins with "prehistory"—photography as a logical continuation of four centuries of the Western pictorial tradition—and concludes with the contemporary period, as television and video affect the directions and practices of still photography.

In his Introduction, Szarkowski describes his innovative approach to the history. "I have attempted to sketch out a history of photographic pictures, organized according to patterns of technological change. The word technology here refers not only to the chemical and optical issues often thought of as constituting photographic craft, but to methods of distribution of photographic imagery, economic constraints, and professional structures. It is my hope that this approach will allow the art of photography to be seen not as a special case, peripheral to the larger story of the medium's broad concerns and instrumental functions, but rather, and simply, as that work that embodies the clearest, most eloquent expression of photography's historic and continuing search for a renewed and vital identity."

Mr. Szarkowski has selected the photographs included in this book from the Museum's own collection and from public and private collections throughout the world. The quality of the reproductions is outstanding. The 161 plates are printed in tritone offset, the 126 reference illustrations are printed in duotone offset, and 17 plates are printed in full color.

continued on back flap

344 pages; 161 tritone plates, 126 duotone illustra
17 color plates

11/90
1989

CIVIC CENTER

3 1111 01135 9674

DATE DUE

JUL 3 1 1990
AUG 0 6 1990
SEP 0 4 1990
SEP 2 1 1990
OCT 2 2 1990
DEC 0 5 1990
JAN 0 2 1991
JAN 2 8 1991
NOV 3 0 1992
APR 0 6 1993
MAY 1 4 1993
JAN 3 0 1995
AUG 2 6 1995
DEC 2 9 1995
MAY 0 1 1997
MAY 0 1 1997
JUL 1 3 1998
JUL 1 0 1999
OCT 1 8 2001

SPRINGS OF ACHIEVEMENT SERIES
ON THE ART OF PHOTOGRAPHY



Photography Until Now

JOHN SZARKOWSKI

The Museum of Modern Art

New York

DISTRIBUTED BY BULFINCH PRESS · LITTLE, BROWN AND COMPANY

BOSTON · TORONTO

Published on the occasion of the exhibition *Photography Until Now*,
organized by John Szarkowski, Director, Department of Photography,
The Museum of Modern Art, New York, February 14-May 29, 1989.

Also shown at The Cleveland Museum of Art, June 27-August 19, 1990.

The exhibition and book are supported by a generous grant from
Springs Industries, Inc., and are part of the Springs of Achievement Series
on the Art of Photography at The Museum of Modern Art.

Edited by Susan Weiley
Designed by Michael Hentges
Production by Tim McDonough and Pam Smith
Halftone photography by Robert J. Hennessey
Color separations by Imaging International, New York
Composition by Graphic Technology Inc., New York
Printed by Litho Specialties, Inc., St. Paul, Minnesota
Bound by Sendor Bindery, New York

Frontispiece: Lee Friedlander. *Canyon de Chelly, Arizona.* 1983
Front cover: August Sander. *Young Girl in Circus Caravan.* 1932
Back cover: Photographer unknown. Two plows. c. 1870

Copyright © 1989 by The Museum of Modern Art, New York
All rights reserved
Library of Congress Catalog Card Number 89-64140
Clothbound ISBN 0-87070-573-3
Paperbound ISBN 0-87070-574-1

The Museum of Modern Art
11 West 53 Street
New York, New York 10019

Printed in the United States of America

Contents

Foreword 6

Introduction 8

Photography Until Now

1. Before Photography 11

2. The Inventors 21

3. The Daguerreotype and the Calotype 35

4. Paper versus Glass 69

5. George Eastman and Alfred Stieglitz 125

6. Photographs in Ink 177

7. After the Magazines 249

Notes to the Text 298

List of Illustrations and

Checklist of the Exhibition 313

Acknowledgments 335

Trustees of The Museum of Modern Art 337

Index of Names 338

Foreword

In 1937 The Museum of Modern Art presented an exhibition surveying the history of photography until then. *Photography 1839-1937*, organized by Beaumont Newhall, celebrated photography's centennial. It did a good deal more than that. It prepared the way for the founding in 1940 of the Museum's Department of Photography, the first such department in a museum of art. The exhibition and its catalog also became the basis of Newhall's *The History of Photography*, the first book to define the subject not as a chronicle of technical progress but as a coherent thread within the evolution of modern culture. Published by the Museum in 1949, revised in 1964 and again in 1985, Newhall's *History* immediately established itself as the standard work in its field.

Now we are celebrating photography's sesquicentennial and also the fiftieth anniversary of our Department of Photography. It seems a most appropriate time for the Museum once again to survey the history of photography to date. This book and the exhibition it accompanies are the creations of John Szarkowski, Director of the Department of Photography since 1962. It might be convenient to suggest that *Photography Until Now* represents a summation of his work and long experience in the field; however, this would not do justice to the range and depth of John Szarkowski's knowledge and sensibility, to the keen specificity of his thought as well as its broad reach. The originality of thinking that characterizes all his work makes *Photography Until Now* not a summation but a fresh departure.

This new perspective on the evolution of the art of photography does, of course, reflect insights and observations that have emerged in the Museum's continuing process of exploring and reassessing the development of photography through publications and exhibitions. Since 1964 the Museum has also had on view a changing selection of works from its permanent collection designed to suggest the shape of photography's history. For *Photography Until Now*, the Museum has been able to draw on not only its own rich holdings but also on other important collections, public and private. We are most grateful for the cooperation of these lenders, to whom we express our warm thanks.

We also owe our deep appreciation to Springs Industries, Inc., which has generously supported both the exhibition and this book. *Photography Until Now* is the fourteenth exhibition in the Springs of Achievement Series on the Art of Photography at The Museum of Modern Art, a distinguished program that represents an outstanding example of corporate patronage of the arts. The series was initiated in 1978 by Peter G. Scotese, then chief executive of Springs, and has flourished under Walter Y. Elisha, who assumed that post in 1981. The series has included such landmark projects as *The Work of Atget*—four exhibitions and books presented from 1981 to 1985—and *Garry Winogrand*, in 1988. Equally important is Springs' commitment to the Museum's program for contemporary work, notably the annual *New Photography* exhibitions, of which the fifth was presented in 1989.

On behalf of the Museum's staff and its Trustees—and above all, on behalf of its public—I wish to express our very warm gratitude to Walter Elisha and Springs Industries, Inc., for their enlightened support.

Richard E. Oldenburg
Director
The Museum of Modern Art

Introduction

In his old age Renoir, cranky and crippled with arthritis, told his son Jean that he regretted that painters no longer had apprentices to grind their pigments for them, but that since they did not it would be as idiotic for him to grind his own as it would be to dress like Andrea del Sarto. Besides, he said, "Paint in tubes, being easy to carry, allowed us to work from nature. . . . without paints in tubes there would have been no Cézanne, no Monet, no Sisley or Pissarro, nothing of what the journalists were later to call Impressionism."*

Renoir did not say that Impressionism was the invention of paint in tubes. Perhaps it worked the other way around, and a broadly felt need to paint the ephemeral landscape created a demand for ready-to-use paints. In either case the two issues—ends and means—were reciprocating, like an internal combustion engine or a mathematical equation. If one side of the equation changed, the other must also.

When I first read Renoir's remark, twenty-some years ago, I thought it wonderful. I had of course long known that form and function were thought to be related, and that one did not paint frescoes for buyers to be named later; but Renoir's formulation of the principle gave it a new, vernacular authority, and it struck me that his view of things might provide a useful approach to the history of photography. I thought that such an approach might allow one to bring together in one simple, coherent story the thousand, endlessly complicated plots that are the story's component parts.

I think it is fair to say that the standard histories of photography—for forty years all based on the conceptual structure provided by Beaumont Newhall's *The History of Photography from 1839 to the Present Day* (1949)—treat the technical evolution of the medium and the creative achievements of its most talented practitioners as two basically separate issues, which touch and affect each other intermittently and provisionally. This view is based on the belief in a basic distinction between technology and art. The first is thought to involve a story that can be fully told in a language of

*Jean Renoir, *Renoir, My Father* (Boston: Little, Brown, & Co., 1962), p. 77.

objective, verifiable fact; the second, a parallel story that can be properly grasped only in terms of subjective, unquantifiable *knowing*.

I do not mean to deny the difference between empirical and intuitive knowledge, but to suggest that these two ways of knowing meet in the process of making things. The meeting can be cordially symbiotic or aggressively competitive, but its resolution defines the character and meaning of the thing that is made.

This book and the exhibition it accompanies do not attempt a history of photographic craft or technology—a subject that I would not consider myself competent to essay. I have attempted rather to sketch out a history of photographic pictures, organized according to patterns of technological change. The word technology here refers not only to the chemical and optical issues often thought of as constituting photographic craft, but to methods of distribution of photographic imagery, economic constraints, and professional structures.

It is my hope that this approach will allow the art of photography to be seen not as a special case, peripheral to the larger story of the medium's broad concerns and instrumental functions, but rather, and simply, as that work that embodies the clearest, most eloquent expression of photography's historic and continuing search for a renewed and vital identity.

John Szarkowski



Photographer unknown. Untitled. c. 1855

1. Before Photography

Inventions—the name by which we call devices that seem fundamentally new—are almost always born out of a process that is more like farming than magic. From a complex ecology of ideas and circumstance that includes the condition of the intellectual soil, the political climate, the state of technical competence, and the sophistication of the seed, the suggestion of new possibilities arises.

Radical disruptions have long prior histories. After many incremental successes and nominal failures a new idea (which is generally not so new an idea) gains a measure of success that lifts it over the threshold into visibility, at which point it is given a name and begins its official history.

In 1929 Abbott Payson Usher pointed out that it was futile to try to identify the inventor of mechanical printing, or the steam engine, or the airplane, since "cultural achievement is a social accomplishment based on the accumulation of many small acts of insight by individuals."[1] Mr. Usher surely did not mean to suggest that each of these acts was of equal importance, but rather that the most imaginative and thrilling of them stood on the shoulders of a thousand earlier contributions.

The invention of photography depended on the confluence of three streams of thought. Two of these tributary sources had long histories as scientific disciplines called optics and chemistry; the third was the poetic idea that it might be possible to snatch from the very air a picture formed by the forces of nature.

Chemistry (with its mother-art, alchemy) is an ancient craft, but it seems likely that the contemplation of the stars and planets (and thus the study of light and sight) is even older. It is said that by the fifth century B.C. the Chinese philosopher Mo Ti had determined that a shadow does not move of its own accord, but only if the object or the light that forms it moves. He was perhaps the first to note the phenomenon of the camera obscura, in which light passing through a pinhole into a dark room will form on a surface behind the pinhole an inverted image of the scene outside.[2] A century later Aristotle observed that the crescent-shaped image of the sun in partial eclipse was projected repeatedly on the ground by the tiny openings between the leaves of a tree.



Artist unknown. Italian [?]. Camera obscura. Seventeenth century. Pen and ink drawing, from a sketchbook on military art



Artist unknown. *Giovanni Battista della Porta*. n.d. Engraving

Thirteen centuries later the Arabian mathematician Alhazen used the principle of the camera obscura to deduce the linearity of light; his work is thought to have been known to Roger Bacon in the thirteenth century and Francis Bacon in the seventeenth. Given the intimate coherence of Western science during the four centuries between Brother Roger and Sir Francis, it seems likely that the basic principle of the camera obscura was fairly widely known;[3] nevertheless no clear description of the phenomenon seems to pre-date that of Leonardo da Vinci, who about 1500 wrote:

When the images of objects which are illuminated penetrate through a small hole into a very dark room, these images are received in the inside of the room on a white paper, situated some distance from the opening. You will see on the paper all these objects in their proper form and colour. They will be reduced in size, they will present themselves in a reversed position, owing to the intersection of the rays.[4]

Leonardo, however, was so secretive a man that he wrote backward, so it happened that Giovanni Battista della Porta, who described the camera obscura more than half a century after Leonardo, was long credited as its inventor. Della Porta's claim was doubtless aided by the great popularity of the book in which his description appears, titled *Magia Naturalis*, or *Natural Magic*.[5] The book has been described as a mixture of science, natural history, party tricks, recipes for cooking and domestic hygiene, and popular superstition.[6] In the fourth volume of the 1558 edition della Porta described,

the manner in which one can perceive in the dark the things which on the outside are illuminated by the sun, and with their colors. . . . This will make it possible for anyone ignorant of the art of painting to draw with a pencil or pen the image of any object whatsoever.[7]

In the 1589 edition—by which time della Porta had learned to use mirrors to rectify the image—he explained that one of his favorite uses of the device involved staging by torchlight, outside his house, fantastic dramas, accompanied by trumpets and apparent mayhem, which were seen on a screen inside the house by an audience of unsuspecting friends, who witnessed the event "not without fear and terror, especially if the artificer be ingenious."[8] Thus even if della Porta cannot be said to be the inventor of the camera obscura he would seem to have a reasonable claim as a progenitor of the adventure movie.

Unlike Leonardo, della Porta did call attention to the potential use of the camera obscura as an aid to drawing, but its more typical serious use was for astronomical observation, for it allowed people to watch solar eclipses, sun spots, and even (in 1639) the transit of Venus across the sun without damaging their eyes.[9]

The use of the camera obscura as a drawing aid seems not to have begun in earnest until the early seventeenth century. By 1611 the great Johannes Kepler had designed a portable camera constructed as a tent, and finally gave the device a name that stuck: *camera obscura.* In that year he showed his instrument to Henry Wotten, an English poet and diplomat, schoolmate of John Donne, and fishing companion of Izaak Walton. Wotten reported on the instrument to Francis Bacon;

Let me tell your Lordship a pretty thing I saw coming down the Danuby . . . I lay a night in Lintz. . . . There I found Keplar, a man famous in the Sciences, as your Lordship knows. . . . In this man's study, I was much taken with the draft of a landskip on a piece of paper, methoughts masterly done: whereof enquiring the Author, he bewrayed with a smile it was himself, adding he had done it non tanquam Pictor sed tanquam Mathematicus *[not as a painter but as a mathematician]. This set me on fire: at last he told me how. He hath a little black tent . . . which he can suddenly set up where he will, and it is convertible (like a Wind-mill) to all quarters at pleasure.*[10]

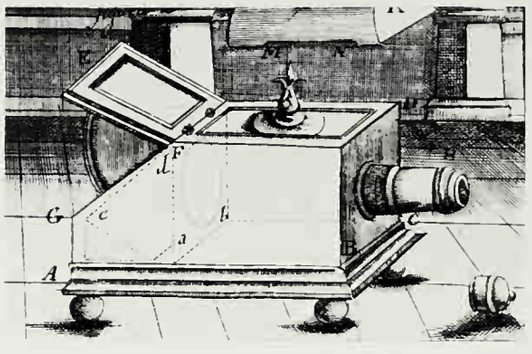
The interior of the tent was dark except for the light admitted by a lens, which focused the image of the scene outside onto a piece of paper. When one drawing was complete the draftsman could rotate the tent,

by degrees till he hath designed the whole aspect of the field: this I have described for your Lordship, because I think there might be good use made of it for Chorography [topographic drawings that served as legal descriptions]: For otherwise, to make Landskips by it were illiberal; though surely no Painter can do them so precisely.[11]

In Wotten's time the word illiberal meant unbefitting a free man, ill-bred, incompatible with the liberal arts. Thus Wotten, more than two centuries before the invention of photography, was apparently the first of a long line of critics to say that the camera was fine for facts, but not really something with which one made art.

About the middle of the seventeenth century the realization took hold that the draftsman need not enter the room—the *camera*—but could remain outside and view the image projected onto a translucent window. After this many truly portable cameras were designed, some of them camouflaged to look like drinking goblets or small writing desks, and others very much resembling those used a century and a half later by the inventors of photography.

By the late seventeenth century the camera was being used by painters. It may or may not have been used by Jan Vermeer (1632–1675) or Antonio Canale (Canaletto) (1697–1768); this aging scholarly argument continues, with the opposing sides trading rounds. In the case of Canaletto the question is of limited interest; if he did use the camera it was to do more easily what would have been natural enough to do without it. Vermeer



Johann Zahn. *Camera Obscura Portabilis.* 1685. Engraving



Jan Vermeer. *A Girl Asleep*. c. 1656. Oil on canvas

presents a different case; if he did not use the camera the fact is of great interest, for his work anticipates many of the qualities that seem to us most deeply photographic. These qualities are attached to the idea of contingency. We are thrilled in Vermeer by the way that he finds, in a constricted space, the right and unexpected vantage point; by the exact quality of light, specific to a given hour and room; by the eloquent placement and description of his "empty" passages; by the vitality of his edges, which seem not the end of his pictures but their point of beginning. If he did not use a camera the fact would seem to suggest that the *idea* of photography was the invention not of opticians and chemists but of the Western pictorial tradition.

By the eighteenth century the camera was a common tool of painters, but it is difficult to know how and why they used it; it would seem that most used it as a crutch rather than a method of exploration. It is possible that the adventurous painters of the time learned the lessons of the camera by looking at the world through it, without needing to carry the machine onto the motif. The artist in Christiaan Andriessen's wash drawing is not working but wool-gathering, entranced by the shimmering and opalescent light of the world that he has captured in his magic box.

It has been known almost forever that light changes the nature and the aspect of things. The name of the amateur naturalist who first noted the pale shadow of the leaf imprinted on the cheek of the apple is lost, but he (she?) has had innumerable successors. A more profitable observation was made by the ancient Phoenicians, who discovered that the yellow mucus secreted by the snails *Murex brandaris* and *Murex trunculus* turned in sunlight into a powerful purple dye, with which they colored the cloth for the tunics of ancient Mediterranean emperors and their favorites.[12]

Georges Potonniée pointed out in 1925 that while the story of light went back to the beginning of time, photography was a recent development, and that the history of its invention did not require that a share of credit be assigned to everyone who ever observed that colored fabrics fade in the sun. Potonniée, a French historian, was especially stern with the German chemist Josef Maria Eder for what seemed to Potonniée a permissive (and chauvinist) overestimation of the role of the earlier German chemist Johann Schulze, who discovered in 1727 that a mixture of chalk, nitric acid, and silver turned black in the light.[13] To determine whether the change was caused by the action of light (not heat, for example) Schulze pasted onto the bottle that held the mixture an opaque paper label, into which he cut letters, making the paper jacket into a stencil. After exposing the bottle to the light he removed the stencil, revealing the blackened letters

against a light ground. When he shook the bottle the letters disappeared, to the great amazement of his friends.

On the strength of this experiment Dr. Eder declared that "accordingly Schulze, a German, must be described as the inventor of photography, which, to be sure, he was proclaimed, first of all, by the author of this book."[14] Potonniée agreed only with the last part of this sentence, and added that Eder would also certainly be the last to award Schulze this distinction.[15]

Potonniée surely won that argument. Photography is not to be confused with the assembled experiments of sensitometry, or even with the shadow on the cheek of the apple: it is a picture-making system.

It is perhaps worth stating the obvious: the camera is central to our understanding of photography. The cameraless pictures—later called photograms—made by most of photography's inventors, as well as those made in the 1920s by Man Ray and Moholy-Nagy, are of interest primarily as exercises that anticipate or further explore discrete and partial aspects of photography's potentials. Outside the context of photography's fundamental agenda they would be less interesting than they are.

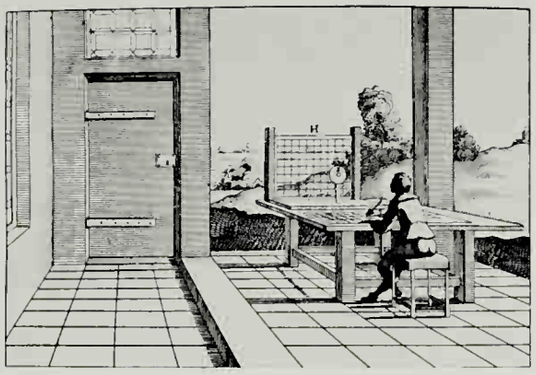
The camera is essential to the idea of photography; the sensitivity of silver salts to light was merely a convenience, a useful expedient until some better or cheaper method of recording the camera's image came along. The world is full of materials that will react to light, including asphalt, especially a variety called bitumen of Judea, but that story will be told in the next chapter.



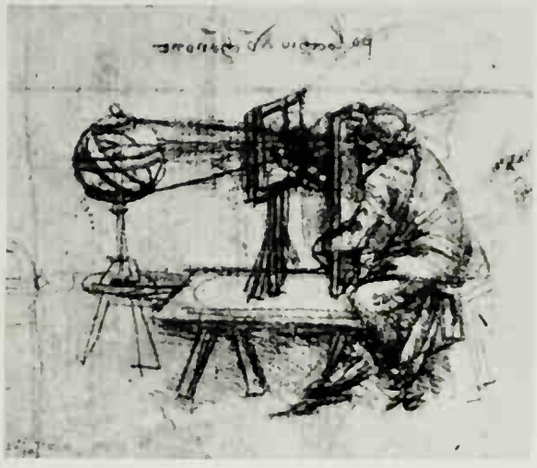
Christiaan Andriessen. *Artist with a Camera Obscura*. c. 1810. Pen and wash drawing

In describing the progressive invention of photography, it would be simple enough, in principle if not in fact, to trace the long line of optical and chemical observations and experiments that provided the technical basis on which the inventors of photography depended. The more difficult question is: from where, and how, did the idea evolve that one might catch a picture in a net, as one might catch not only the butterfly but the piece of sky in which it flew? One might best look for the beginning of an answer in fifteenth-century Italy, where two new intellectual tools became fundamental levers in the transformation of medieval culture into what would later be called the modern world: perspective drawing and modern mapmaking.

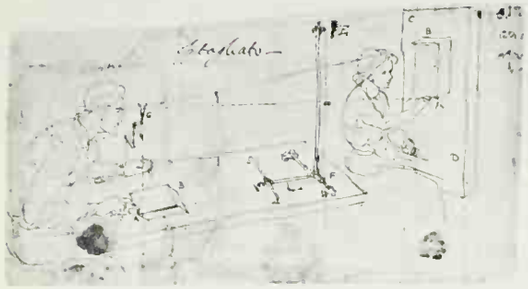
Perspective drawing was a system that produced a geometrically coherent description of three dimensions on a flat surface. Greek and Roman painters had experimented tentatively with perspectival effects, and about 1300 the Florentine painter Giotto managed to design, by some empirical method, a reasonably persuasive illusion of three-dimensional spaces to contain his new, psychologically individuated characters. But the



Artist unknown. Drawing machine. Engraving, from Jean Dubreuil, *La Perspective practique* (Paris, 1663)



Leonardo da Vinci. Man using a transparent plane to draw an amillary sphere. c. 1510. Pen and ink drawing, from the *Codex Atlantico*



Artist unknown [N. Italian]. Two men with a perspective machine. Latter half of sixteenth century. Pen and ink drawing

first clear definition of this epochal invention, and a recipe for a primitive method of its application, was written by Leone Battista Alberti in 1435. In its essentials Alberti's idea proposed a method of making pictures that described a segment of the visible world as it could be seen by one eye at one place at one time. To do this he conceived of the surface that would bear the picture as a transparent plane placed between the artist and the motif, intersecting the cone of vision that comes to a point at the artist's eye. If each part of the subject was then drawn in the size, shape, and position in which it appeared on the transparent plane, it would appear in the picture in correct geometric relationship to all the other parts. A picture so conceived might be thought of as a handmade photograph.

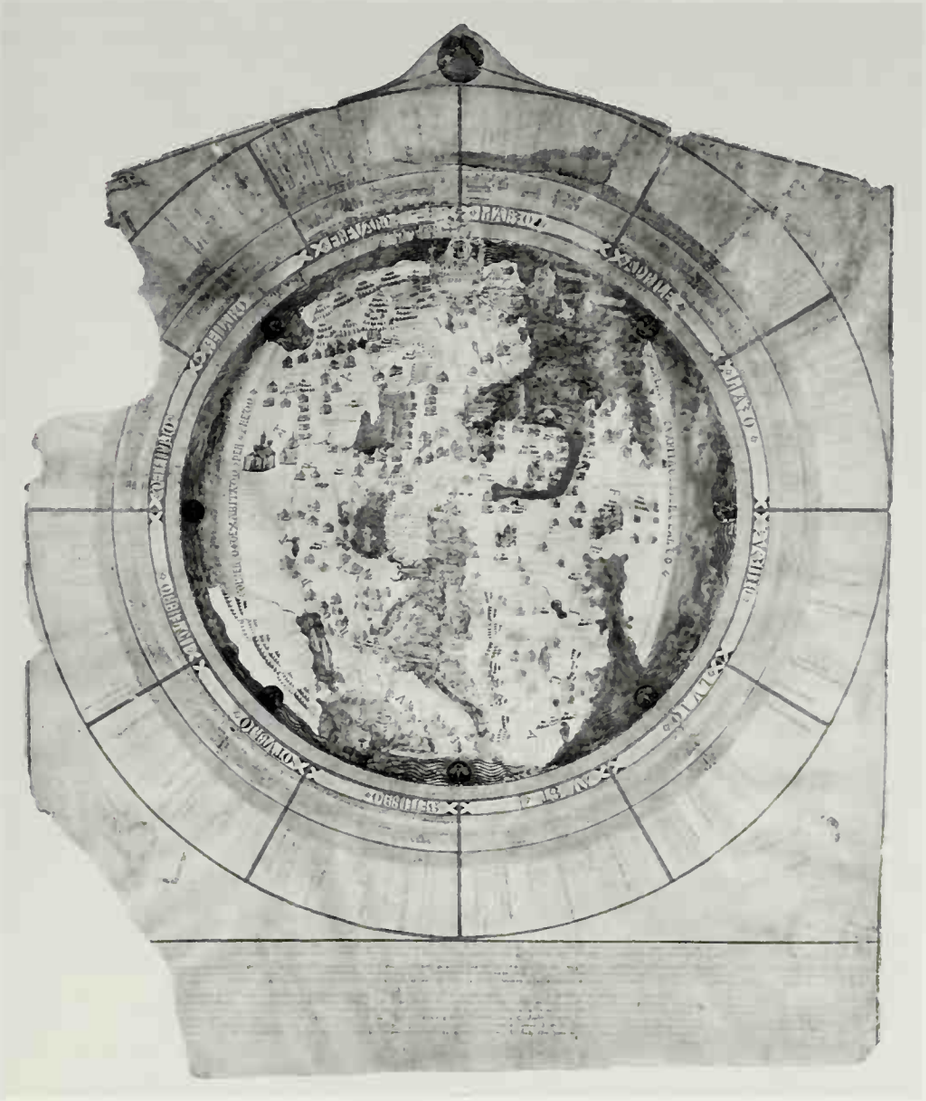
Alberti is remembered not primarily as a painter or poet or musician or architect, although he distinguished himself in all these fields, but as an extraordinary embodiment of the spirit of the best ambitions of the Renaissance. Like his equals, he assumed that art and science and philosophy were related methods of studying a coherent truth. It is said that he may have been assisted in the mathematics of his system by his friend the physician and cosmographer Paolo dal Pozzo Toscanelli, who in his old age corresponded with the Genoese sailor Christopher Columbus, and supplied him with a speculative map of the world that may have been decisive.[16]

Thus Toscanelli seems to have been involved in both perspective drawing and modern mapmaking, two of the period's radical changes in the standards of pictorial description. Samuel Y. Edgerton, Jr., has suggested that Alberti's invention may have grown directly from the seed planted by the ideas of the Alexandrian geographer and astronomer Ptolemy, whose *Cosmography*, written a century after the death of Christ, had resurfaced in Florence at the beginning of the fifteenth century.[17] Ptolemy described three systems of projection—methods of reducing three dimensions to two—that would produce geometrically coherent maps; the third of these, which neither Ptolemy nor his Renaissance followers pursued, was based on the idea that one might, from a theoretical fixed vantage point in space, draw a substantial segment of the globe as it appeared to the eye, without introducing psychologically unmanageable distortions.

It does not seem necessary to assume a direct laying-on of hands from Ptolemy to Alberti to recognize that the new maps and the new paintings were parallel expressions of new attitudes toward both the exterior world and the central function of pictorial indication. The two new techniques had much in common: both were methods that provided for the systematic rationalization of space in pictorial terms; that is, both provided geometrically consistent descriptions of three dimensions on a flat surface. Both techniques provided pictures of the world that were verifiable. Two

mapmakers who plotted the same set of coordinates within the same system of projection would draw essentially the same map. If two artists of the same height could stand in the same place at the same time they would draw the objects within their field of view in the same relationship to each other. These procedures were of inestimable value to geographers, sailors, builders, soldiers, mechanics, and philosophers, for they provided visual description that was systematic, repeatable, and quantifiable.

It should be pointed out that the new systems also involved substantial sacrifices. The new mapmakers and painters could no longer see around corners, or through the surface of the earth, or freely adjust the sizes and positions of the parts of their pictures to make them accord with their philosophical importance. Thus the medieval maps of the world (*mappa-mundi*) survived well into the Renaissance, sharing duty with the modern-



Artist unknown. *Leardo World Map*. 1452. Tempera on vellum

minded Ptolemaic maps. The latter were better for finding one's way from one place to another, the former for understanding the purpose of the voyage.

The Leardo map of 1452 is surely typical of medieval maps in that it shows the world surrounded by an ocean. The world was an island, with Jerusalem at its center, and the gospel-writers sitting at the four corners of the earth—no mere poetic metaphor, but the word of Isaiah.[18] Everything could be fitted neatly on a single sheet. Maps and paintings were like walled cities: the subject was contained and complete; the idea formed its own frame.



Leonardo da Vinci. *The Last Supper.* c. 1495-97. Convent Santa Maria delle Grazie, Milan

Under the new dispensation the idea of the picture was likely to extend to the picture's very edges. One might say that the picture was formed by the edges. Medieval painting can be thought of as an art of assemblage, but the Renaissance painter could no longer freely dispose the component parts of his picture to form a perfect, self-enclosed system. He could, in principle, only change the relationship among the three elements that formed his picture-designing system: the vantage point, the imaginary window, and the (real or imagined) motif. His picture was now a segment of a continuum, part of a larger whole, and the fact gave a new authority to the picture's edges—the means by which the world was edited.



Peter Paul Rubens. Sketch for *The Last Supper.* 1620. Oil on canvas

Perspective projection, though simple enough in principle, was not simple at all in practice, and fifteenth-century painters sensibly began with the easier cases. Often they began by designing something like a stage: an architectural context of regular geometric forms, preferably including a tiled floor or coffered ceiling, the pattern of which receded neatly toward a central vanishing point. On this prepared stage the actors were then disposed, generally in front or side elevation.

Each generation increased its command over increasingly complex perspective problems. At the beginning of the sixteenth century the prototypical Italian painting still seems to have been painted from a vantage point several rows back in the orchestra. But by the latter part of the century Tintoretto, for example, had infiltrated the proscenium arch and was painting from the wings of the stage. Early in the next century Caravaggio and Rubens moved onto the stage itself, and planted their easels in the middle of the action.

The story is of course much more complicated than that. Nevertheless, one might venture the proposition that the central formal problems of painting during the four centuries after Alberti relate in large measure to painters' increasing sophistication in utilizing the possible relationships of vantage point, motif, and picture plane. The painter of the fifteenth century composed his pictures much as a theatrical director composes his: from the "front," and from a safe distance, he would arrange his actors and

his furniture. At the beginning of the nineteenth century Constable composed his by moving nothing but himself, and by using the edges of his canvas to define his subject. Gradually the concept of composition, in which the narrative elements of the picture were arranged within a framework constructed according to architectural principles, was replaced by a new concept, in which the picture consisted of a single part: the undivided, indivisible, visual field.

The third great technical change in picture-making to occur during the fifteenth century was the introduction of the book with printed illustrations, a development that seems to have blossomed throughout Europe during the latter decades of the century. Produced in part by machines, these theoretically identical, mass-produced pictures greatly broadened society's understanding of the potential uses of art. That momentous development will not be discussed here, except to note that it constituted another demonstration that the ends of art were available to the science and technology of the new age.



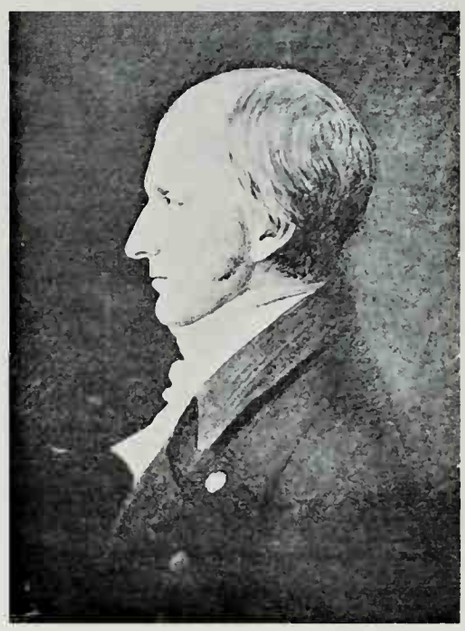
Hippolyte Bayard. Arrangement of specimens. c. 1842–43

2. The Inventors

One could reasonably claim that the idea of photography was invented by the person who first conceived the possibility of yoking together the familiar camera obscura and the new, fragmentary knowledge of photochemistry, to produce a picture formed by the forces of nature.

Thomas Wedgwood, son of the famous English potter Josiah, was probably not the first to have this idea, but he was the first one we *know* had the idea. Around 1800 he had succeeded in making prints of leaves, and the wings of insects, and paintings on glass, by causing the light of the sun to pass through them onto a piece of paper brushed with a solution of silver nitrate or silver chloride. But these simple photograms were fugitive; the sun that formed them continued its work until it had destroyed them by turning the paper black all over. Wedgwood could not find a way to get the genie back into the bottle when the picture was right. Moreover, he was apparently wholly unsuccessful in recording the image of the camera obscura, which had been his first object: the image in the camera was too faint, and his chemistry too weak. Wedgwood evidently considered his experiments a complete failure, and did not return to them during the remaining years of his brief life.

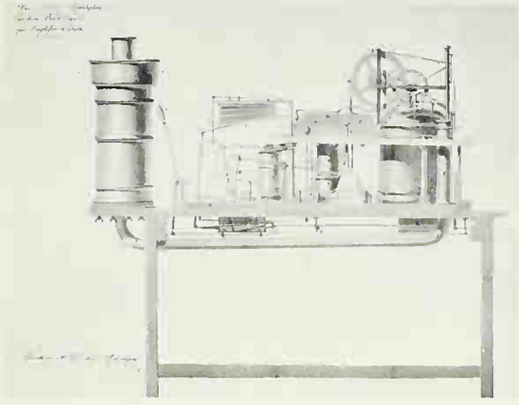
His young friend and collaborator Humphry Davy, however, judged the results worth reporting, and in 1802 published a full account of them in the *Journals of the Royal Institution of Great Britain.*[1] Davy—later Sir Humphry—was then twenty-four, and his great work and fame as a chemist was still in the future, although he had gained some notoriety for his experiments with nitrous oxide (laughing gas), of which in 1799 he had inhaled sixteen quarts during seven minutes, causing him to become "absolutely intoxicated," a scientific observation that did not long escape the notice of Samuel Taylor Coleridge.[2] Davy's report on Wedgwood's experiments noted that the unexposed silver salts were insoluble in water, but that it was "not improbable" that substances might be found that would dissolve them. This was the crux of the problem: how to stop the action of the light when it had gone far enough. "Nothing," Davy concluded, "but a method of preventing the unshaded parts of the delineation from being coloured by exposure to the day is wanting, to render the process as useful as it is elegant."[3]



Artist unknown. *Thomas Wedgwood.* c. 1800. Lithograph



C. Laguiche. *Nicéphore Niépce*. c. 1800. Gouache



Nicéphore Niépce. *Pyréolophore*. 1806. Pen and watercolor drawing

Davy's report seems to have rested unnoticed in the *Journals of the Royal Institution*, but in 1839–40, after Davy's death, it appeared in a collection of his writings, just in time to further complicate the argument about who should be credited with the invention of photography. The argument was, and is, insoluble in the absence of an agreement as to what photography is. If it is a process by which the camera image records itself by altering the chemical or physical state of a receptive field, then photography's inventor was Nicéphore Niépce.

Joseph Nicéphore Niépce (1765–1833) was a member of an old Burgundian family of the high bourgeoisie that had for several centuries served as the well-rewarded agents and advisors for the nobility of the province. During the Revolutionary period the family was, predictably, not universally esteemed. During Revolutionary Year I (1793) Nicéphore found protective coloration in the army, but his military career was cut short by typhoid fever. By 1801 the worst passions of the Revolution had subsided, and Nicéphore returned with his wife and son to his native town of Chalon-sur-Saône, a few kilometers south of Beaune and the *côte d'or* of the greatest Burgundy wines. There Nicéphore spent, almost without interruption, the last thirty-two years of what would seem to have been, in spite of many disappointments, an extraordinarily satisfactory life.

When Nicéphore returned home, his older brother, Claude, returned also, and the two continued their lifelong investigations of artistic, scientific, mechanical, and agricultural problems. The quality of their friendship, in its intellectual purity and fraternal loyalty and affection, was in itself a superb achievement, and in retrospect colors even their failures with an aura of triumph.

The Revolution had greatly diminished but not exhausted the resources of the brothers, but this last condition was finally very nearly achieved by means of one of their most spectacular inventions, the *Pyréolophore*, a motorboat propelled by an internal-combustion engine that burned lycopodium powder[4] and substantial sums of money. The *Pyréolophore* was patented in 1807 and gradually improved. The machine sometimes seemed to work well, except for one minor problem or another that seemed to occur especially when potential investors were watching. In 1816 Claude went to Paris to promote the boat; disappointed in Paris he went to England, then the true home of high technology, from which he never returned. He died in England in 1828, apparently quite mad, and with him the *Pyréolophore* was finally laid to rest.

If Claude had not left home we would presumably know even less than we do about Nicéphore's photographic experiments. Until Claude left for Paris there was no need for Nicéphore to explain his thinking and describe his progress. The surviving letters—generally not Nicéphore's reports but

Claude's very discreet responses, always urging secrecy—give an intimate if ambiguous record of the work's progress after 1816.

Several years earlier, perhaps in 1813, Niépce had become, along with much of Europe, fascinated with the new technique of lithography. In this radical new printmaking system ink was deposited on the paper not from a raised surface, as with the woodcut, or from an incision below the surface, as with engraving or etching, but from a flat surface that was coded according to the principle of the antagonism of oil and water. The older printmaking systems required the skills of a jeweler, but for the artist lithography was as simple as drawing on stone. It would allow a new autographic freedom to artists who learned to use it as a means of personal expression, but in 1813 that was still in the future; Goya and Ingres and Géricault and Delacroix had not yet demonstrated the artistic capacities of lithography, and Honoré Daumier was only five years old. But forgetting the issue of original art, it was already clear that lithography made possible a new standard of precision and objectivity in the reproduction (or more properly, the transcription) of works originally produced in other media. Niépce was interested in lithography as a reproductive medium, and so he concerned himself with finding a method of transferring the design to the lithographic stone not manually but automatically—a method that might rescue reproduction from interpretation.

Almost nothing is known of the specifics of Niépce's experiments with lithography, except that they failed. They did, however, establish in Niépce's mind the idea that photography—what he would call heliography—was a part of the history of the graphic arts, and wholly compatible with ink. A little later he would arrange this prodigious marriage.

In the meantime he had determined to record the image of the camera obscura, and in May 1816 reported to Claude that he had managed a degree of success, but that three major problems remained to be solved: (1) his pictures were not sharp; (2) the values were reversed, with light reading dark and vice versa; and (3) the pictures were not stable. Nicéphore thought the ones he sent his brother would change even if kept from the light. And he added, with unbelievable good cheer, "mon cher ami, as you have well put it, we don't lack patience, and with patience anything can be done."[5]

Niépce's first experiments had been based on the chemistry of silver salts (probably silver chloride), as Wedgwood's had been; but he soon tried a new tack, evidently in the effort to find a substance that the light would bleach rather than darken, and thus produce a picture in which the values were not inverted. After experimenting with a long list of substances that were rumored to be in some sense or degree light-sensitive, in 1822 or earlier Niépce discovered the light sensitivity of a variety of asphalt called

bitumen of Judea. The material was found in every etcher's studio, since it was one of the essential ingredients of the resist with which they coated their copper plates.[6] Niépce had heard that bitumen of Judea bleached on exposure to light; it did, very slightly, but Niépce discovered a more interesting fact about the material. Before exposure to light, it is readily soluble in oil of lavender; afterward it is not.

Perhaps in 1822, or 1824, or 1826, but surely not later than 1827, Niépce coated a pewter (or a glass) plate with bitumen of Judea dissolved in oil of lavender, placed the plate in his camera obscura, and made an exposure that lasted all day long. He then washed the plate with oil of lavender; the resist that had been hardened by exposure to light remained, but in those areas that represented the darker parts of the original scene the coating washed away, revealing the support. If the support was glass, the clear areas would reveal the cast shadow behind the plate; if it was pewter, the metal read slightly darker than the remaining resist.



Nicéphore Niépce. *View from His Window at La Gras.* 1827

Only one of Niépce's pictures made in the camera survives in its original form. The contrast of the picture, on pewter, is very low, and the middle tones are barely defined. The image is seen best in an extreme raking light, and even then one not familiar with the motif could hardly guess that it represents a courtyard of Niépce's estate, viewed from an upper window of the château, as authorities assure us it does. It is nevertheless a stable, autographic record of the camera's image—perhaps the first such image made, surely the oldest known. It is, as Nicéphore wrote to Claude of an unidentified success in 1824, "really something magical."[7]

With the bitumen-ground technique Niépce made unique pictures on pewter and glass; he also developed a third, variant technique that in terms of the subsequent development of photography was of great significance. This was a photomechanical process: after the metal plate had been exposed and the unhardened bitumen washed away, the plate was bathed in acid; those parts of the plate no longer protected were etched away, creating an intaglio plate that could be printed on an etcher's press. He was not successful in applying this technique to pictures made in the camera, but it worked well when used to reproduce traditional prints, which were placed directly on the sensitized plate, and served as a filter or matrix through which the plate was exposed. The process was in principle a primitive version of photogravure; it could not reproduce halftones, but a generation later Nicéphore's nephew, Claude Abel Niépce de Saint-Victor, took up the process and improved it to the point where it was capable of reasonably persuasive middle values.

Late in 1825 Niépce received a letter from Louis-Jacques-Mandé Daguerre (1787–1851), whose name he did not know. The letter is lost, but it most likely suggested, in a respectful and unpresumptuous manner, that

the two men might usefully share the fruits of their related research. The brothers' efforts to keep their photographic research to themselves had been of no avail; Charles Chevalier, son of the Paris optician who served both Niépce and Daguerre, had let the secret slip. Niépce felt that he was within sight of his goal, and attempted to sidestep the question, but Daguerre was politely persistent, and Niépce was gradually won over. In 1827, on his way to London to visit Claude and to find support for his picture-making system, he visited Daguerre in Paris and was favorably impressed, perhaps even charmed. From London, after five expensive months of repeated disappointment and English food, he returned home much more sympathetic to the idea of collaboration. Late in 1829 he reminded Daguerre that he had earlier suggested the two join forces. Daguerre agreed with alacrity, and before the year was out he took the stage to Chalon to sign the partnership agreement.



P. Dujardin. Portrait of Daguerre, after a miniature by Millet de Charlieu. 1827. Lithograph

Of all of photography's inventors Daguerre was the only professional artist.[8] He had contributed to Baron Isidore Taylor's vast architectural survey, *Voyages pittoresques et romantiques dans l'ancienne France*,[9] very early in its history—probably before 1820—but his principal achievement and considerable status were in the field of theatrical design. After studying with one Degotti,[10] a leading designer for the Opéra, Daguerre himself became first a master and then an outstanding innovator in theatrical design. It was an age, like our own, in which theatrical special effects came to rival in importance the literary content of the play. In London, for example, the Drury Lane Theatre produced in 1823 the sensational "Cataract of the Ganges," remembered chiefly because it featured not only a herd of real horses but a cascade of real water.[11] Around the turn of the century the panorama had been introduced to both London and Paris; it was a form of theater that dispensed with both play and actors, and gave the audience instead scenery on a grand scale, and of breathtaking realism. Daguerre's original contribution to this chapter in the history of spectacle was the Diorama, which introduced to the panorama a temporal element, effected by changing the lighting on a series of transparent, painted screens so as to show in turn the pictures on their fronts and backs. This device enabled Daguerre to add to pure spectacle a simple narrative idea, such as the fall of darkness and the coming of dawn in "The Midnight Mass at Saint Etienne du Mont." The Diorama was both a critical and a popular success. Georges Potonniée claimed that in some years the establishment made a profit of 200,000 francs,[12] then a very substantial amount of money, and in 1824 Daguerre was made a Chevalier of the Legion of Honor in recognition of the artistic quality of his Diorama painting *Holyrood Chapel*. Daguerre's contemporary, the dramatist Augustin Eugène



Louis-Jacques-Mandé Daguerre. *Holyrood Chapel*. 1824. Oil on canvas

Scribe, was later credited by Sheldon Cheyney with having achieved the supreme triumph of mechanics over literary content, but Cheyney was presumably not considering in his competition those varieties of theater that had dispensed with literary content altogether.

The agreement between Niépce and Daguerre stated in effect that they would fully share present and future knowledge, and, when success was achieved, equally share honor and profit. When the agreement was signed Niépce's contribution constituted virtually the whole of the firm's scientific capital; in six or seven years of experiment Daguerre had accumulated only negative data. He did, however, bring to the partnership advantages of a different order: he had relative youth, energy, enthusiasm, and determination, plus a famous name and powerful friends.

The immediate problem was to find a substance much more sensitive than Niépce's bitumen of Judea, which was much too slow to make photography in a camera practical. The two partners began immediately to share information and suggestions, in letters studded with numbers that stood for words to be kept secret. Daguerre had decided that iodine (code number 20) might be the magic ingredient, and encouraged Niépce to experiment with it also.[13] Niépce had tried it before, but tried it again before finally declaring it hopeless. In fact it was not iodine but silver iodide that Daguerre had found sensitive; but it was also slow, it created a faint image that was tonally reversed, and Daguerre, like his predecessors, did not know how to stop the process: how to fix the image. No significant progress had been made by the summer of 1833, when Niépce died of a stroke at the age of sixty-nine.

Niépce's son, Isidore, now the partner of record, seemed unlikely to contribute much of value; Daguerre, who so far had discovered nothing, was on his own. Sometime during 1835 he found an answer. Whether it came out of deductive reasoning, random chance, or Divine guidance Daguerre did not choose to say, but it worked. When silver iodide was exposed to light it was reduced to tiny particles of metallic silver. However, in the first stages of this process the silver particles were so small the change was not visible. In 1835 Daguerre fumed such a plate with mercury vapor. The silver particles attracted to themselves the mercury, forming a whitish alloy. Thus the lighted parts of the scene were recorded more or less white, according to their brightness, while the unexposed silver iodide was unaffected by the mercury fumes and remained mirror-smooth, reading dark if it reflected a dark background.

Daguerre informed his new partner of his success, although he did not risk explaining how he had achieved it, and after a little wrangling the two agreed on how the two inventions—Daguerre's and Niépce's—would be sold and how the credit and profit would be divided. The first scheme

stipulated that the two inventions would be sold by subscription for a total of 400,000 francs, but subscription proved a clumsy method of selling a secret: obviously none of the investors could be told exactly what they had bought until the list was full. After it became clear that the subscription method was not working, Daguerre decided to find a single agent or protector to sell the idea. During much of 1838 he knocked on the right doors, showing his remarkable (in fact scarcely credible) results to distinguished bureaucrats, scientists, politicians, and journalists; he was perhaps even successful in planting the rumor that foreign governments were bidding for the prize. When he succeeded in enlisting François Arago as his (and Isidore's) champion, the battle was all but won. Arago was not only a distinguished scientist but a superb politician.[14] As a member of the Chamber of Deputies he was perfectly placed to arrange the civilized and intelligent thing: the French nation would buy the invention (technically both inventions) from Daguerre (and Niépce) and present it (them) freely to the whole world, or at least to all the world except England. When Arago had his votes counted he wrote a perfectly crafted letter to Tannegui Duchâtel, the Secretary of the Interior, which in effect gave him the choice of presenting the bill himself, and thus being counted among the angels, or of forcing Arago to take the more laborious and potentially divisive route of presenting the bill from the floor. Duchâtel naturally appointed a committee to consider the question of whether there was sound reason for the State to purchase the inventions. The committee included Arago, who would be presumed to speak for science; Louis Vitel, a Deputy who was interested in historic monuments; and Paul Delaroche, a member of the Académie des Beaux-Arts, who spoke with perfect confidence for the fine arts. The committee's report was unanimous and enthusiastic. Delaroche considered the daguerreotype "an immense service rendered to art," a verdict that in 1839 might have seemed to some a little speculative. After the formalities had been completed Daguerre was awarded a lifetime pension of 6,000 francs a year, and Isidore one of 4,000 a year.[15,16]



Louis-Jacques-Mandé Daguerre. Collection of shells and miscellany. 1839

Daguerre remains a mystery. He would seem to have been altogether a sane and reasonable man, a man of action, quick to seize the opportunity at hand, to improve the good, to market a useful product with intelligence, but he does not seem the type to pursue doggedly, year after year, a gaseous daydream, with virtually no scientific understanding to support his ambition. His wife secretly asked a doctor whether her husband might be mad, and was told not necessarily. It was presumably not clear to her, as it is not to us, why Daguerre, as busy as he was with a successful and demanding artistic enterprise, should have wanted to invent photography. He had of course used the camera obscura to establish the very precise perspectival structures required of the Diorama pictures, but if he thought that photog-

raphy might be a more useful sketching tool for his theatrical work it did not work out that way. The Diorama burned to the ground in the spring of 1839, and Daguerre was not interested in joining his associate Charles-Marie Bouton in rebuilding it. His interest in the daguerreotype itself—once he had succeeded—seems spasmodic and flickering. In 1841 he announced, through Arago, that he had succeeded in making the plate many times more sensitive than it had been, but the claim proved to be first premature and finally unfounded. It was perhaps aggravating to be asked to compete with the whole world in improving what had been one's own invention and secret.

In 1841 he moved to a house in the village of Bry-sur-Marne and devoted himself to remodeling its gardens to make them conform more closely to the dramatic superrealism of his Diorama landscapes. His last major work was an illusionist painting that filled the nave of the small local church, and transformed it, for some, into a great cathedral. He died in 1851, poor again in spite of all his successes, but full of honors. His work as a photographer—whatever it might have been—was subsequently lost to the ravages of war and those of museum carelessness;[17] only a handful of plates exist that are known to have come from his hand.



Photographer unknown. *William Henry Fox Talbot.* c. 1855

The first accounts of Daguerre's success, in January of 1839, were very distressing to the Englishman William Henry Fox Talbot (1800–1877), who had also been inventing photography earlier in the decade, but who had put aside his experiments in 1836 for what seemed more pressing matters. It might not have occurred to Talbot that someone else might dare finish his invention before he found time to return to it. His otherwise superb imagination was perhaps not at its best at imagining other people.

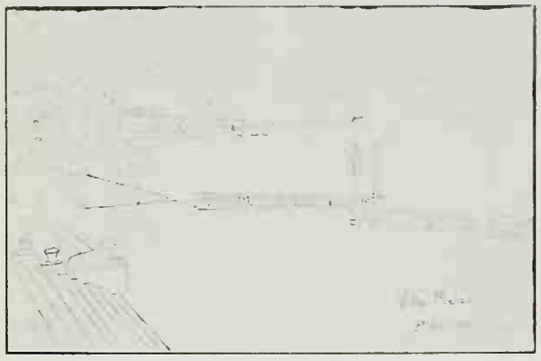
Talbot moved quickly to control the damage, and to establish whatever rights of priority might properly be his. Examples of his results were shown to the members of the Royal Institution on January 25, 1839, and six days later, at a meeting of the Royal Society, he read his first public paper on the subject, reviewing his experiments to date and describing some of the specific uses to which the principle might be applied.[18] The paper was hurriedly prepared, and Talbot later claimed that it omitted much that it should have included, but it does reveal the quality of his mind. It is perhaps most impressive when Talbot explains—briefly and almost casually—the answer to the question that neither Niépce nor Daguerre had solved, concerning the problem of inverted values—of white shadows and black highlights. One simply used the first picture as a filter, through which the sun was directed onto a second piece of sensitized paper. This second paper received the most light through those parts of the negative that were most translucent, and least through those parts that were the densest black.



William Henry Fox Talbot. *Botanical Specimen.* c. 1840



William Henry Fox Talbot. *Lace*. 1840s



William Henry Fox Talbot. *Villa Melzi*, October 5, 1833. Camera lucida pencil drawing

Thus the values of the negative were inverted, and those of the print corresponded to the highlights and shadows of the real world. Talbot also wrote to members of the Académie des Sciences claiming priority vis-à-vis Daguerre, in case this should turn out to be true. And he returned to his experiments, perhaps working now at a rather more purposeful pace.

In the fall of 1833, Talbot later recalled, he had looked down from the Villa Melzi on Lake Como and had been so struck with the beauty of the scene that he had attempted to draw it, first using as an aid Wollaston's camera lucida, a relatively recent invention that had become a common piece of baggage among gentlemen travelers of intellectual bent, because it was small and light, and because it was believed, erroneously, that it might come in handy. The instrument was badly named, since it was in no sense a room but only a prism, held above the drawing paper by thin legs, that in theory allowed the draftsman to see simultaneously, with one eye, both the subject and the paper, and thus to trace the first onto the second. Talbot described his results as "melancholy to behold." He then reverted to the familiar camera obscura, which, although heavy and bulky, formed an image outside of one's head. Talbot still did not like his drawing, but was moved to consider the opalescent, evanescent beauty of the camera's image:

The idea occurred to me: how charming it would be if it were possible to cause these natural images to imprint themselves durably and remain fixed upon the paper! And why should it not be possible? I asked myself. . . . Light, where it exists, can effect an action, and in certain circumstances does exert one sufficient to cause changes in material bodies. Suppose, then, such an action could be executed on the paper; and suppose the paper could be visibly changed by it. In that case surely some effect must result having a general resemblance to the cause which produced it.[19]

Or so Talbot remembered his thoughts eleven years later.

Like Wedgwood, Talbot started with silver nitrate, then proceeded to silver chloride, making a real advance by discovering he could produce a faster chloride by forming it on the paper rather than brushing it on. In this way he produced an "imperfect" chloride, with excess silver. With this paper Talbot made beautiful contact prints of botanical specimens and bits of lace; but to secure even dim negatives in the camera required very long exposures, or tiny cameras with lenses that concentrated their light-gathering power in a small field. Talbot also had trouble, like his predecessors, with the problem of fixing the image, although he managed to stabilize it somewhat by dipping the picture in boiling salt water. By 1836 Talbot seems to have come to something of a dead end, and he focused his energies on other projects, including a book that would summarize his studies in philology and archaeology, entitled *Hermes, or Classical and Antiquarian Researches* (1839).

After news of Daguerre's success Talbot's friend and fellow-scientist Sir David Brewster advised him to keep his process secret, carry it as far toward perfection as he could without substantial delay, and then patent it. "I do not see why," he said, "a Gentleman with an independent fortune should scruple to accept of any benefit that he has derived from his own genius."[20] Talbot rejected Brewster's advice; he did not patent his process, and he did publish it, although he was in his first paper vague, perhaps studiously vague, about technical details. He was on the other hand remarkably forthcoming in his letters to the French physicist Jean Baptiste Biot, who as a member of the Académie des Sciences was one of those who first considered the daguerreotype. (It would seem that Talbot was reluctant to acknowledge the existence of Daguerre, a showman with no standing at all in the scientific community, but he maintained civil communication with the French scientists.) To Biot he gave full information concerning the preparation of his paper and his fixing procedures, presumably so that someone in France would know what Talbot knew before Daguerre published his own recipes.



David Octavius Hill and Robert Adamson. *Sir David Brewster.* c. 1843

In the meantime Talbot continued to work on his own system. His precise and logical mind made small, incremental improvements; in 1840 his friend John Herschel, the astronomer, told him that a year earlier he, Talbot, would have jumped and clapped hands at the results he was now achieving—that is, he added mischievously, if Talbot ever did such things.[21] Nevertheless, it was not until late that year that the breakthrough came, and it came, as usual, in the guise of an accident. Talbot had been sensitizing paper by different methods, and exposing it in the camera to test them for relative speed. One test paper that showed no noticeable image Talbot carelessly put aside in the darkroom while he went about his work. When he returned to it later it bore a fully formed image. "I was certain there was nothing of the kind when I had looked at it before," he later wrote, "and therefore (magic apart) the only conclusion that could be drawn was that the picture had unexpectedly *developed itself* by a spontaneous action."[22]

Talbot had used gallic acid as an ingredient in the sensitizing process, and this chemical, remaining unchanged in the paper, acted much like a modern photographic developer: it completed what the light had invisibly begun, and converted the silver salts into silver. When Talbot analyzed what had happened he possessed a new system of photography. The sensitive paper need not be visibly changed but merely encoded by the light, and the transaction completed by chemistry. Talbot estimated that his new method was one hundred times more sensitive than his old one.

Less than two years earlier Talbot had given to the world the basis for a radically new picture-making system, and had heard in response an endless chorus of gratuitous praise of the daguerreotype. The inventor of



William Henry Fox Talbot. *Reverend Calvert Jones at Lacock Abbey.* c. 1845

that technique had chosen to patent it in England alone,[23] seemingly as an insult directed toward Talbot and his competitive invention. After discovering the latent image and the principle of development, Talbot paused to reconsider his position.

Talbot is invariably described as a country gentleman of comfortable independent means, but it is difficult to be confident that a man is comfortable without knowing his ambitions. In 1826, when he was as old as the century, Talbot reclaimed the ancestral family seat, Lacock Abbey, in Wiltshire. He had not lived there since his first year, when his father had died and the place had been let to a tenant. It was, in broad outline, an appropriate place for a gentleman who would also be a distinguished scholar and scientist, but its picture galleries were empty and its gardens neglected.[24]

When Talbot died he was honored for his Assyrian dictionary, his work in integral calculus, and that on hieroglyphics and Babylonian cuneiform inscriptions, for his researches on the nature of light, his translation of "Macbeth" into Greek verse, and for many other admirable works that no one, least of all Talbot, would have expected to make a profit that would put fine paintings back into Lacock Abbey. But in 1841 it might have seemed that the new, improved photography on paper might make him rich. In February 1841 Talbot applied for a patent for his new method, which he called *calotype,* meaning beautiful picture. He had first sought and received the blessing of Herschel, who in principle did not believe in patents but who told Talbot, "With the liberal interpretation you propose in exercising the patent right no one can complain."[25] Herschel had misunderstood. Once Talbot had his patent he defended it with a single-mindedness that sometimes verged on cruelty.

During the spring of 1839 Arago had worked swiftly and effectively to secure the daguerreotype for the public domain (except in England). He did this in part by emphasizing the role of a single, unique hero—Daguerre—to serve as the focal point for the nation's curiosity, enthusiasm, and gratitude. But the plan was complicated by the appearance of a whole series of new prospective heroes. First Talbot claimed precedence; then Francis Bauer, an English botanist who was Niépce's friend from his unhappy days in London, protested that Niépce's role had been scanted and his memory dishonored; finally in May a petty bureaucrat from the Ministry of Finance appeared with a portfolio of paper photographs made by a method that he apparently invented during the first months of that year. Hippolyte Bayard had solved the problem that had so long frustrated the efforts of both Niépce and Daguerre: his method produced a direct positive—a picture with the lights and shadows correctly disposed—by

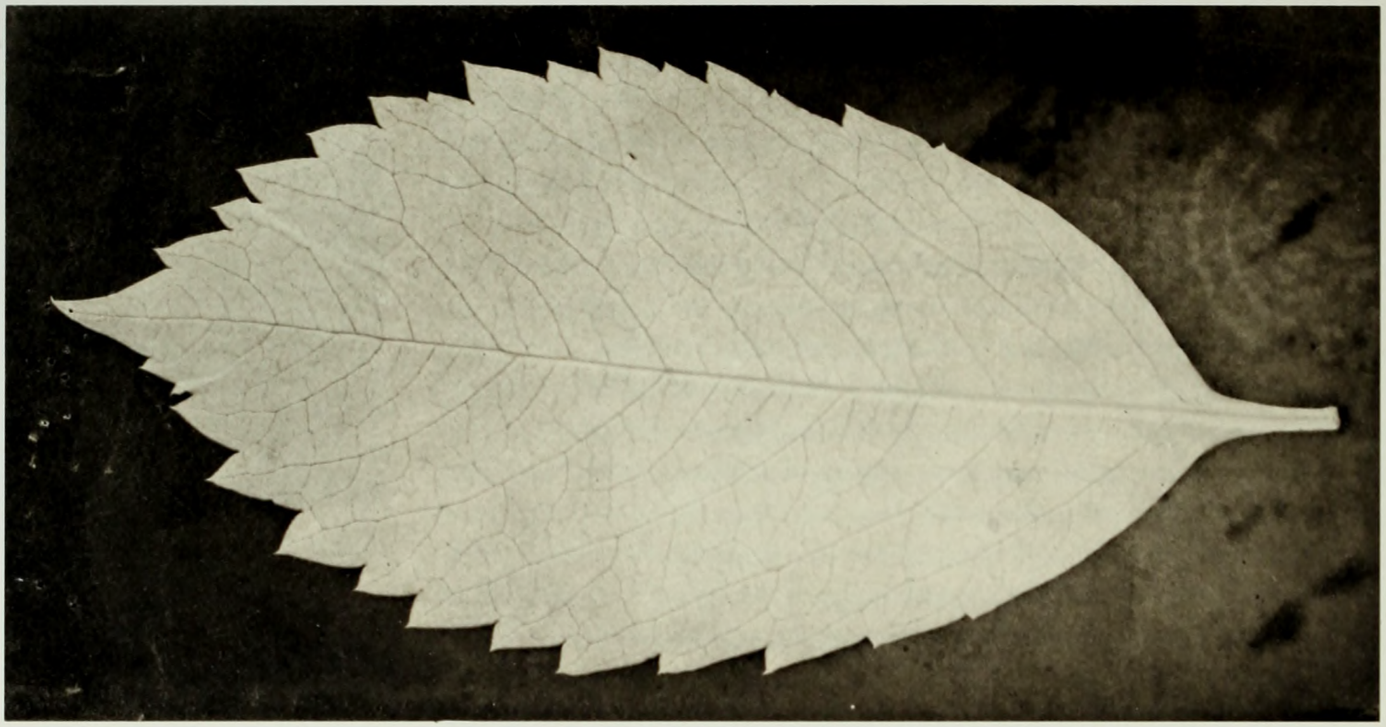
beginning with a totally blackened sheet that was then bleached by the light.[26] According to Bayard, Arago had asked him please not to publish his method, since it might prejudice the case for Daguerre.[27] Someone asked the Ministry of the Interior to please give Bayard 600 francs for a new camera and lens, perhaps in the hope that the new instrument would keep him occupied for a few weeks, which it apparently did. Early in 1840 Bayard finally published his process, but it was found to be fundamentally the same as that of three other contenders who had—by then—published earlier. There is, however, poetic justice in the fact that Bayard got a new camera and lens, for of all the inventors he proved to be the most interesting photographer.



Hippolyte Bayard. Self-Portrait. 1842–50

It is somehow wrong to count Herschel as one of the inventors of photography. He was a superior scientist with a lively mind, and after hearing that Daguerre and Talbot had each invented such a thing he retired to his laboratory and in a few days confirmed that it was scientifically correct for them to have done so. Twenty years earlier he had produced the chemical he called sodium hyposulfite, now called sodium thiosulfate (except by photographers, who still call it "hypo") and noted that it dissolved the salts of silver—a fact that he later brought to Talbot's attention. He also explored the photosensitivity of many substances other than silver salts, including iron salts, which produced the beautiful cyanotype—the blueprint. Nevertheless, photography was not his idea; nor does it seem that there was any sacrifice or anguish involved on his part, or any elation at success, since it was for Herschel too easy a problem. It was not in fact *his* problem.

There were other inventors and possible inventors and would-be inventors whose names at least we know, and sometimes more. There was the Reverend Joseph Bancroft Reade of Buckinghamshire; and Antoine Hercules Florence, a Frenchman living in Brazil; and Hans Thøger Winther, a Norwegian lawyer, lithographer, and publisher; and even an Indiana schoolboy named Wattles; and others, each of whom could tell about this subject an interesting story, and perhaps a true one. And the experimenters whose names we do not know might make an even longer list, and they also may have undermined their health, squandered their fortunes, neglected their families, and compromised their ethical principles to bring into existence this interesting new tool, even though it now seems unlikely that anyone could have held it back.



William Henry Fox Talbot. *Leaf.* 1839

3. The Daguerreotype and the Calotype

A lovely story is told concerning Thomas Alva Edison's invention of the phonograph. After he had demonstrated to an audience of journalists that the machine really worked, one reporter asked Edison if he could conceive of any practical use for his exotic toy. Apparently Edison had not given much thought to that part of the problem, but after a pause he suggested that it might be good for Last Wills and Testaments.[1]

It is natural to assume—until one thinks about it—that the several men who independently invented photography thought that they were inventing something like a primitive version of what we now consider photography to be. But of course they did not know what we now consider photography to be.

The inventors of photography shared the belief or intuition that it should be possible to make pictures that were formed directly by the agency of the light's energy. They were remarkably vague about what functions such pictures might serve. Talbot called his invention a royal road to drawing, and said that he had begun his experiments as a result of his frustrating failure to produce satisfactory sketches with the aid of the camera lucida. But he said these things more than a decade after he had begun his research, in his book *The Pencil of Nature*, which was among other things an advertisement for his process. In his earlier papers prepared for reading to the Royal Society, Talbot's interest seems that of a disinterested scientist, concerned more with general principle than with application. Daguerre seems to have said almost nothing about the daguerreotype, except to describe how to make one, but he did think that because of the very long exposures that his chemistry required the process would never work for portraiture.[2] In fact portraiture turned out to be precisely what the daguerreotype was good for.

Photography was not invented to serve a clearly perceived need. If there had been such a perception the several varieties of early photography would have been capable of serving it; but the daguerreotype and the calotype, which may stand as the two limiting cases, were very different in their attributes and their potentials. In traditional terms, the daguerreotype was scarcely a picture at all, but a new kind of magic that preserved for



Albert Sands Southworth and Josiah Johnson Hawes. Portrait. c. 1850

its owner something that almost passed as a fragment of the real world. Daguerreotypes were sold not in frames but in small, closed cases, little reliquaries that, if opened in the right light and addressed from the right vantage point, revealed an image of exquisite subtlety and perfection. The fragile, evanescent character of their imagery was perfectly suited to their miniature status; they were not at their best with heroic, expansive subjects. A few virtuosic attempts at large wall pictures survive, such as William Shew's five-plate panorama of San Francisco harbor, but they remind us of dancing poodles and Lippenzahner horses, which do with remarkable skill unnatural things. Daguerreotypes of Niagara Falls or commercial establishments or works of architecture were occasionally made, and they are prized by collectors for their rarity. But their rarity is testimony to the function that the daguerreotype was understood to serve. Of every one hundred daguerreotypes made, ninety-nine were portraits.

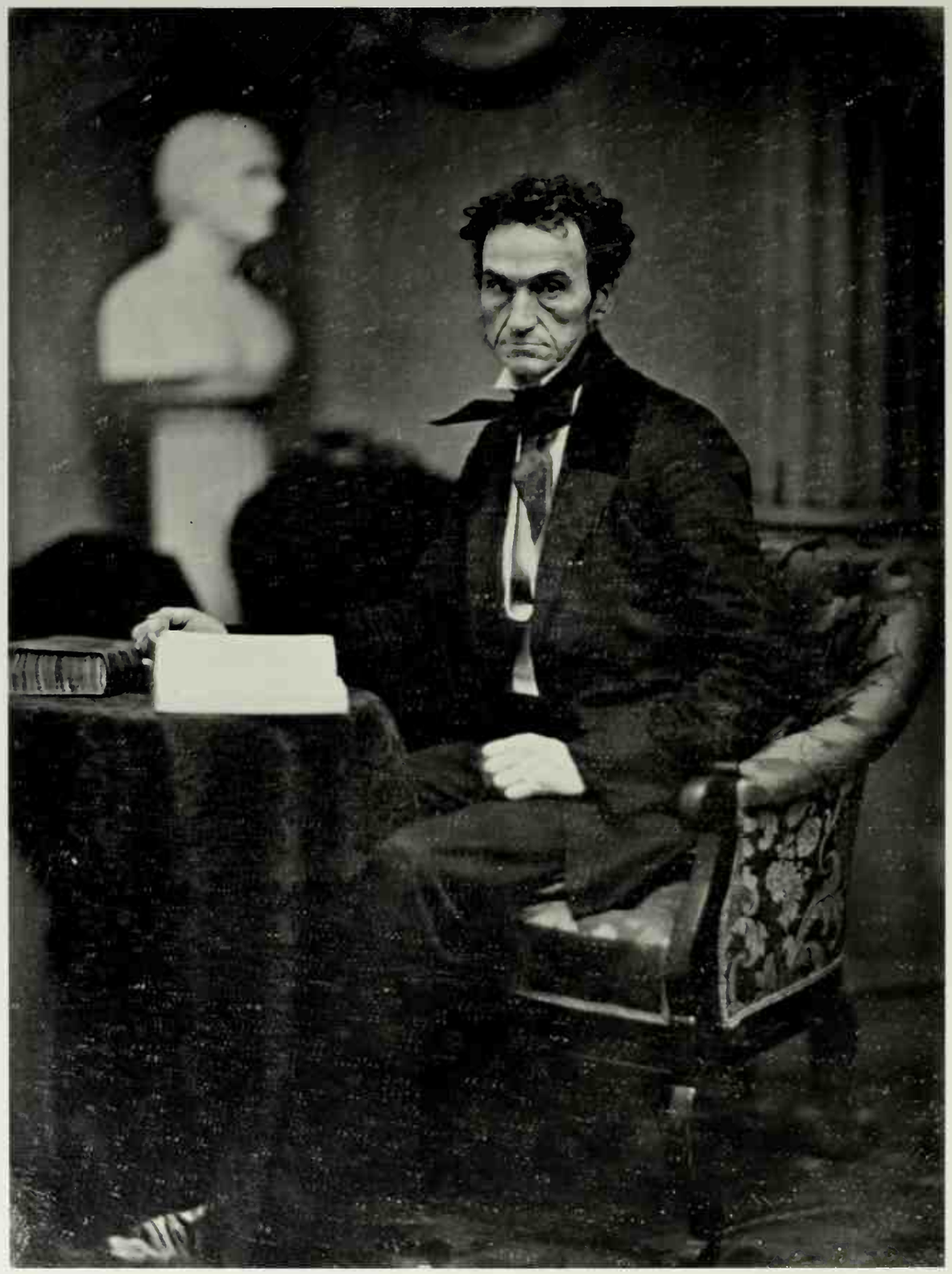
The daguerreotype was a unique object. It could be replicated only by using the camera to take a new picture of the old one, a process that was as laborious and costly the second time as the first, and that inevitably resulted in some loss of quality. Or one could use the daguerreotype as a model, and try to copy it by hand as an engraving or a lithograph. This generally produced pictures that neither the original author nor the translator could love, crammed with more niggling detail than the translator's medium could gracefully accommodate, and lacking the mirror-smooth continuity of description that was the crux of the daguerreotype's beauty.

Thus the daguerreotype was of very limited utility for subjects of broad public moment. It found its special function in making pictures for the smallest and most private of audiences—the families of uncelebrated men and women. Daguerreotypists made portraits of millions of people who were unknown beyond their own village, people whose forebears had never before been portrayed as individuals but only as supernumeraries: representative types from which one could create an army or a mob or a wedding party. It is poetically just that the daguerreotype belongs to the century that saw in Western countries a radical expansion of suffrage. After Daguerre the yeoman, and then the peasant and the proletarian, would also have visible ancestors and family histories.



Photographer unknown. Portrait. c. 1850

Talbot's invention—the calotype—was a profoundly different matter. The thing that Talbot produced in his camera was a negative—that is, it reversed the brightness of the original scene, and made deepest black that part of the subject that reflected the most light. As we have seen, both Niépce and Bayard had tried to solve this problem by discovering a chemistry that would enable the light to bleach a dark ground rather than darken a light one. Bayard succeeded in doing this, and thus invented a one-step method of producing positive photographs on paper.[3] The



Albert Sands Southworth and Josiah Johnson Hawes. *Rufus Choate.* c. 1851

inventor and painter Samuel F. B. Morse also claimed to have achieved, during his days at Yale University, some results by exposing in a camera obscura paper that had been dipped in silver nitrate, but when he found that the values were reversed he assumed that his idea was impracticable, and gave up.[4]

Talbot's solution to the problem assigned to the (negative) picture made in the camera the function of a matrix from which one could make any number of positive prints.

On the face of it a one-step system, like Daguerre's, would seem preferable to a two-step system, and there is no evidence to suggest that Talbot would have devised the negative-positive system if a one-step system had suggested itself first. The principle of (more or less) endless reproducibility later came to be thought of as central to the very meaning of photography, but it was not a central issue to the generation that invented photography. It was their grander and less utilitarian goal to capture a field of energy on a screen.

Nevertheless, once Talbot had demonstrated his simple, brilliant idea, it was obvious to anyone that one negative could yield an infinite number of prints—or at least more than the world would conceivably want. The idea of publishing photographs, in books or as loose prints, followed soon behind.

Several problems delayed the success of this prospect. The most important of these was perhaps the fact that it was Daguerre's version of photography that dazzled the people—not only the uninitiated, but the savants also. Herschel could not restrain his enthusiasm for the French process when writing to his friend Talbot on the daguerreotypes that he had seen in Paris. He had been swept off his feet by the unprecedented novelty of aesthetic effect obtained in the little silvered plates, and called them miraculous. "Certainly they surpass anything I could have conceived as within the bounds of reasonable expectation."[5] Six weeks later, having perhaps guessed that such rhapsodic praise of Daguerre's invention was not precisely what his friend Talbot had wished to hear, he wrote again, and said that there was also an important place for Talbot's system, since it allowed for multiple prints. But even in this second, placatory letter he did not call the Talbotype miraculous.

In the autumn of 1840, a little more than a year after François Arago had announced the daguerreotype to the world, Hippolyte Bayard wrote his now famous semi-comic complaint—accompanied by a self-portrait of himself as a suicide by drowning—pointing out that he too, like Daguerre and Niépce, was a French inventor of photography, but that while Daguerre and the heirs of Niépce had been handsomely rewarded and praised by the State, he did not even get answers to his letters to the



Photographer unknown. Daguerreotype camera. 1866–67

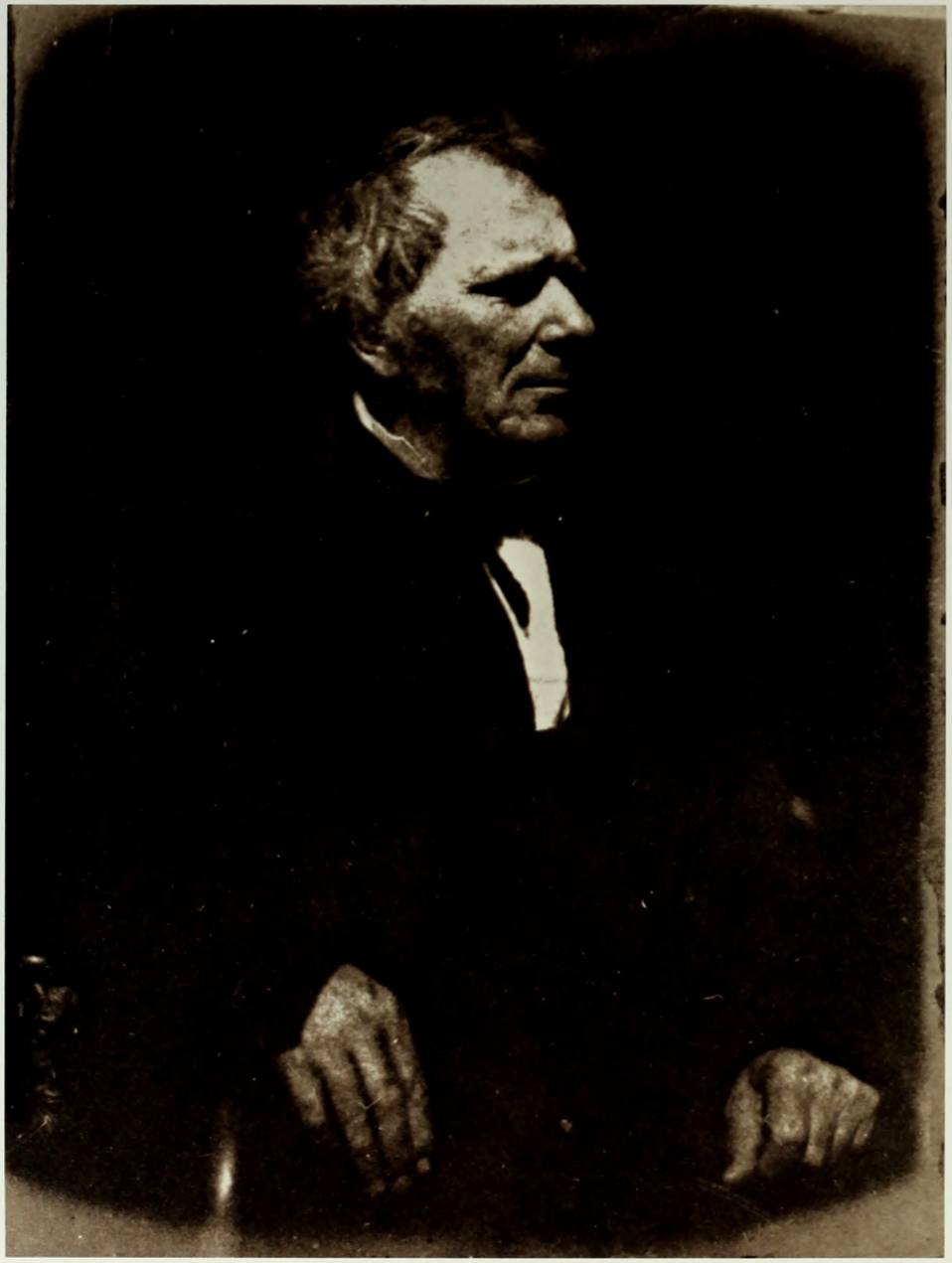
authorities. In defense of the authorities, it should be pointed out that Bayard's process, although elegant, combined the shortcomings of both Daguerre's and of Talbot's. Like the former it made unique examples; like the latter it produced pictures that resembled, in their general character, things that might have been made by lithography or mezzotint. The second of these flaws was surely the more crucial. Daguerre's process made pictures that were wholly unfamiliar, and that seemed like a reflection of the world itself, seen in a monochrome reducing glass. Bayard (and Talbot) had made art by a new method, but Daguerre had made magic, which naturally and properly won the audience.

Other political and economic issues also worked against the paper process. When the French government bought Daguerre's invention it gave it, according to Arago in his address to the Chamber of Deputies, freely to the whole world. In the event, the whole world was not intended to include (less than a quarter century after Wellington and Waterloo) the English. Daguerre's agent had applied for a patent covering England and Wales a month before Arago had spoken. Talbot was presumably already feeling slightly put-upon because of the tepid reception of his own invention. Perhaps partly out of pique and partly out of hope for profit, Talbot, as has been noted, retaliated by patenting his own new calotype process. This proved to be an unfortunate decision, as it seems primarily to have discouraged the development of his invention in his own country. It is alleged that in 1842 Talbot asked £20 sterling—then a very substantial sum—for a license for amateur use, which prohibited even giving away prints without Talbot's permission.[6] In the same year Talbot contracted with Antoine Claudet, the first successful daguerreotypist in London, to offer calotype portraits also; Talbot was to be paid 25 percent of the receipts, and if this payment fell short of £400 sterling a year, Talbot would be free to grant other licenses.[7] It was a splendid contract on paper, but Claudet's customers wanted daguerreotypes. By 1846 Talbot had reduced his licensing fee to one guinea—a pound and a shilling[8]—but the response remained laggard. The next year Talbot opened his own portrait studio, operated by his assistant Nicolaas Henneman, who was at liberty due to the commercial failure of the photographic printing factory that Talbot had established at Reading. The studio also failed.

Talbot's system enjoyed its first great success—in artistic if not in economic terms—in Scotland, where the process had not been patented. There the painter David Octavius Hill and the chemist Robert Adamson collaborated to produce what is perhaps the most remarkable body of work done in photography's first decade. Hill and Adamson did cityscapes and genre scenes and architectural studies, but are justly best known for their portraits of Scottish clerics and intellectuals and artists.[9] As a painter Hill



David Octavius Hill and Robert Adamson. *East Gable of the Cathedral and St. Rule's Tower, St. Andrews, Scotland.* c. 1844



David Octavius Hill and Robert Adamson. *William Gillespie*. c. 1844

knew that visual clarity was not dependent on a wealth of detail; on the contrary, it was the function of broad and equable massing, enlivened by the piquant accent. Thus he understood that the calotype's shortcoming could be made a virtue. He explained that the "unequal texture throughout of the paper is the main cause of the Calotype failing in details, before the process of Daguerreotypy—and this is the very life of it. They look like the imperfect work of a man—and not the much diminished perfect work of God."[10] Whether the Hill and Adamson portraits would be less effective if sharp, and possessed of a full scale of gray tones, is a moot question; the pictures they did make—simply constructed of a few broad patches of tone, gracefully posed, boldly lighted—are grand.

The Crystal Palace Exhibition of 1851 changed the perception of photography in England, for it included 700 photographs from six nations, and made it clear that the Americans made daguerreotypes of extraordinary quality, and the French, calotypes of such distinction that even Hill and Adamson received only an honorable mention. Until this point Talbot had defended his patent rights with considerable energy, though to little profit, but after the Crystal Palace his fellow-amateurs—all gentlemen, and for the most part friends—grew increasingly restive under the restrictions that Talbot's patents seemed to impose. In 1852 Lord Rosse and Sir Charles Eastlake, presidents of the Royal Society and the Royal Academy, wrote a joint letter to Talbot, obviously though not explicitly on behalf of those colleagues who felt that Talbot was playing dog-in-the-manger with the new art. Their letter was cordial in tone, but the importance of their roles left little doubt that their suggestion should receive Talbot's most careful consideration. They did not doubt "that some judicious alteration" in the exercise of Talbot's patent rights would "give great satisfaction, and be the means of rapidly improving this beautiful art."[11] They also alluded to the specter of possible French preeminence in the field, a condition that a patriotic Englishman could hardly view with equanimity. Talbot relented, to the extent of renouncing his rights over work done by amateurs.



Henri-Victor Regnault. Woods at Sèvres or Meudon. c. 1851

The new freedom to practice photography without a license produced a brilliant if brief flowering of calotypy in England. Those few who had been serious devotees of the art under the earlier restrictive conditions were now free to publish the results of their experiments, exchange prints, organize exhibitions, and recruit new proselytes without fear of legal action. The Photographic Society of London (much later the Royal Photographic Society of Great Britain) was formed in January of 1853. Talbot was offered the office of president, probably in the belief that he would have the delicacy to refuse the honor, which he did. Sir Eastlake was made president, and the office of honorary secretary went to a young solicitor named

Roger Fenton, then thirty-four, whom Talbot had only recently heard of.[12] The Photographic Society was in large measure the successor to the casually organized Calotype Society, which had been founded six years earlier with a membership of ten or twelve, none of whom would have identified himself as a photographer. Nor is it likely that one would have identified himself as a geologist, or a psychologist, or an art historian, or a civil engineer, but individual members practiced these several arts. In a society dedicated to the principle of amateurism an educated person was expected to do many things well, for the advancement of art and science, and for the love of it. The new, more formal Photographic Society was first proposed by the newcomer Fenton, whose first pictures seem to have been made after the Crystal Palace Exhibition. It is not clear precisely what functions Fenton expected the new society to serve that could not have been served by the clubby old Calotype Society, but it is possible that he felt this exclusive group was too single-mindedly devoted to the goal of disinterested amateurism. For his own part, Fenton proved sympathetic to the idea of making a profit from his photographs. His proposal made it clear that the new group was not for gentlemen only, specifying rather that, "while men of eminence, from their fortune, social position, or scientific reputation, will be welcomed, no photographer of respectability in his particular sphere of life will be rejected."[13]

The days of the paper negative were numbered, but while they lasted the technique was a perfect one for the coterie of cultivated amateurs—literary men, scientists, antiquarians, and artists—who devoted themselves to it. For the interests and ambitions of such men, photography on paper was a process of infinite charm. Unlike the daguerreotype, which—like the modern Polaroid photograph—presented its maker in one step with a finished and essentially unalterable product, the calotype process was highly plastic. After the negative was made the value, contrast, and color of the prints could be controlled over a wide range; the use of masks, or dyes painted on the negative allowed the photographer to change the relative values of the parts of his picture. These controls affected the meaning as well as the aspect of the picture, and gave the photographer the delicious pleasure of reforming the world, of bending it toward that higher standard of simplicity and order that identifies the artistic enterprise.

The calotype was also greatly superior to the daguerreotype in the degree of spontaneity, and the freedom of movement, it allowed the photographer. The daguerreotypist was tied to his vaporizing cabinet and his chemicals, but the calotypist could prepare in advance a few sheets of sensitized paper against the unanticipated opportunity. "Suppose," wrote Talbot to a friend, "that in travelling, you arrive at some ruins unexpectedly. You stop, make your exposure, and in ten minutes are again on your way."[14]



John B. Greene. Ancient ruin, North Africa. 1855–56



William Newton. *Birnham Beeches.* 1855

The development of the negative could be deferred until evening. Such flexibility meant that the calotypist was available to subject matter that was ephemeral and unpredictable, such as the passing effect of light and shade on a forest path, or the still life created by the chance arrangement of tools by a garden wall.

It is also true that the calotype was a print on paper, with qualities of line and tonality that could be compared to those of etchings and mezzotints and lithographs, and this was comforting in a time when familiar, dependable things were being replaced each day with those that were perhaps better but strange, and difficult to love. James Watt's steam engine, and the scores of machines that it had spawned, had radically revised the landscape, and relationships among the people who lived in it. The new cities, with their featureless brick plains and their anonymous poor were perhaps the most frightening aspect of the new world. In 1840 Emerson wrote to Carlyle: "I always seem to suffer some loss of faith on entering cities. They are great conspiracies; the parties . . . have taken mutual oaths of silence not to betray each other's secret and each to keep the other's madness in countenance."[15] The Romantic movement was in part a flight from the city, into a countryside that still bore the marks of what seemed a more noble and a more humane past.



William Henry Fox Talbot. *Garden Scene at Lacock Abbey, May 2, 1840*

Grace Seiberling has pointed out that the English amateurs of the 1850s chose not to photograph new buildings or railways, but would travel far to make pictures of an old waterwheel or an ancient, dying tree.[16] Roger Fenton, comparing English work to that of the French, said that the English excelled at subjects such as "the peaceful village; the unassuming church, among its tombstones and trees; the gnarled oak, standing alone in the forest."[17]

This hunger for vestigial signs of a simpler time was not restricted to aging squires on their ancestral seats. In 1858 James Mudd described the quality of his pleasure: "landscape photography! . . . What delightful hours we passed in wandering through the quiet ruins of some venerable abbey, impressing, with wondrous truth, upon the delicate tablets we carried, the marvelous beauty of Gothic window, of broken column, and ivy wreathed arch."[18] Yet Mudd is remembered today chiefly for his professional work, most especially for his cool, anatomically precise pictures of great railroad locomotives, made in Dickensian Manchester.

"Suppose," Talbot had said, "that in travelling, you arrive at some ruins unexpectedly." Of all the surprises that might persuade one to postpone one's journey, a ruin was the delight that came most naturally to Talbot's mind. In this taste he was altogether representative of the educated classes of his time and place. Ruins were revered both for their meaning and their aspect: both as documents to be read for what they told of the medieval or



Thomas Sutton. *Ruined Tower, Isle of Jersey.* 1854 or earlier

ancient past, and as embodiments of the picturesque, a word that resists precise definition, but that expressed a taste for the used above the new, the irregular over the geometric, the rough rather than the smooth. The ruin was a central icon to the Romantic imagination, and if, by 1850, the idea had been well worked over by painting and poetry, photography brought to it a new specificity and conviction. And the calotype, which itself tended toward the rough and irregular, and did not look too insistently new, was an excellent tool for the issue at hand.

Talbot's process provided the foundation on which photography until now has been built; Daguerre's was ephemeral, and in half a generation—by the late 1850s—it was obsolescent. Nevertheless, during photography's first decade surprisingly little was done with Talbot's idea. There was the work of Talbot himself, and a little by a few of his friends and by Bayard in France, and in the years between 1843 and 1847 that of Hill and Adamson in Edinburgh; beyond that the achievements of the calotype in the 1840s are remarkably scant. Several explanations have been proposed to account for this. It is said that Talbot's patents were an inhibition to experiment and development, but the patents were not strenuously enforced outside of England. The impermanence of many early photographs on paper is cited as a reason for the lack of broad enthusiasm for it, and it is true that Talbot's own promotional efforts, most notably his serial publication *The Pencil of Nature,* were plagued by fading, but the prints of Hill and Adamson, made in the same years, have lasted well. André Jammes and Eugenia Janis have suggested that the authority of the French government had identified photography with the daguerreotype[19] and that attention to the paper processes—and therefore to the potentially embarrassing claims of Bayard—was discouraged. But even if the French government had the power to keep the calotype a secret in France, it hardly seems credible that it could have discouraged its use elsewhere.

Perhaps the best explanation for the relatively limited activity in calotype photography during the 1840s is the simple fact that most of the world agreed with Herschel: if the two systems were to be judged as miracles, the daguerreotype was more impressive than the calotype, even if its potentials were severely limited. Under the circumstances the development of Talbot's system fell to little groups of artists, who were less interested in miracles than in the tradition of picture-making.

Talbot had announced his invention before he would have wished, to protect what he believed were his rights of priority. He therefore showed it to the world when it was still in a primitive and experimental stage. But by the end of 1840 his own experiments had produced the new calotype method, the foundation on which future improvements would be based. In



William Pumphrey. *Norman Porch of St. Margaret's Church, Walmgate, York.* 1852 or 1853



William Collie. *Dr. Wolfe.* 1852

Talbot's earliest negatives, the silver salts were reduced to metallic silver solely by the action of light, but this process was extremely slow. In 1840 he discovered that long before the exposure to light created a visible change, submicroscopic particles of the salts were affected; if the paper was then placed in an appropriate chemical bath, the affected particles acted as a catalyst on silver ions in the chemical solution, causing their reduction to metallic silver.[20] The process might be thought of as roughly analogous to the relationship between the record player's needle, which produces an almost inaudible sound, and the system's amplifier, which produces from this tiny signal a current strong enough to vibrate the cones of the speakers.

Since Talbot had greatly improved the sensitivity of his negatives by the developing process, it seems surprising that he did not extend the same principle to the manufacture of prints, but he did not. It is true that he was able, even with the slow printing-out system, to produce many more prints than the market wanted.

Helmut and Alison Gernsheim estimated that in the mid-forties there were only about a dozen users of calotype photography,[21] and even if that guess is low, it is surely true that the world had not beaten a path to Talbot's door. In an effort to promote his invention Talbot produced three publications illustrated with his pictures: *The Pencil of Nature,* issued in six fascicles containing a total of twenty-four prints, appeared over a two-year period beginning in 1844; *Sun Pictures in Scotland* in 1845, and contained twenty-three pictures of landscape and architecture associated with the work of Sir Walter Scott; in 1848, as his last major publishing effort, Talbot (or Talbot's several assistants) produced 1,675 calotypes[22] as illustrations for Sir William Stirling's *Annals of the Artists of Spain.* In addition, in 1846, Talbot's establishment produced 7,000 prints from several negatives for inclusion in the June issue of the periodical *The Art Union.* The magazine's editor stated that the effort had occupied Talbot's assistants for "many months," and even allowing for normal editorial hyperbole, 7,000 prints, which in bad light might each take an hour or more to print, was a serious undertaking. Counting only the three books and the *Art Union* project, it might be guessed that Talbot's establishment produced between 1844 and 1848 something like 20,000 prints.[23] This seems impressive on the face of it, but if one calculates this production on the basis of a six-man staff (of the nine bodies visible in a 1845 calotype of Talbot's printing house at Reading at least six seem to be workers) working a six-day week and a three-hundred-day year for four years, the total comes to 7,200 man days, or less than three and a half prints per man per day.

The editor of *The Athenaeum,* tired of waiting for the next tardy fascicle of *The Pencil of Nature,* finally decided that "the labor consequent on the production of photographs is too great to render them generally useful for



Alfred Capel-Cure. Bat and insects. 1850s



James Mudd. *Clouds.* 1850s[?]



Benjamin Brecknell Turner. *Windmill at Kempsey.* 1852–54

the purposes of illustration."[24] To make matters worse, many or most of Talbot's prints faded more rapidly than the eyesight of their buyers. Thomas Malone, one of Talbot's assistants, wrote to his employer in 1849 of being "constantly and unpleasantly cross-examined on the subject [of fading]. The *Art Union* copies containing the sun pictures seem to have done harm. The artists who have them are interested in giving every publicity to their growing faintness." Shortly afterward Talbot, understandably discouraged, turned his attention to the production of photographs in ink. The next logical step in chemical photography would thus be left to a Frenchman named Louis Désiré Blanquart-Evrard.

Talbot's problems notwithstanding, negative-positive photography had been by the latter 1840s greatly improved in terms of clarity, permanence, speed of production, and sensitivity to light.[25] It had largely escaped its laboratory phase, and had become a practical picture-making system that could be taken into the world. The next decade saw an extraordinary efflorescence of photography, and seems now to represent the first of the medium's periodic moments of surprising, broad-based achievement.

Much of the most impressive work of the 1850s was done in France; during that decade a dozen French photographers made pictures with the paper-negative process that remain admirable and instructive. The French calotypists were more likely than their English counterparts to have been trained in the traditional arts;[26] it is worth noting, although difficult to explain, that four of the best photographers of the decade—the Frenchmen Gustave Le Gray, Charles Nègre, and Henri Le Secq, and the Englishman Roger Fenton—had all been students of the painter Paul Delaroche. The eleventh edition of the *Encyclopaedia Britannica* (1910) devotes a third again as much space to Delaroche as to Delacroix, but in the years since his star had dimmed. His ivory-smooth, meticulously detailed surfaces would seem an unlikely source of inspiration for the calotypists, with their love of broad, impressionistic effects. But if one puts to one side the issue of style, the example of ambition remains, and as a teacher Delaroche could surely not be faulted for a deficiency of ambition. When the daguerreotype was announced to the world, Delaroche was at work on a painting, thirty yards in length, that summarized the history of art since the Greeks. It seems likely that novitiates who placed their training in his hands left his atelier with a cultivated appreciation of grand ideas.

The calotype seems to have served a somewhat different function in France than it did in England, and the difference may correspond to two separate views of history that characterized the two countries. (America called itself the New World, and in the 1850s did not yet believe in history;



Charles Nègre. *The Angel of the Resurrection on the Roof of Notre Dame, Paris.* 1853



Jean-Louis Henri Le Secq. *The Violin Player, Maison des Musiciens, Rheims.* c. 1851

the calotype was not significantly exploited there.) England had not recently had a revolution of consequence, and the national identity was comfortably taken for granted; those with the leisure and inclination to think about history tended to think not about the bloody days of Cromwell two centuries past, but of the staunch and secure family seats built by their great-grandfathers, or of those remoter ancestors who had in fact or legend presided over the building of the local Gothic abbey, now in picturesque and touching dishabille. An aging Frenchman, in contrast, remembered not only the semi-failed revolutions of 1830 and 1848 but also the *Terror*, when heads fell like leaves in autumn. Those who were not eager for a return to that fratricidal violence tended to favor projects that promised to celebrate national rather than parochial achievement, in the hope that these would nourish a sense of shared identity. Exemplary of the the fruits of such hopes was Baron Taylor's *Voyages pittoresques* (1820–78), a compilation of some 3,000 lithographs devoted largely to France's Romanesque and Gothic patrimony.

In 1848, as photography on paper was about to begin its public work, France chose Louis Napoleon Bonaparte, nephew of Napoleon I, as the first president of its new Second Republic. Within four years he was Emperor Napoleon III, and as such suspended most of the remaining rights that were to have been assured in perpetuity by the Revolution. It was his plan to unite his country by means of railroads, industrialization, and grand artistic projects. The plan worked reasonably well for almost twenty years, until wrecked by Bismarck and the Franco-Prussian War, and then fratricide again.

While it lasted, the Second Empire provided excellent opportunities for artists whose tastes and talents fitted them to do work that seemed to advance the cause of national unity. Among the projects that appeared to serve this end was the Missions Héliographiques, a photographic project that was an adjunct of the larger and older Commission des Monuments Historiques. Under its auspices five photographers were commissioned in 1851 to photograph historic works of architecture—most of them in grave need of fundamental repair—in five areas of northern France. The first photographer chosen was Bayard, one of the medium's inventors; the others were Le Secq, Le Gray, Edouard-Denis Baldus, and O. Mestral. It is not known how the choice was made, but it is an extremely impressive one; all with the exception of Mestral would be ranked among the masters of early photography without reference to the work that they did for the Missions Héliographiques. The program was great good news to French photographers, who took it to mean official recognition of the importance of their art.

The calotype in England focused on parochial concerns, defined by



Henri-Victor Regnault. *The Ladder, Sèvres Porcelain Manufactory.* c. 1852



Gustave Le Gray. *Forest of Fontainebleau.* 1849 or 1852

personal intuitions. In France photography was in significant measure supported by the State, which directed the medium's attention to matters of importance to the national polity. In this latter case committees of oversight would expect tangible results on schedule. These less casual, more official circumstances may have encouraged Blanquart-Evrard to found the first commercial photofinishing plant, the Imprimerie Photographique Blanquart-Evrard à Lille.

Blanquart-Evrard had found a way to make large numbers of photographic prints quickly and cheaply, and therefore, he thought, a way to bring photography into the world of common publishing. His project was based on a new method of print production, by which he claimed that he could make two or three hundred prints per day from a single negative.[27] His new method, in concept, extended to the making of prints the improved method that Talbot had earlier discovered for the making of his negatives. Blanquart-Evrard was a successful merchant of broad intellectual and artistic concerns, including a passionate and lifelong interest in photography that dated from the announcement of Daguerre's process. In 1844 he learned the calotype process from one Tanner, a chemist in his hometown of Lille who had studied and worked with Talbot.[28] By 1846 Blanquart-Evrard was reporting his modifications of the process to the Académie des Sciences and by 1851 he sent to the Crystal Palace Exhibition prints made by his new developing-out process.[29] In the same year he opened his Imprimerie, which was not only a photofinishing lab but a publishing house. Unlike Talbot, whose publications seem intended primarily as a demonstration of the potentials of his invention, Blanquart-Evrard took photography as a given, and proceeded to use it as an educational tool. His goals for the Imprimerie were not narrowly photographic but broadly cultural. The books and portfolios the company published (or co-published) during its four-year life included many works that might be regarded as examples of the new art of photography, but the main thrust of their content emphasized the importance of the things described: ancient and modern architecture, and works of traditional art; even the landscapes typically showed places of historical or cultural resonance.

The work of the Imprimerie was in part an expression of the period's broadly held intuition—and wish—that one might see in the arts, and especially in the mother-art of architecture, the imprint of a people's fundamental character and moral aspiration. In the same year that Blanquart-Evrard opened his printing plant, Ruskin published the first volume of *The Stones of Venice,* which seemed to Carlyle to be not merely an art-historical treatise, but "a sermon in stones."

Blanquart-Evrard's new printing system was, for the mass production of photographs, a very great improvement on that of Talbot, and until 1855



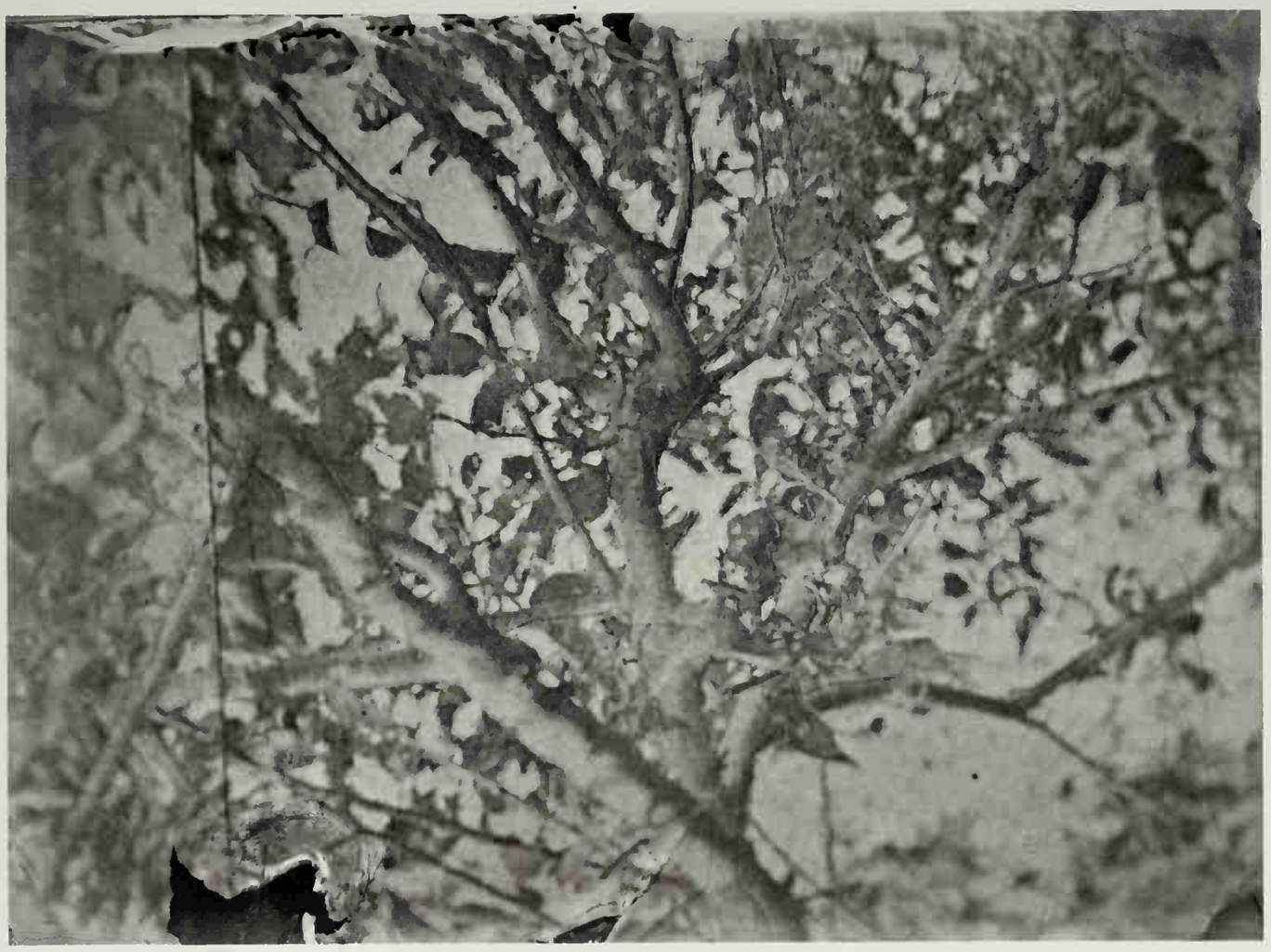
Charles Marville. *Landscape: Trees along a Highway, Coblentz.* 1853–54 or earlier



Louis-Rémy Robert. *The Park at Saint-Cloud.* c. 1853



Photographer unknown. Cow. 1853



Pierre-Charles Simart [?]. Untitled. c. 1856

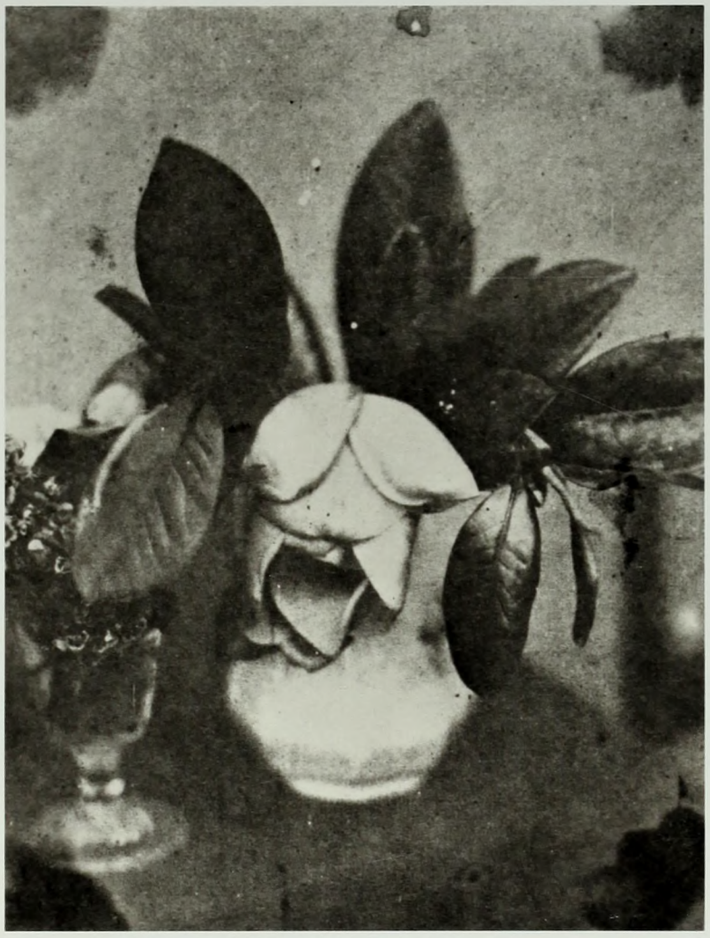


Félix Teynard. *General View of the Pylon, Temple of Sebou'ah, Nubia.* 1851–52

he produced many thousands of prints by many of the best French photographers of the day, and some of the British. His establishment hired as many as forty workers, among whom the various aspects of the work were divided according to assembly-line principles. The many prints that have survived are of almost uniformly high quality, and have proved remarkably resistant to fading and discoloration. It proved impossible, however, to achieve the low prices that Blanquart-Evrard had envisioned. Le Gray had said that a print should cost one or two francs,[30] but he was perhaps speaking of out-of-pocket production cost; in 1856 a London photographic supply shop advertised for sale Le Gray's *Sea and Clouds*—"admitted to be the finest Photograph yet produced"[31]—at sixteen shillings, perhaps about twenty francs. Before he opened his factory Blanquart-Evrard said that he expected to be able to produce prints for from five to fifteen centimes,[32] but clearly he had miscalculated. His prints ended up retailing for an average of almost five francs,[33] much more than a popular lithograph, and the business foundered.

Like Blanquart-Evrard's Imprimerie, the Missions Héliographiques had encouraged French photographers to think that their art might have public work to do, but after 1851 no further assignments were given, and the work already done disappeared into the archives of the Commission, without exhibition, publication, or official comment. Gradually the calotypists turned their attention to pure art, that is to say, to matters of private issue. Some soon turned to the new professional method of making negatives on glass, and many abandoned photography and returned to earlier interests.

The great moment of photography on paper had lasted a little more than a decade, beginning with the work of Hill and Adamson in the mid-forties. *The Art of the French Calotype,* by Jammes and Janis, reproduces 186 photographs made with the paper process; only 11 of these are thought to have been made after 1856. By the mid-fifties the amateurs were in retreat; next it would be the professionals' turn.



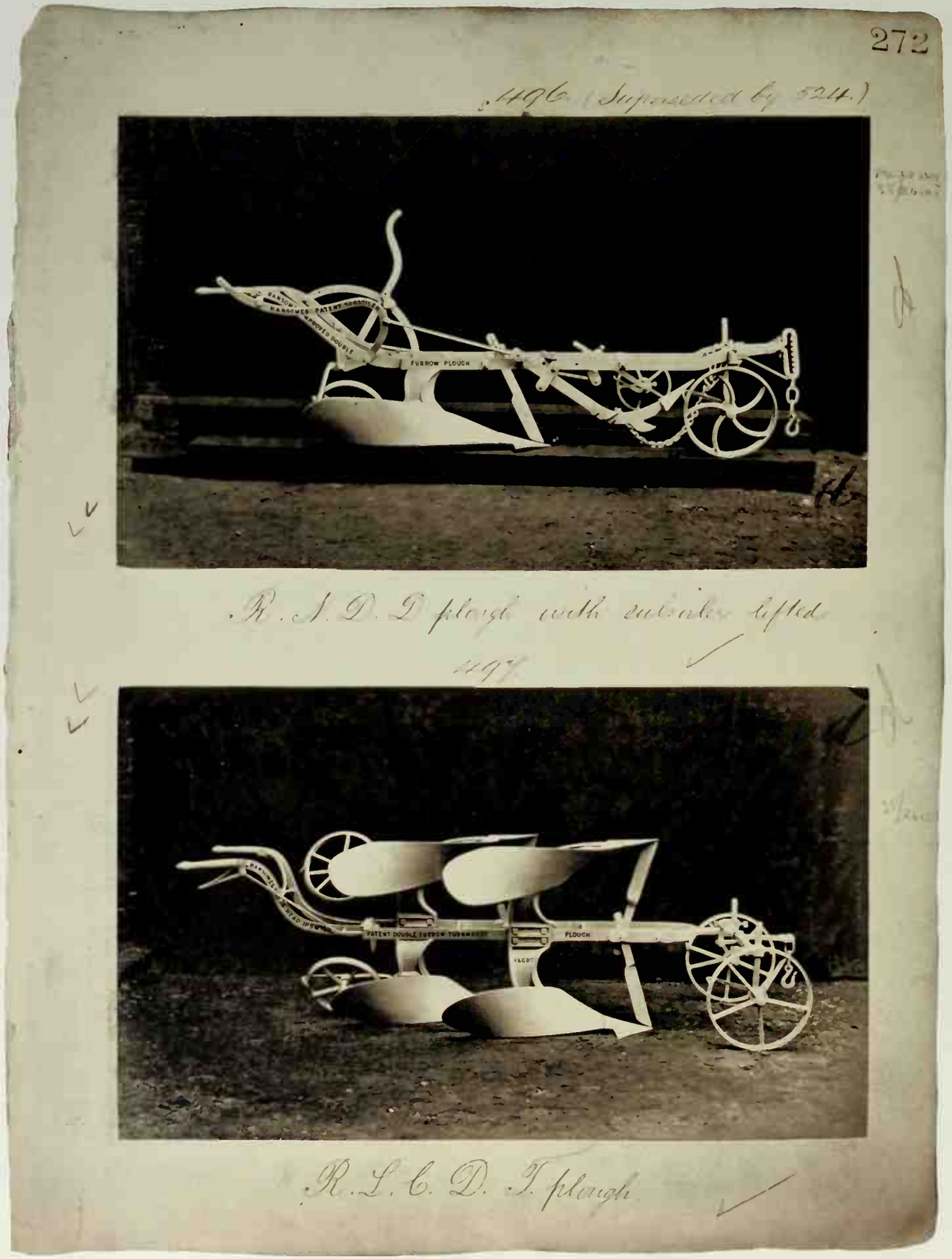
William Collie. Still life. c. 1850



Linneaus Tripe. *Aisle on the Southside of the Puthu Mundapum, from the Western Portico, Madura, India.* 1856–58



Auguste Salzmann. *Jerusalem—Helmet Found in Jordan.* 1854



Photographer unknown. Two plows. c. 1870

4. Paper versus Glass

In 1851 Gustave Le Gray published his new method of making negatives on paper, in which he impregnated the paper with wax before sensitizing it. This so greatly increased the translucency of the paper that it was almost as clear as glass. In the same year the Englishman Frederick Scott Archer announced his new system for making negatives on glass.[1]

In Archer's new process the sensitive salts were suspended into a watery colloid comprised of guncotton (nitrocellulose) and alcohol. It was called the wet-plate system, since it required that the glass plate be coated, sensitized, exposed, and processed before the colloid had begun to dry. The method produced negatives that combined the hard-edged, eagle-eyed clarity of the beloved daguerreotype with the potential for multiple original prints, and by the standards of the day the plates were fast—perhaps five times as sensitive as Le Gray's waxed-paper negatives. The previous year Blanquart-Evrard had invented a photographic paper that was a perfect complement to the new plates. By first coating the paper with whipped egg whites he sealed its surface so that the silver salts were captured in the smooth surface emulsion, rather than soaking into the body of the paper, thus preserving maximum sharpness. Within a few years the wet plate and the albumen print had driven the daguerreotype and the calotype from the field, and for a generation this combination remained the virtually universal method by which photography was practiced.

To say that Le Gray's ill-fated waxed-paper method was almost (thus not quite) as good as Archer's wet-plate (or collodion) system is simply to report the judgment of history, but that judgment is not altogether easy to understand. Archer's system made sharper negatives with shorter exposures, but Le Gray's system made pictures as sharp as many modern photographs—which are generally enlargements from small negatives—and the greater sensitivity of the wet-plate system did not constitute such an advance that one could photograph running horses or bouncing balls.[2] The paper negative, on the other hand, possessed great advantages over the collodion negative, and it would seem that these were given up with scarcely a backward glance of regret, except on the part of a few mossy amateurs.



Charles Marville. *Street Lamp.* c. 1870

The preparation and development of the wet plate had to be performed quickly in relative darkness, which meant the photographer was obliged to carry his darkroom with him wherever he hoped to work. A Dr. John Nicol later recalled that his own outfit weighed 120 pounds, and that some others were heavier. "Of course, where the [dark] tents were set up, there or thereabout the whole work of the day had to be done."[3] In 1852 Thomas Sutton managed, with difficulty, to get permission to photograph the grand view from the top of the campanile tower in Florence, but was refused permission to take his dark tent with him. He concluded regretfully that he could not race up the 500-step tower, expose his plate, and get back to his tent on the street within the five minutes that he thought his plate would last.[4]

The wet-plate system was in other words a rigorously conceptual method. If the photographer wished to make a picture he had to manufacture his plate, expose it, and process it on the site. The system demanded methodical planning and discouraged spontaneity. Talbot's pleasure in the serendipitous discovery of an unexpected ruin was not available to the wet-plate photographer. Rather than the ten-minute delay that Talbot described—a refreshing break in the tedium of the journey—the wet-plate photographer would likely have been stopped for two hours, and therefore would not have stopped at all.

It is difficult to escape the conclusion that the triumph of the wet-plate system was won not on practical but on aesthetic grounds. There was, generally, no practical advantage in being able to count each mortar course in the brick wall of a distant building, but it was nevertheless a pleasure to look at a picture that allowed one to do this. It produced the satisfactory illusion that all was revealed, nothing withheld.

The introduction of the wet-plate system created a fundamental change in the practice of photography. Before Archer, professionals had produced daguerreotype portraits by the million; the rest of photography was left fundamentally in the hands of artists, scientists, and amateurs, in whose care it was pursued with the gentle reasonableness that characterized tennis before television. With the coming of the new system, paper prints rapidly replaced the daguerreotype in the portrait studios, and it thus became the standard professional method that apprentices learned. By the mid-fifties commercial photographers had begun to move into the field to photograph ancient monuments for libraries and scholars, or scenic views for tourists; soon they were regularly performing a new and quickly essential role by photographing products of industry and works of engineering.

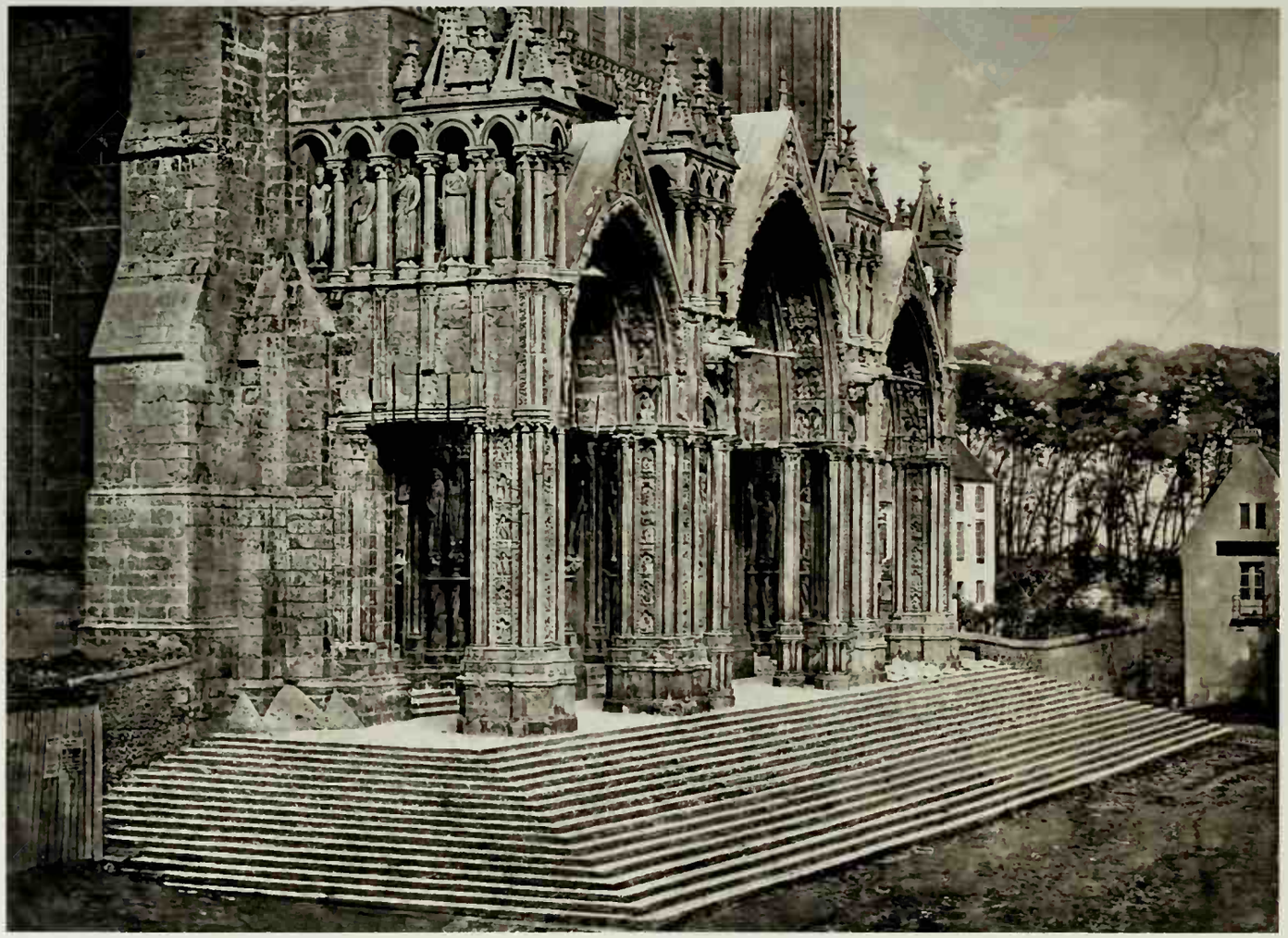
Francis Frith is an exemplary case. In 1856, the year after the failure of Blanquart-Evrard's effort to publish in quantity and at low prices the work



C. Daplantes. A traveling photographer with a portable wet-collodion photographic apparatus. 1859. Woodcut



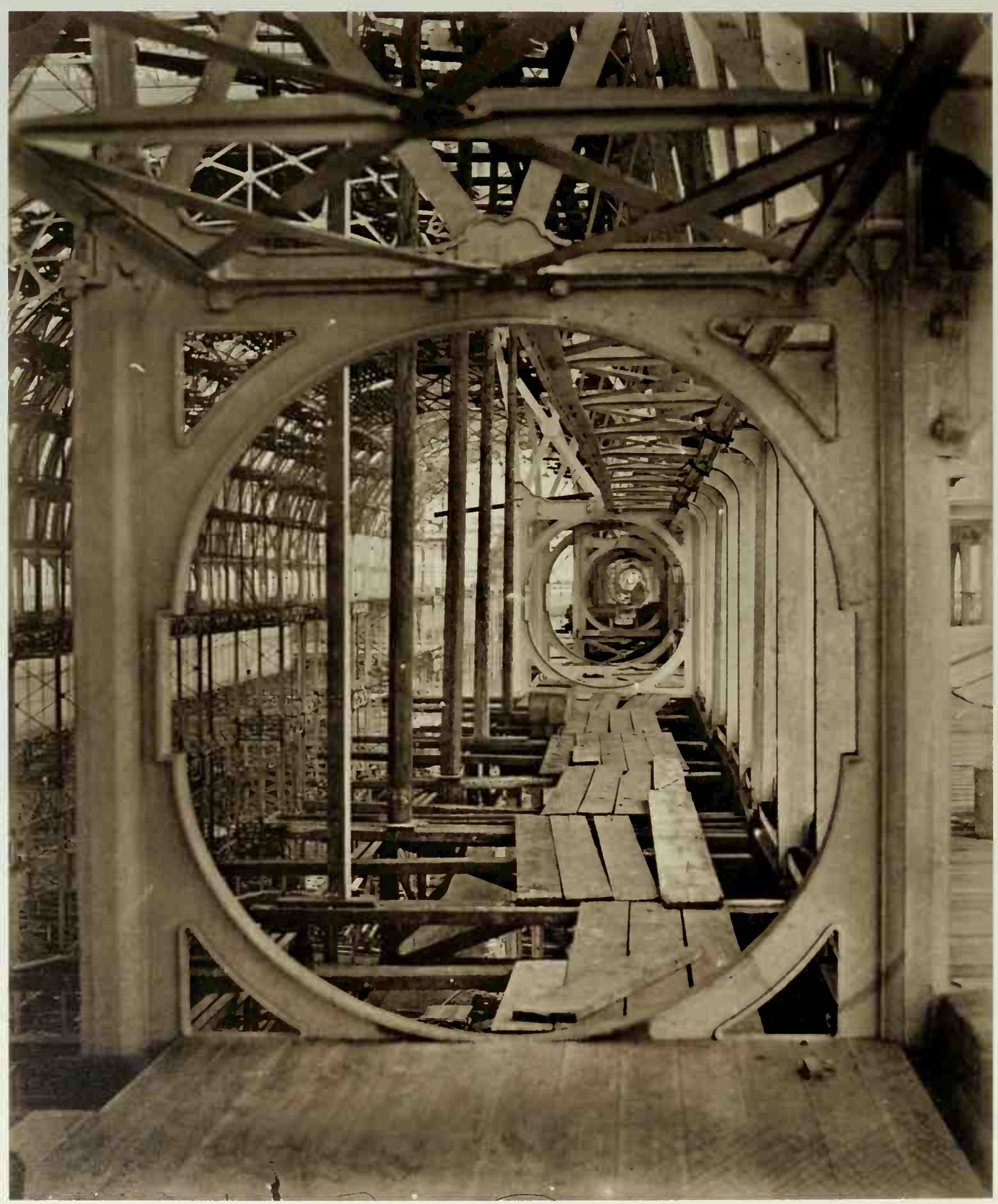
Robert Howlett. *Stern of the "Great Eastern."* 1857



Charles Nègre. *South Porch, Chartres Cathedral.* c. 1856



Charles Nègre. *Fame Riding Pegasus, Sculpture by Coysevox, Tuileries Gardens, Paris.* 1859



Philip Henry Delamotte. *View through Circular Truss, Crystal Palace.* 1853–54



Edouard-Denis Baldus. *Pont du Gard.* c. 1855



Charles Clifford. *Martorell, Spain: Devil's Bridge.* 1850s [?]



Robert Macpherson. *Palazzo dei Consoli, Gubbio.* c. 1864



Robert Macpherson. *Temple of Vesta and Fountain, Rome.* c. 1857

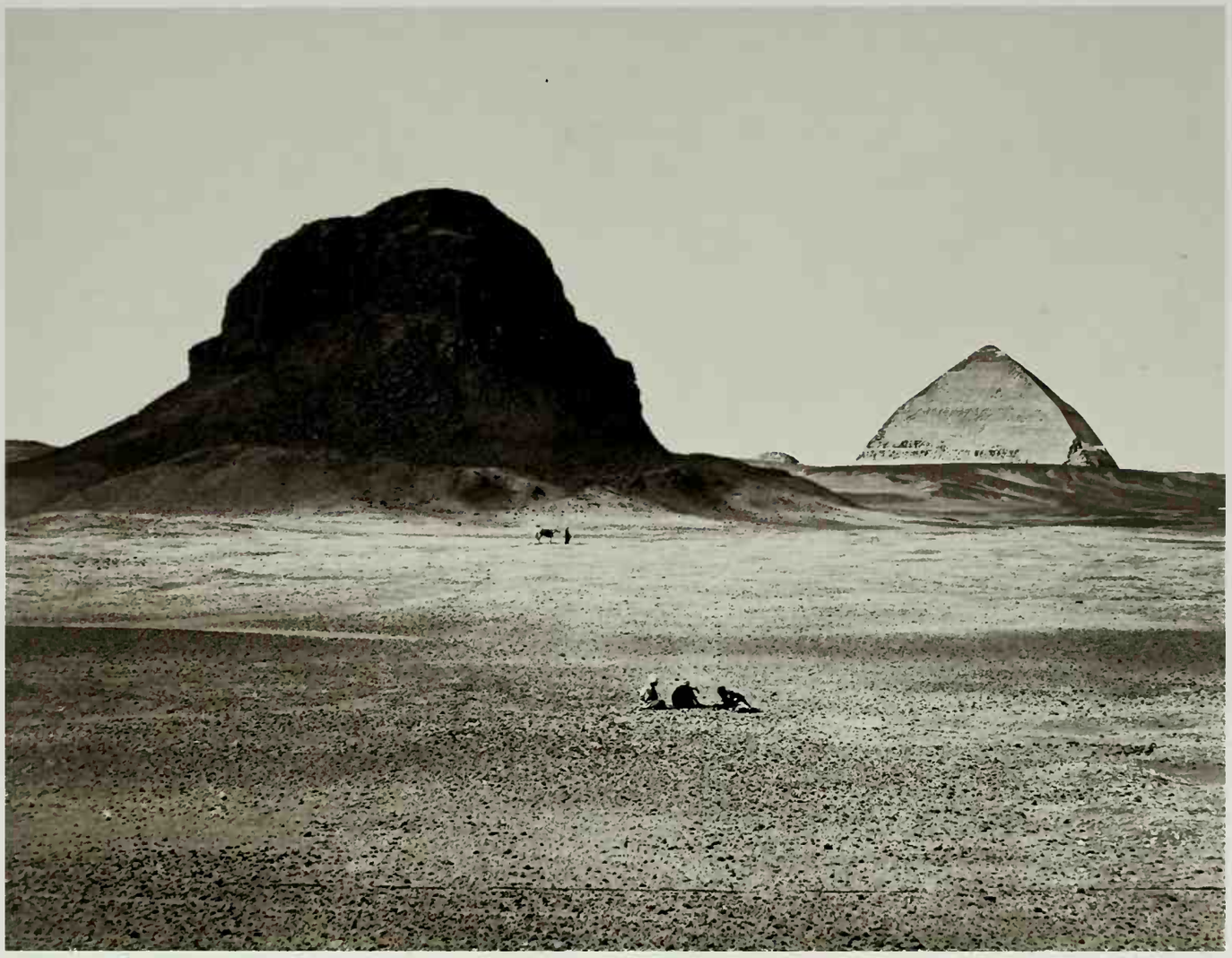
of the best calotypists, Frith went to Egypt with glass, and made photographs of the ancient monuments and holy sites that were bigger, sharper, and more brilliant than any the public had seen before. The pictures were a critical and a commercial success; indeed, Frith turned Egypt and the Palestine into a virtual career, making three tours of the area by 1859, and publishing seven books of original prints of the work he did there, often reusing the same negatives in books with different titles. By 1860 he had returned from his final trip and established his own photography factory at Reigate, which printed his own negatives and those of many other photographers who worked for him across the world, or whose negatives he had acquired. By the 1890s Frith offered some 30,000 subjects of Britain alone.[5] Francis Frith & Company survived for 111 years, until 1971.

During the 1860s and 1870s comparable establishments appeared in all Western countries,[6] although in France the tradition of state patronage continued under a variety of rubrics, and modified somewhat the general entrepreneurial structure of photography during the latter nineteenth century.

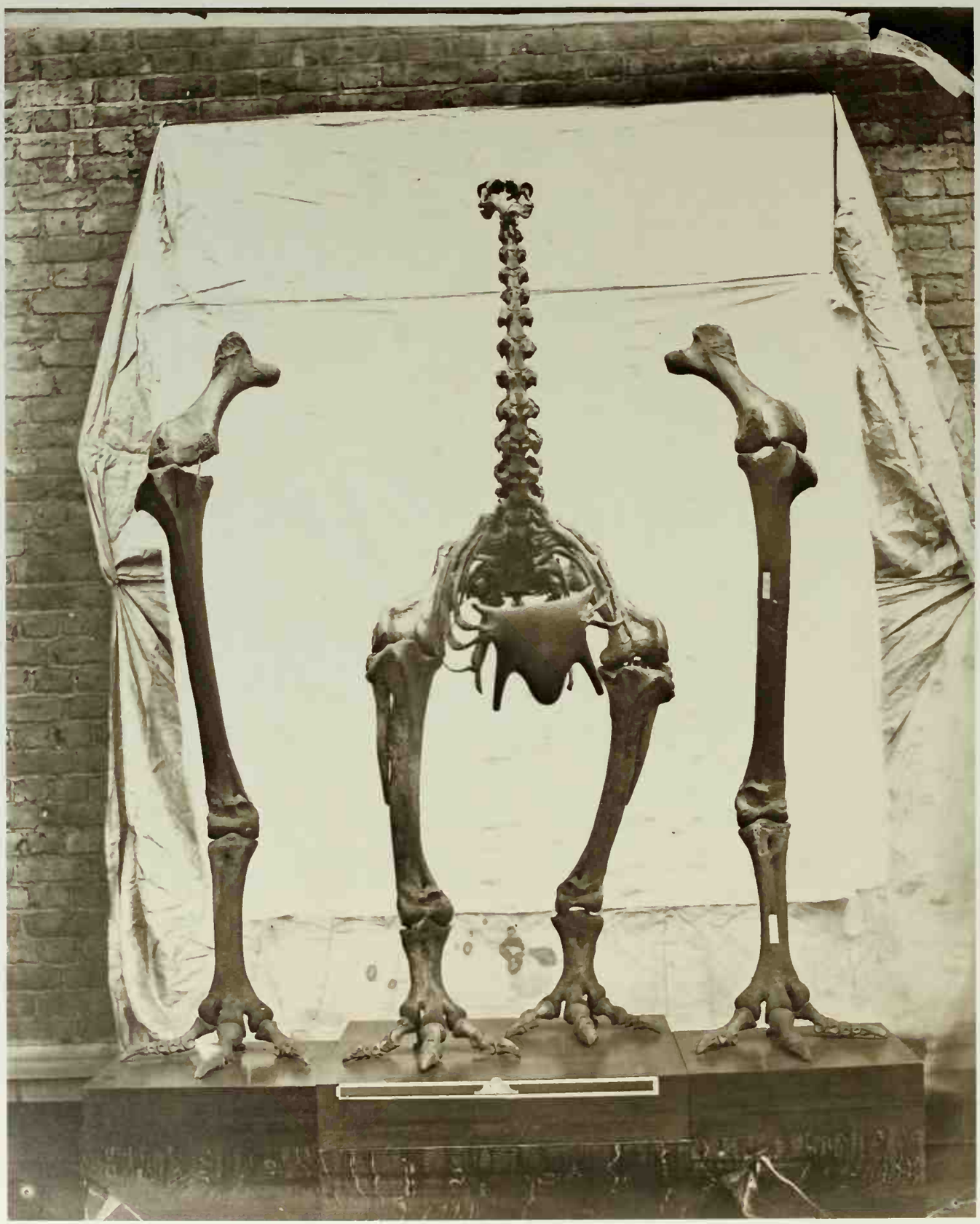
Many of those who turned professional in the late 1850s had earlier worked as amateurs, photographing ruins and waterwheels side by side with fellow enthusiasts from whom they now seemed progressively estranged. Especially in England, the spirited debates of the 1850s concerning the relative merits of the paper-negative and the wet-plate systems were also, just below the surface, the expression of a tension between amateur and commercial workers, for once Archer's system had been mastered the paper negative was left wholly to those who photographed for the pure love of it.

During the 1850s several of the most notable English amateurs, all members of one or more of the traditionally oriented clubs and societies, became professionals, including Roger Fenton, P. H. Delamotte, Francis Bedford, Henry Peach Robinson, and Robert Howlett. It was a delicate situation, since the amateurs saw themselves as members of a team, working in concert for the progress of art and science, while the professionals were trying to progress faster than their competitors. In 1853, at a meeting of the Liverpool Photographic Society, one member suggested that professional members of the Society might hesitate to share the results of their experiments, in the true amateur spirit, since their secrets were a valuable commercial asset. The secretary, a Mr. Forrest, begged to state that this was surely not the case; it is not known whether any member believed him.[7]

In 1856 Fenton, Delamotte, William Lake Price, T. F. Hardwich, and Charles Vignoles were asked to resign from the Council of the Photographic Society because they had lent their names to advertisements of a



Francis Frith. *The Pyramids of Dahshoor, from the East.* 1857



Roger Fenton. *Dinornis Elephantopus*. c. 1858

new photographic association that would solicit and exhibit works for sale.[8] The amateurs were, however, in an untenable position, even if the fact was not yet evident. In 1851 there were fifty-one professional photographers in England; ten years later there were forty times that number.[9] Their economic interests constituted a force that the amateurs could not have been expected to withstand. In the event, there is little evidence that the amateurs attempted to find grounds for accommodating the growing horde of professionals, and in a few years the schism was virtually complete.

The tension between amateur and professional was doubtless an embarrassment to all those who had begun as a little group of like-minded enthusiasts, but the situation of Roger Fenton was perhaps especially difficult. Although a young man of education and independent means, he was not of the old gentry, but the grandson of a self-made industrialist. He had, perhaps a little aggressively, been instrumental in forming the Photographic Society on a basis that was both more professional and more democratic than the friendly, insular clubs that had preceded it. Fenton himself sold his pictures and his skills energetically almost from the time of his entry into the field in 1851. His pictures of the Crimean War were published in substantial editions by the Manchester print dealer Thomas Agnew, and he seems to have made more money from his service as official photographer to the British Museum than the Museum had expected, since their payment of his bills appears to have been a slow and painful process. When Fenton finally ended his work for the Museum in 1859 a special committee was appointed to negotiate the settlement.[10] One might say that in the early 1850s Fenton was a gentleman professional among gentlemen amateurs, but by the end of the decade there were professionals everywhere, performing comparable functions at tradesmen's prices. Photography almost overnight had been taken over by commerce.

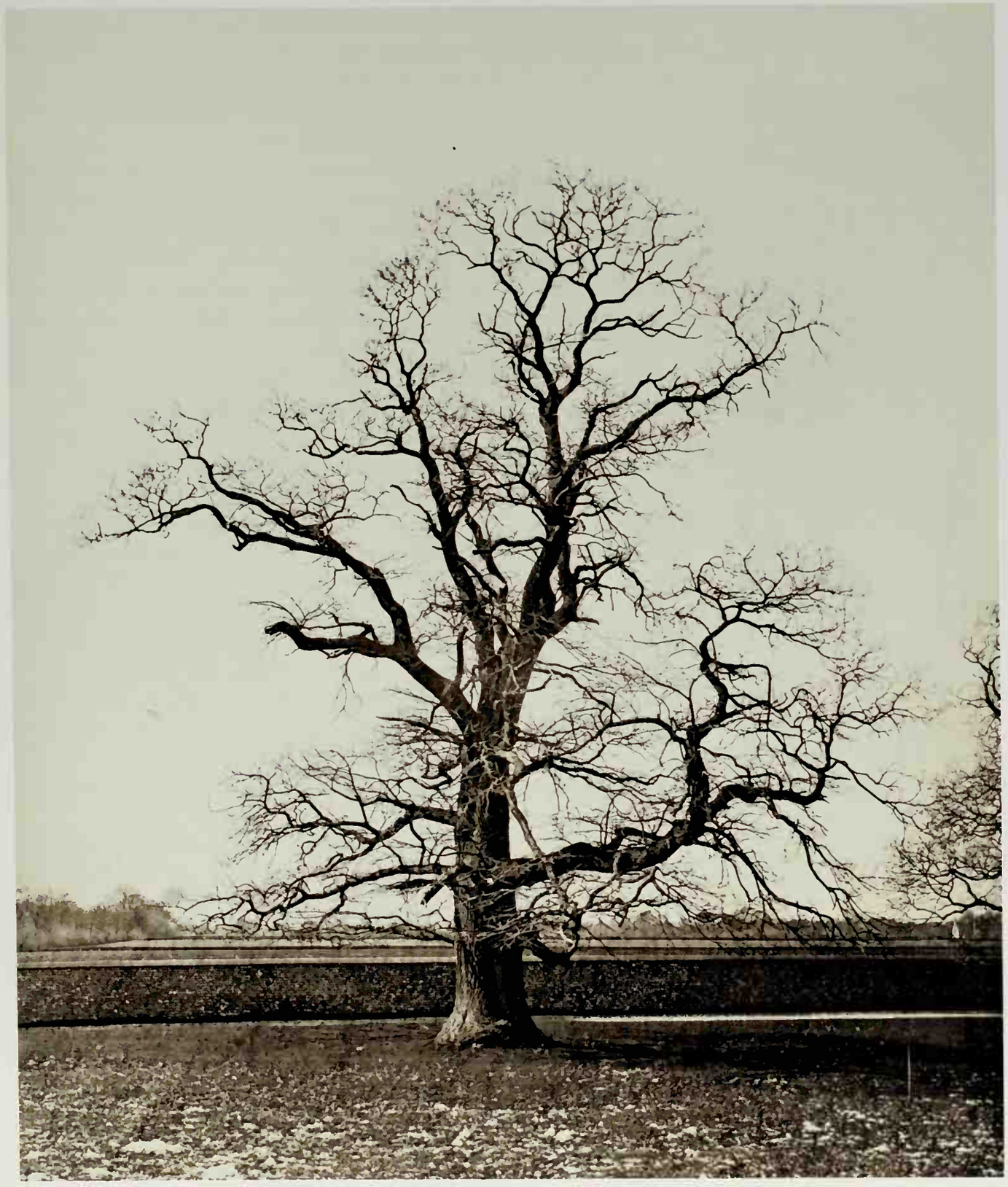


Francis Edmund Currey. *Heron.* 1863

During the 1850s two inexpensive photographic novelties appeared that contributed greatly to the boom in the photography business: the stereograph and the carte-de-visite portrait. The principle of the stereograph had been demonstrated just before the invention of photography, and the first stereographs, representing simple geometric volumes, were line drawings. If two drawings of a cube are made—one showing the figure as it is seen by the left eye, and the other as seen by the right—and the two drawings are then so disposed that each is seen only by the corresponding eye, a remarkable illusion of three-dimensionality results. Drawings, if made with extreme precision, were adequate for demonstrating the principle in terms of simple forms, but could not hope to accurately describe, from two subtly different vantage points, a tree, or a crowded boulevard. Photography could do it easily by photographing the scene twice, with lenses three inches apart.



E. Fox. *Spanish Chestnut in Summer.* early 1860s



E. Fox. *Spanish Chestnut in Winter.* early 1860s



Photographer unknown. *President Roosevelt's Choicest Recreation, Amid Nature's Rugged Grandeur, on Glacier Point, Yosemite.* 1903 or earlier

Sir David Brewster, remembered by physicists for his work on the polarization of light, also invented a practical stereoscope, a hand-held viewing device that made the stereograph popular. He said that by 1856 over a half-million of these instruments had been sold, and that photographers were busy "in every part of the globe" making pictures for them.[11] It was not hyperbole; the appetite for stereos was enormous, and remained strong into the early years of the twentieth century.

Early stereos were often on glass, which gave them an added brilliance, but Oliver Wendell Holmes—a great enthusiast of the form—complained that they caused headaches, and preferred the paper variety, mounted on cardboard.[12] Headaches aside, the paper stereos were cheaper, and unbreakable. Virtually all professional photographers, except portraitists, made stereos, until finally they became so cheap that only the largest publishers could make a profit.

The same photographers who made large landscape views almost invariably also made stereographs of the same subjects, but to make the stereos they stood in a different place. Like 3-d movies, stereographs succeeded or failed on the level of simple sensation. The point was to produce a picture that would produce a thrilling simulacrum of real space, and to achieve this an intelligent photographer would find a vantage point from which something—almost anything—appeared in the near foreground. Because of the technical issue called depth of field[13] this is easy to do with a stereo camera, or with any small camera, and difficult or impossible with a large-view camera. With the lenses required for large-plate cameras, the goals of all-over sharpness and brief exposure times tended to be mutually contradictory. A reasonable resolution of this impasse dictated that the large-plate photographer generally keep the closest part of his subject a good distance from the camera—perhaps thirty feet or more—and design his picture fundamentally in terms of flat pattern, rather than dramatic juxtapositions of near and far.

Beaumont Newhall has pointed out that the stereograph never seemed to capture the deep affection of photographers. Even in the nineteenth century, photographers who did not seem to worry about their status as artists were more interested in the monocular camera, and prouder of their successes with it than with the stereos that they produced by the millions. The explanation may lie in the fact that we have been conditioned for thousands of years to think of the game of picture-making as a matter of depicting three dimensions on a flat surface, and that in these terms stereo seems a species of cheating. Suspended in some insubstantial land between the world of pictures and that of sculpture, the stereograph finally seems an idea without a body.

Nevertheless, marvelous and radical pictures were made in stereogra-

phy, and although they were meant to be seen in a stereoscope, they were of course continually looked at as conventional flat pictures, if only for the purpose of sorting and retrieval. Seen in these terms they are perhaps among the most radical images of the nineteenth century, whatever their makers might have thought.

One photographer, N. G. Burgess of New York, thought that the stereo was the father of the carte-de-visite, since it planted the idea that more than one picture could be made at one time.[14] The carte-de-visite was paper photography's even cheaper answer to the daguerreotype: it was small—only a little bigger than a visiting card—quickly made, and generally made no claim to artistic merit. It was not intended to be cherished as a unique memento by the sitter's loving family, but was produced by the dozen (or the gross or the ream), almost as a throwaway—a proclamation of one's self to be broadcast to friends and near-friends, rather in the spirit that one later sent Christmas cards. Soon its function shifted, and it became the means by which a newly affluent middle class collected totems of their favorite authors, painters, actors, military heroes, clerics, and aristocrats, much as small boys would later collect pictures of their favorite athletes, which came in packages of cigarettes or chewing gum. The sitter, if marketable, was courted by the photographer to have his or her photograph made without charge, in exchange for the right to sell it, sometimes in prodigious numbers.



Etienne Carjat et Cie. *Gustave Courbet.* c. 1867–75

The king of the carte was André A. E. Disdéri, a Parisian photographer who in 1854 had the good idea of patenting a method of making up to ten portraits on a single plate, thereby radically reducing the costs of production. By 1861 the carte business had grown to the point where one could order by mail any of 800 famous figures, at 1.25 francs per picture. More than three hundred of these subjects had sat for Disdéri.[15] In 1866 Alexandre Dumas *père* commented in good humor on the indignity of it all:

Formerly, when people gave their portraits . . . they were so valuable that they gave them only to those persons whom they dearly loved. . . . Now all that is past. One gives portraits to those who ask for them as we would alms to a mendicant. . . . [You and your confrères] are arranged like a collection of butterflies or moths; only there is the difference that the beautiful butterflies of the Tropics, or specimens of rare and sacred beetles, may cost a hundred francs each, while the greatest of contemporaneous men joined in collection are invariably sold at ten sous a piece. It is humiliating.[16]

Disdéri hit his phenomenal peak in 1860, when he averaged 1,600 plates a month, each presumably with eight images (eight proved more practical than ten). Then his clients turned to other amusements, and Disdéri began the descent toward bankruptcy, the almost common fate of nineteenth-century photographers.

34



P. Graver



D. Richards



Pat. Murphy



M. Baumgardner



S. Hammond



J. Carlin



Photographer unknown. Portraits of workers. 1862–67

Specialists in the carte-de-visite worked with cameras that generally exposed four or eight images on a single plate, thus simplifying the problem of producing large numbers of prints. But cartes were also made by copying a large print onto a number of small negatives, which could then be gang-printed. This was the case with Mathew Brady's 1860 portrait of Abraham Lincoln, which the subject is alleged to have credited—along with his Cooper Union speech, made later the same day—with his election to the presidency. The frontier lawyer who was said to look "half-alligator and half-horse"[17] looks in Brady's photograph rather more like Gregory Peck. It is not known how many of Brady's portraits of Lincoln were sold in carte-de-visite form, but the one made by Alexander Hesler the following June was said to have sold more than 100,000 copies.[18]

Photography was thus made available to the needs of the hero class. Lincoln and his contemporary Napoleon III, also accused of being ugly, were photographed repeatedly. One hundred and thirty-six photographic portraits are thought to have been made of Lincoln,[19] more than one hundred during the five years and a little that remained to him after the first Brady portrait of 1860.

Photography differed from the established professions and trades in being unregulated by either a licensing system or an approved course of study or training. In 1860 photography seemed to offer high profits from relatively modest capital and a brief, informal apprenticeship. Elizabeth Anne McCauley tells us that the new photographers in Paris had come from civil engineering, journalism, dentistry, teaching, and the theater, and that at least one (Charavet) had previously been a masseur.[20] Nathaniel Hawthorne's fictional daguerreotypist Holgrave of *The House of Seven Gables* had tried his hand at three of these fields, and had in addition lectured on mesmerism and been a traveling salesman for cologne water.



Nadar. *Rain of Photographers* from *Journal pour rire*. 1855

Predictably, the field was rapidly flooded with supplicants who brought to it all degrees of talent and competence. In 1865 thirteen Paris studios filed for bankruptcy,[21] but there were always new hopefuls to take their place, and continue the work of depressing prices and—for the most part—standards.

Nadar (Gaspard Félix Tournachon), the greatest of the great Second Empire portraitists, later confided to his son Paul that after the exhilarating first years the business of photography had inspired in him first indifference, then aversion and horror.[22] The complaint is repeated like a litany by portrait photographers for a century, accompanied by fruitless demands for a licensing system, or a practical method of price-fixing. By the mid-eighties Henry Peach Robinson, probably the best-known English photographer of the day, told the English Photographic Convention that he feared that "photography, as a profession, has, of late years, greatly



Nadar. *Portrait of a West Indian.* 1854–59



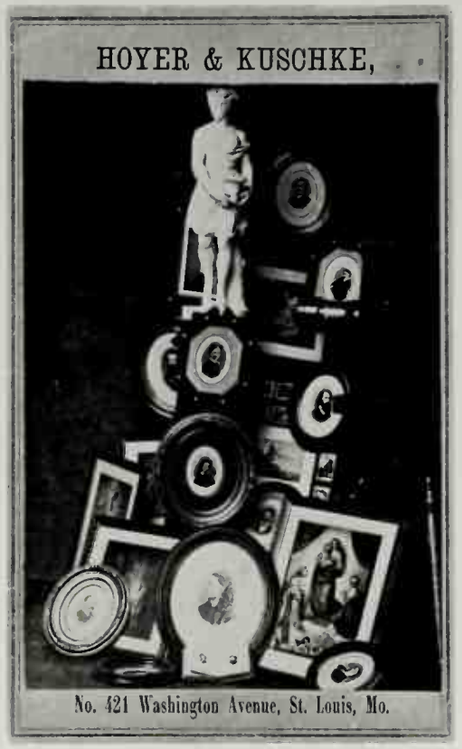
Nadar. *Théodore Rousseau.* c. 1857

changed for the worse, and I think many of my hearers will agree with me. It is not now the best photographer, but the most shameless tout that makes the most money."[23] Henry Mayhew, in *London Labour and the London Poor* (1851–64), tells of a photographer who begins to make portraits—apparently tintypes[24]—for sixpence each, before he learned how the process worked. When the plate came out black and spotted, he told the customer that it would brighten as it dried. If they returned to complain he made a new try, for half-price, which was generally better, for the photographer "picked it up very quick."[25] In 1861 *The Photographic News* (London) reprinted a piece from *The Daily Telegraph* that characterized the most offensive of the new professionals as "the very scum and offscourings of humanity—fellows who have not wit enough to be skittle-sharpers [professional bowlers?] and not courage enough to be prize-fighters." The writer also reported that "even the most respectable of our thoroughfares are becoming more and more rapidly infested" with such low types.[26]

Within the space of a decade the sweet art of the calotypists had become a fiercely competitive trade, inhabited by an unquestionably motley array of practitioners. In Alphonse Daudet's novel *Le Nabob*, set in the time of the Second Empire, André Jenkins, a young man of privileged background, leaves home to become a photographer. He is sought out and confronted by his bourgeois father, who upbraids him for having forsaken his family and the respect of the world "to rush into some unheard-of life, taking up a ridiculous trade, the refuge and the subterfuge of failures."[27]

To the degree that the view of professional photographers held by André Jenkins's father was representative of the sentiments of polite society by 1862, the fact—in combination with falling prices—may have constituted for Roger Fenton a persuasive argument for abandoning photography and returning to the uninterrupted pursuit of the law. In the fall of that year he sold his equipment and his prints and negatives—most of the latter to Francis Frith, who continued to make prints from them at his Reigate factory. During his remaining seven years of life, Fenton is not believed to have made a photograph.

Those English amateurs whose ambitions were less demanding than Fenton's—or whose social credentials were more secure—felt no need to abandon photography, but they did withdraw further into a private world, behind the hedges that shielded their gardens and their beliefs from the uglier and more distressing aspects of Victorian industrialization. Julia Margaret Cameron, Lewis Carroll, and Lady Clementina Hawarden, the most interesting English amateurs of the 1860s, seem not to have made a photograph of the outside world, except when one of its great players was invited for the weekend. Oscar Rejlander and Henry Peach Robinson worked with one foot in the amateur world and the other in commerce, a



Photographer unknown. *Hoyer and Kuschke, No. 421 Washington Avenue, St. Louis, Mo.* 1866–67



Clementina Hawarden. *Clementina Maude*. c. 1863–64



Julia Margaret Cameron. *Iago.* 1867



Lewis Carroll. *Irene MacDonald.* 1863

difficult stance then as now. Each apparently supported himself primarily as a professional portraitist, but their greatest enthusiasm was reserved for their exhibition pictures, the most famous of which now seem to combine the insular view of their amateur colleagues with an easy submission to popular sentiment.

In France the rise of professionalism was marginally less disruptive than in England, perhaps because the authority of the amateur ideal was less pervasive in France. It has been said that the Société Héliographique, the first photography association in France, was "dedicated to the integration of science and the arts, where the main goals were friendship, free exchange, and facilities to encourage a full exploration of photography."[28] Nevertheless, four of its founding members were among the five photographers who were chosen by the state in 1851 to document its architectural patrimony. This made them instruments of national policy, and their function could not be served by depending wholly on the dictates of taste and intuition, or on the inherited ideal of the picturesque. It might be argued that in those kinds of work that touched on the cultural commonweal, state patronage established standards of quality and objectivity—intellectual rectitude—that acted to balance the amateur's tendency toward frivolity, and the entrepreneur's weakness for the cheap and vulgar. There is in the best of early French photography, notably in photography of architectural motifs, a magisterial quality that survives late into the century. Hippolyte Bayard, surely the most interesting photographer among the several men who invented photography, continued to make new and surprising pictures for thirty years; Charles Marville, one of the greatest of all photographers, apparently continued to work until his death, probably in 1879.

Nevertheless, it seems true that Le Secq made no new negatives after about 1856; Baldus none after the mid-sixties, Charles Nègre little of consequence after 1861. Le Gray, his ambitious portrait studio on the Boulevard des Capucines a failure, abandoned his family in 1860 for an adventure in the Mediterranean. When he died in 1882—after falling from his horse—he was a drawing instructor in Cairo. Almost nothing is known of O. Mestral; even his first name is a mystery, and no work from his hand is known after the mid-fifties. Of the five chosen to work for the Missions Héliographiques, only Bayard remained an active photographer.

For a few years after the rise of the wet plate and the professional photographer, the French amateur tradition persisted, more or less in exile, and produced a steamer trunk of pictures that celebrated, consciously or otherwise, the surviving, tattered beauties of the prerevolutionary world. Like their English counterparts, the French amateurs abandoned the field of modern life to the commercial operators.



Oscar G. Rejlander. Untitled. c. 1857



Fallon Horne. *Youth and Age.* 1855



Henry Peach Robinson. *Sleep.* 1867



Lewis Carroll. *The Reverend C. Barker and his Daughter May.* 1864

Many of the best of the late pictures of the French amateurs—mostly calotypes—were made by a little group of enthusiasts gathered around the great, ancient porcelain factory at Sèvres. It was widely thought that the artistic quality of Sèvres porcelain had deteriorated badly while Henri-Victor Regnault, director of the Manufacture, and Louis-Rémy Robert, chief of its painters and guilders, and others on the staff were devoting their best energies to photography, but no one suggested that there was a direct cause-and-effect relationship between these facts.



Photographer unknown. Untitled. 1850s

What one might call the failure of the first generation of artistically ambitious amateurs is in human terms touching, even poignant, but it should also be recognized that these splendid minor artists, to the degree that they wished to demonstrate that photography was one of the Beautiful Arts, could hardly challenge the standards by which those arts were judged.

One of the most widely quoted critical evaluations of early photography was written in 1857, six years after the invention of the wet-plate system, by Lady Elizabeth Eastlake, wife of Sir Charles, the director of London's National Gallery of Art. Lady Eastlake's essay makes it clear that she liked the early calotype pictures better than the new collodion sort. With their soft papers and broad, impressionistic indications the calotypes resembled a little prints from the older graphic processes; beyond that their very imperfections had encouraged one to hold high hopes for the future. If these modest first efforts—admittedly experiments, and often crude—were as interesting as they had been, how wonderful might not photographs be once the process was perfected? Lady Eastlake's answer in 1857 was that they were less wonderful now that they were perfect. Both the mystery and the suspense were gone:



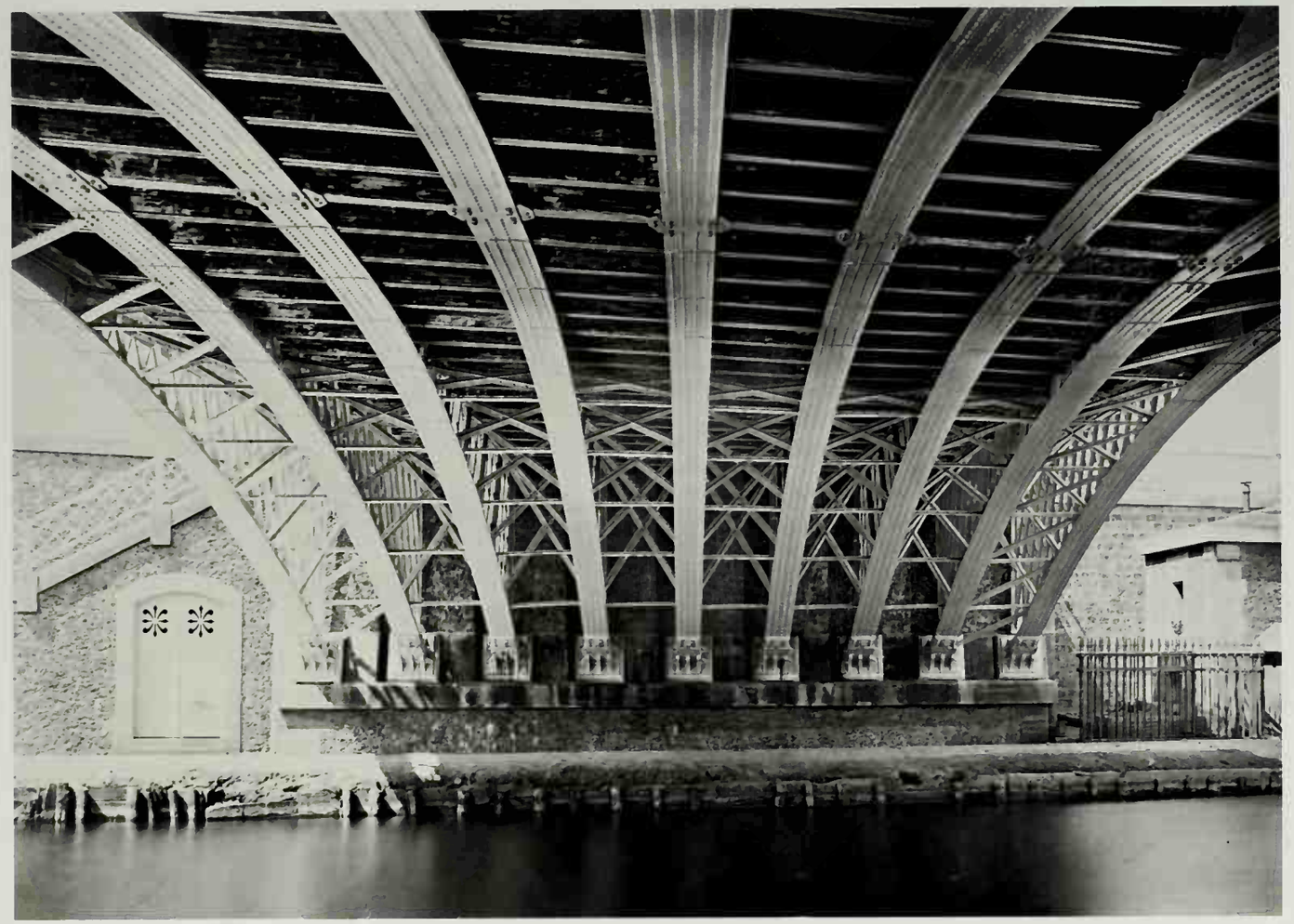
Guillaume-Benjamin-Amand Duchenne de Boulogne. *Fright.* 1862

The science . . . which has developed the resources of photography has but more glaringly betrayed its defects . . . it is superfluous therefore to ask whether Art has been benefitted, where Nature, its only source and model, has been but more accurately falsified. . . . For everything for which Art, so called, has hitherto been the means but not the end, photography is the allotted agent—for all that requires mere manual correctness, mere manual slavery, without any employment of the artistic feeling, she is the proper and therefore the perfect medium.[29]

The same conclusion, stated in a less temperate tone, was expressed by Charles Baudelaire two years later. He said that photography "has become art's most mortal enemy. . . . It is time, then, for it to return to its true duty, which is to be the servant of the sciences and the arts—but a very humble servant, like printing or shorthand which have neither created nor supplemented literature."[30]



Photographer unknown. Portraits of prisoners. c. 1880



Albert Collard. Bridge. 1860s [?]



Charles Hippolyte Aubry. Leaf arrangement. 1860s



Louis-Emile Durandelle. *Ornamental Sculpture, New Paris Opera.* 1865–72



Hugo van Werden. *Panorama of the Fried. Krupp Cast-Steel Factory.* 1864

Those photographers who had high ambitions for their art were thus embarrassed from above and below—from below by the tidal wave of commercial work that, at its best, seemed to have little to do with what Lady Eastlake meant by "the artistic feeling," and from above by an intelligentsia that tended to regard the camera as something roughly comparable to the pantograph.

Beginning in the mid-fifties with the retreat of the amateurs, the most radical and challenging photographs were likely to be made by professionals, who were asked to deal with unprecedented problems, and who had little time, and probably little inclination, to defend their status as artists.

In the 1850s the distinction between amateurs and professionals, except in the portrait studios, was generally fluid and relative. Amateurs were delighted to sell their prints when they could, and professionals were not always successful in selling theirs. For the purpose of the distinction made here, one can say that the basic difference was that the amateurs did what they wanted to do, and the professionals did what someone else wanted done. Most of what was done by each group was perhaps in the long view trivial, but their failures were based on different principles. The failures of the amateurs remind us of things done better earlier; those of the professionals are chaotic and unformed, and remind us of nothing. The best successes of the amateurs—like the best portraits of Cameron and the best landscapes of Le Gray—add something new and valuable to a familiar tradition. The best of Fenton's pictures from the Crimean War, or Auguste Salzmann's archaeological documents, or Marville's pictures of Paris lampposts, are different: they seem not simply to advance the tradition, but to deflect it a little.

Fenton went to the Crimea in 1854, with a commission from the print publisher Thomas Agnew and letters of introduction from important



patrons, to report on a disastrous, unpopular conflict. We cannot guess what his sponsors might have thought his pictures could show. Surely they did not expect pictures of war as Gozzoli or Velázquez or Benjamin West had shown it; nevertheless, what he came back with must have been puzzling. The pictures were perhaps a puzzle to Fenton also, who must have wondered, as photographers still wonder, what he was doing there, and why he pointed his camera at one mute, reticent fact rather than another; but he continued to work until brought down by cholera. He returned to England with some 360 plates, none of which showed a battle, or even a dead body. They showed high dignitaries and famous generals in Savile Row tunics that seemed not quite to fit, junior officers with unkempt horses that seem of a different genus of creature than those painted by Van Dyke or Stubbs, and bare, moonlike landscapes with bits of relevant fact—clues to a difficult problem—scattered in them. His pictures are moving partly because they document how limited his resources were. *Sebastopol from Cathcart's Hill* is dated 1855 (p. 106). If this is correct the officer in the middle of the distant group, pointing toward Sebastopol, the prize, is not Sir George Cathcart himself, explaining to his friends how he could walk into the Russian port almost without the loss of a man. Cathcart had criticized the caution of Lord Raglan, the commander-in-chief; on November 5, 1854, he thought he saw an opportunity to turn the Russian flank, but he was wrong, and died, with many of his men.

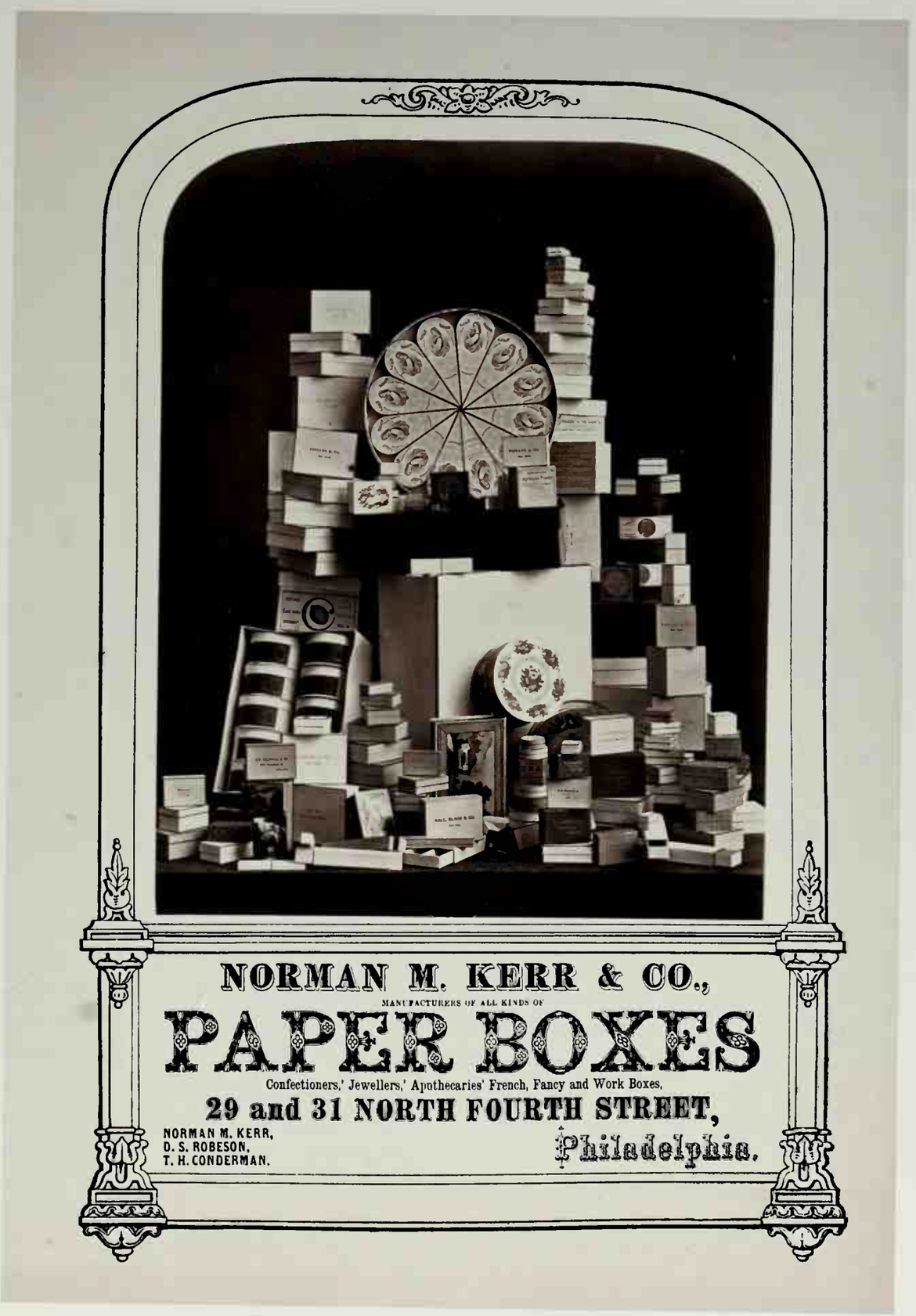


William James Stillman. *Figure of Victory, Athens.* 1869

During the 1850s and 1860s the Middle East was worked over by a dozen or more photographers, who made pictures of the sites and monuments of that spiritually central place in the hope of selling them to the scholarly and the faithful. The interests of Auguste Salzmann, a painter turned archaeologist, were narrower and more precise. To him the ruins were not merely



Jane Clifford. Shield. c. 1863–66



Photographer unknown. *Paper Boxes.* c. 1870



Roger Fenton. *Sebastopol from Cathcart's Hill.* 1855

marvelous but cogent; he saw them as an archive from which the history of the remote past could be written. His best-known pictures were made to support the radical new theories of another archaeologist, Louis F. Caignart de Saulcy, who claimed that some parts of extant ruins dated back to the time of King Solomon. Caignart de Saulcy supported his ideas by detail drawings, but these were accused of subjective bias, so Salzmann—already in Jerusalem on another project—was engaged in 1853 to photograph the same subjects that Caignart de Saulcy had drawn. Salzmann said that the results had "a conclusive brutality." They did not in fact settle the archaeological argument, but the pictures themselves do have great power and confidence, a graphic muscularity that perhaps derives from the monocular certainty of a precisely focused idea. Jammes and Janis write, "Salzmann's photographs of details are selectively arranged like collages of masonry, architectural ornament and shadow which defy reference to a larger context. Each print is a kind of trophy, an extraction victoriously proclaiming its own visual rules.[31] Salzmann himself said "photographs are more than tales, they are facts endowed with convincing brute force."[32] Consciously or not, he was describing his own pictures. His work of the mid-fifties was done wholly with the paper-negative process, demonstrating again that the usefulness of that method was not restricted to elegiac impressions.



Louis-Constantin-Henri-François De Clercq. *Southern Side, Krak of the Knights (Kalaat-et-Hosn), Syria.* 1859

Of all of the photographers who had done work of importance with the paper-negative process, Charles Marville was the one who succeeded most fully in revising and liberating his conception of photography so that it could fulfill the capacious but exacting demands of the new technical vocabulary of the wet plate and the albumen print. Lady Eastlake recognized correctly that the early calotypes rested more comfortably within the traditional idea of pictorial art than the sharp, shiny new photographs of the latter 1850s. If the calotypist's lens did not quite cover the negative, or if the image was soft in the middle and fuzzy on the edges, or if the texture of the paper was more visible than the texture of the subject, or if tonal gradations were abrupt and blocky, these technical flaws need not be considered artistic handicaps, since in fact they helped unify the image, helped produce the "broad effect" that was held in such high esteem. The early calotype was a beautiful piece of paper that bore a persuasive but obviously mediated impression of the real world. The new glass-plate pictures were almost as transparent as air; they seem less like objects of art than windows, behind which lay the fragmentary, scruffy particularity of unedited experience.

To make coherent, visually rewarding pictures with albumen prints from glass negatives required a precision of feeling and of understanding that was not required of the calotypist, for whom a degree of slovenliness in



Charles Marville. *Rue de Choiseul, Paris.* c. 1865

conception was effectively masked by the formula of broad effect. Charles Marville eschewed the convenience of Le Gray's permissive theories, and within the narrow and unforgiving discipline of the wet-plate system constructed a vision of nineteenth-century Paris that presents to us a silent epitome of civilized life: a great city, filled with delights, in which we—one by one—are the only inhabitant. He bypasses the great monuments and the famous boulevards, and gives us instead shopping streets and suburban roads, framed with so lively a sense of ingenuous virtue, and recorded in so pure a morning light, that his pictures persuade us that these places are our forgotten childhood home.

In America the rise of professionalism created no painful dislocations, since there was no amateur tradition there that identified the role of photography with the conventional ambitions of the fine arts. Except occasionally, at the higher levels of society, art itself was not a matter of concern; if the issue arose, it was assumed that art was made in Europe, as it had always been, or in China. Photography was regarded fundamentally as a technique, and as a sort of science—not an analytical science, like physics, but a natural science, like ornithology. Excepting its great daguerreotype portraits, America produced no work of importance to the development of photography during the medium's first twenty years.

It would surely be wrong to say that American photography profited from its ignorance. One might say instead that its only important teacher was the daguerreotype, and that it learned well the lessons of that spartan and demanding tutor. Of the major American photographers who began their important work in the 1860s—Carleton Watkins, Eadweard Muybridge, Timothy O'Sullivan, William Henry Jackson, and Andrew Russell—only Watkins is known to have begun as a daguerreotypist; but when they were young photography, in America, meant daguerreotypy, and the daguerreotype was sharp and plain and all fact. In 1852 S. D. Humphrey wrote in his magazine that "in America, the Silvered plate, the discovery of Daguerre, who has given his name to the art, is almost exclusively patronized. . . . The calotype is, comparatively speaking, almost neglected."[33] Comparatively speaking, it was almost nonexistent. Humphrey's fellow-Philadelphians Frederick and William Langenheim had three years earlier bought for $6,000 the American licensing agency for Talbot's process, and had sold none, at $30 each.[34] The calotype reminded Lady Eastlake of Rembrandt and Reynolds, but to those to whom the Langenheims tried to sell licenses, Rembrandt and Reynolds were perhaps not familiar names. On the other hand, John Singleton Copley, who knew all about Rembrandt and Reynolds, and who died before Daguerre had begun his experiments, also made pictures that were



Gustave Le Gray. *View on the Sea: The Cloudy Sky.* c. 1856



William McFarlane Notman. *Spruce Tree, Forty-four Feet in Circumference, Stanley Park, Vancouver.* 1890–92

sharp and plain and full of fact. Perhaps it was an American, or at least a Yankee, taste.

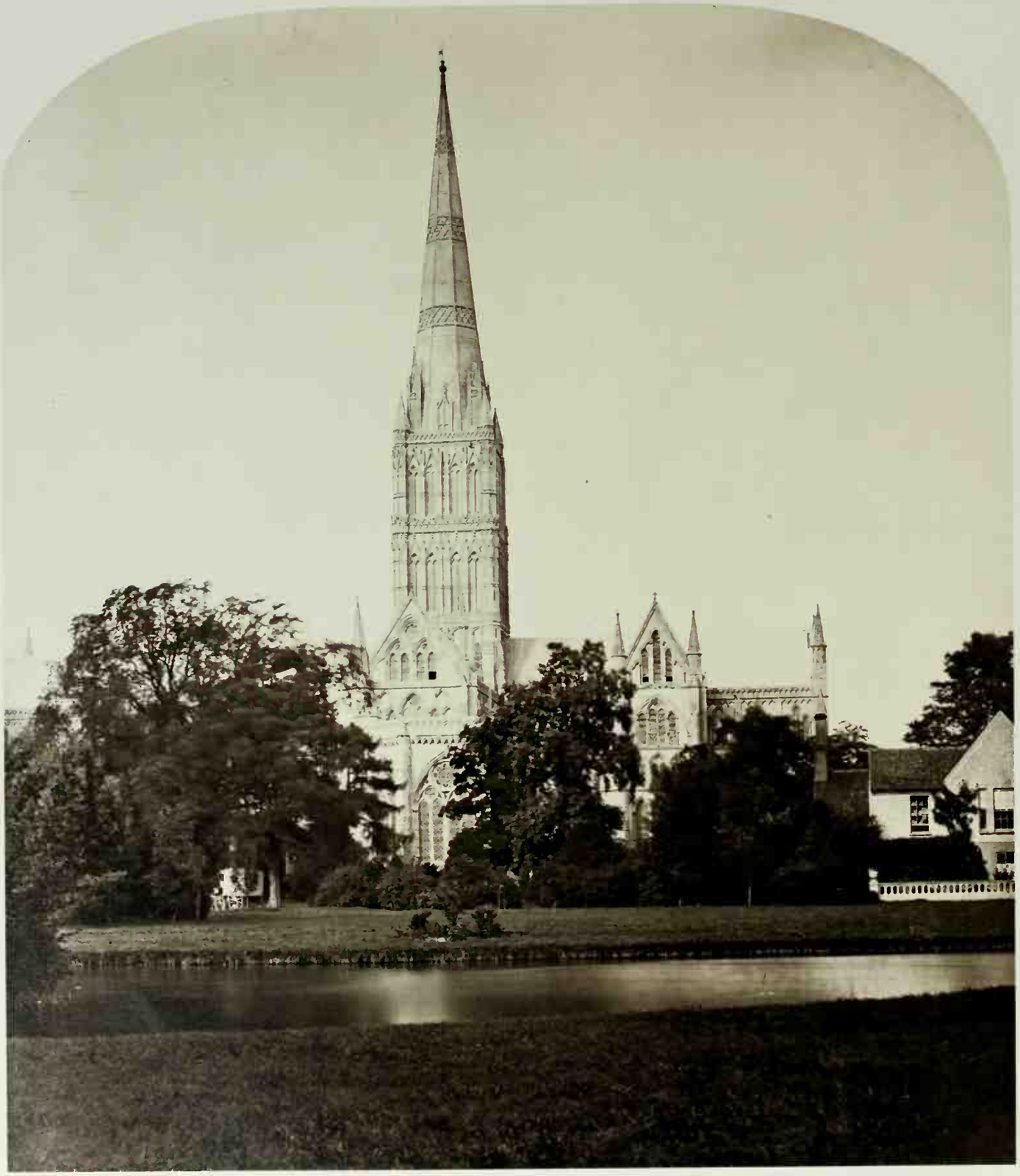
American photography came of age in the West during the 1860s and 1870s, although O'Sullivan and Russell and others received their training during the Civil War, when they acquired supple techniques and an indifference to the dictates of pictorial conventions. It is thought that more than three hundred photographers were passed through the Union lines during the War.[35] Until recently they were generally, for convenience, all called "Mathew Brady," a generic label like "Homer," or "King James," but in the past generation some of them have again assumed individual identities. Mathew Brady did apparently himself make a few of the pictures that bear his imprint—but not many, since he also needed to supervise his portrait studios in Washington and New York, which provided the money that he spent on his record of the war. Thirty years later he said that his advisors had been against the venture into war photography, but "like Euphorion, I felt I had to go. A spirit in my feet said 'Go,' and I went."[36] The Civil War was not an economic success for Brady. In 1873 his New York studio was declared bankrupt, and a few years later the Washington studio was lost. Mark Twain visited his new quarters, probably in 1891, and after looking at the pictures on view declared that Brady had a fortune there. He did not stop to explain how the fortune might be precipitated, perhaps because he was himself not far from Queer Street, because of his efforts to save from destitution another hero of the war, Ulysses S. Grant.

For his great pictorial history Brady had commissioned, or bought negatives from, many photographers, but he also sent several of his own photographers to war, including three whose work there is probably better known than that of any of the other photographers who described the conflict: Timothy O'Sullivan, George Barnard, and Alexander Gardner. Although they were sent to war by Brady, they did not remain in his service long, or regularly, but seemed to move about like jazz musicians, from gig to gig.[37] By the end of the war Gardner had accumulated 3,000 negatives by at least eleven photographers,[38] from which he chose 100 for inclusion in his two-volume *Gardner's Photographic Sketch Book of the War*, a strange and unsettling collection that documents the war mostly by describing a random set of sites and artifacts that circumscribed the action: a farmhouse that was once a temporary headquarters, a mud-spattered wagon, a temporary pontoon bridge. Interspersed with these are scenes showing the rusty indolence of camp life, and then without preparation, pictures of fields covered with distending bodies.

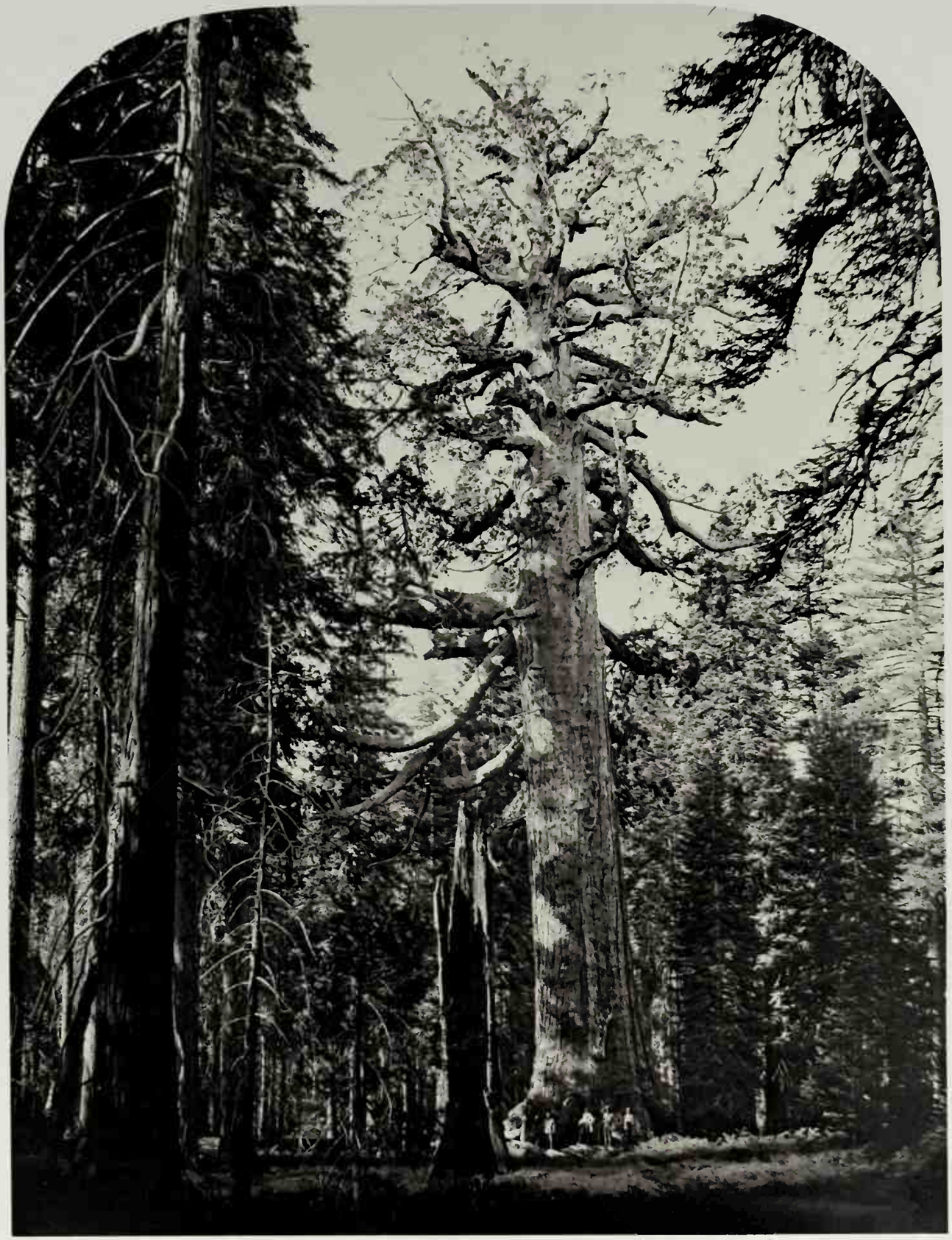
Stephen Crane was born five years after the war had ended, but Ernest Hemingway said of him that he had listened to the veterans' stories, told on the porches of general stores, and that surely he had known the marvelous



Timothy H. O'Sullivan. *Slaughter Pen, Foot of Round Top, Gettysburg, July 1863*



Roger Fenton. *Salisbury Cathedral: The Spire*. c. 1860



Carleton Watkins. *Grizzly Giant, Mariposa Grove.* 1861



116 Eadweard Muybridge. *Valley of the Yosemite from Mosquito Camp.* 1872

Brady photographs.[39] *The Red Badge of Courage* seems photographic not so much in the character of its prose as in its posture and assumptions. The large issues of Union and Slavery are unconsidered; the Youth is nameless and inconsequential; the battle in which he stands and fights proves not to be the real battle, but only a diversionary skirmish. The real War is somewhere else, perhaps over the next ridge. The novel does not attempt to explain the War, or even present it; it gives only the trial of one ignorant participant, who sees the event from so close a perspective that large patterns are invisible:

It seemed to the youth that he saw everything. Each blade of the green grass was bold and clear. He thought he was aware of every change in the thin, transparent vapor that floated idly in sheets. The brown and grey trunks of the trees showed each roughness of their surfaces. And the men of the regiment, with their slanting eyes and sweating faces, running madly, or falling, as if thrown headlong, to queer heaped-up corpses—all were comprehended. His mind took a mechanical but firm impression, so that afterwards everything was pictured and explained to him, save why he himself was there.[40]

Carleton Watkins moved to California in the early 1850s, a year or two after the discovery of gold had made that place a state, although before transcontinental railroads or the Panama Canal it was as remote from the eastern states as Australia. It was remote from the Civil War also; in 1861 Watkins made his first trip to Yosemite Valley, a miniature version of the world as it might appear in the most extravagant dreams of romantic painters. The valley had been discovered (by white men) ten years earlier, and tourist trips had begun in 1856. Watkins was thus not the first photographer there, and in 1861 he framed many of the same subjects much as C. L. Weed had two years earlier, and much as Eadweard Muybridge would again a little later.[41] Yosemite was in its broad forms and in its detailing so nearly like a work of art—so finished—that it has resisted radical reinterpretation; its best photographers have approached it with a tactful circumspection and perfect technique, both necessary to convey the character of a place that seems constructed of granite and lace.

Pictures of Yosemite, and comparable pictures by Watkins and his competitors, were intended for customers who believed that there was something close to a religious meaning in wilderness—especially spectacularly beautiful wilderness—and spiritual value in its contemplation. This was a widely held belief, and one not incompatible in practice with the rapid destruction of the country's forests and the damming of its rivers, since one set of beliefs concerned ideals and the other opportunities.

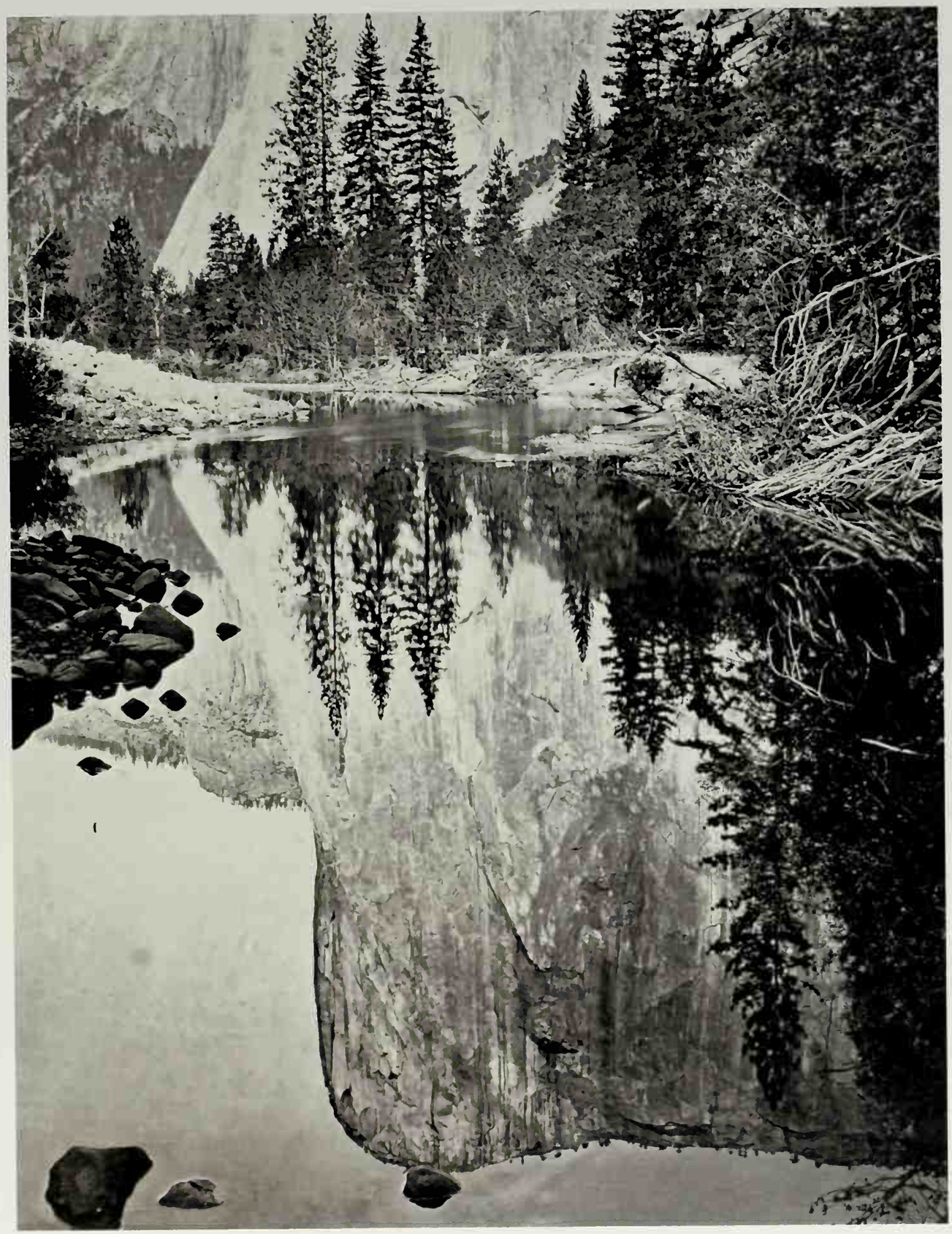
Watkins in 1861 was apparently the first American photographer to

work with the so-called mammoth-plate camera, the negatives of which measured 18 × 22 inches. The photographer Charles Savage was astonished that Watkins could carry "such huge baths, glasses, etc., on mule back" in such difficult terrain.[42] In 1888 William Henry Jackson wrote an article entitled "Landscape Photography with Large Plate," which was in its entirety an instruction on how to pack one's own equipment to avoid breakage. But the problem was much simpler by 1888, as by then the dry plate had eliminated the need to prepare and process one's plates in the field.[43]

Watkins's landscape photographs, made mostly in California and Oregon, are among the most elegant and poised in photography's history, but after 1873 he devoted less of his energies to landscape and more to the instrumental, illustrative jobs that were a commercial photographer's normal fare. He, like Brady, had been forced into bankruptcy by the financial Panic of that year, or perhaps partly by the Panic and partly by his tendency to listen more attentively to the promptings of artistic opportunity than to those of the market. Watkins seems not fully to have recovered from that setback. In 1880 he wrote to his wife of a year, "If this business don't give us a living we will go squat on some government land and raise spuds."[44] It did not quite come to that. In 1906, when the fire that followed the San Francisco earthquake destroyed Watkins's studio and his negatives, he was already blind, and had small use for them.

When the Civil War was over, America turned again to the exploration of the continent, especially the immense and little-known West. Early in 1867 Clarence King, a twenty-five-year-old geologist, persuaded Secretary of War Edwin Stanton to back a survey of the Fortieth Parallel between the Sierra Nevada and the Rocky Mountains. The project was approved and King was appointed geologist in charge. Joel Snyder has pointed out that the agendas of the government and King were—if compatible—hardly identical.[45] The government was interested in reliable maps, railroad routes, coal, and precious metals; King was not uninterested in these things, but was even more interested in the relationship between geology and God. He was also deeply interested in Ruskin, and in Ruskin's faith in the symmetry of science and art. For reasons that are not recorded, he chose O'Sullivan as the photographer for his expedition.

O'Sullivan worked with subjects that were not yet known to be subjects, that were unnamed and untried as the raw material of pictures. Unlike photographers who worked the Roman Forum or the Acropolis, his subject matter was still plastic. He would go into the field "prospecting for views," meaning that he would go out without his burro and his heavy apparatus to find the right thing to photograph, and the right place to stand, and then would later return with the machinery on another day at



Charles Leander Weed. *Mirror View of El Capitan, Yosemite Valley.* c. 1864

the same hour, hoping the light would again be right. So rigorous was his standard of selection that he seems to have set off on the 1867 King expedition—a project that hoped to report on some 80,000 square miles of wilderness—with 125 pieces of glass.[46]

During seven of the next eight years O'Sullivan spent the field season in the West, working either for King's survey or for the approximately comparable expedition of Lt. George Wheeler. During the winter he would typically return to Washington and print work from one or both projects, sometimes on salary and sometimes on contract. In 1874, working on contract, he made albumen prints from his 9 × 12–inch plates for ninety dollars per thousand—nine cents each—but this apparently proved unprofitable, for the next year he requested twenty cents each.[47]

O'Sullivan worked throughout his short but happy life as a hired hand, not an entrepreneur, and thus never made enough money to go bankrupt. In compensation he did not have to worry about the taste of tourists or of print-gallery proprietors, only about the needs of the impassioned scientist King, or the martinet Wheeler, for both of whom he produced pictures of extraordinary power and unfamiliarity—pictures that seem formed by forces as irresistible and as disinterested as those that formed the wild, inhospitable landscape that he worked in.

After 1869, when with great fanfare and the driving of golden spikes the Central Pacific and the Union Pacific were joined, and the United States was spanned from East to West by rails, the nature of the landscape-photography business began to change. The new market favored not pictures of inaccessible wilderness, but souvenirs of famous landmarks, which were by definition near the tracks, or even visible from the train. As these subjects became increasingly standardized they became progressively less interesting to make, and were naturally made with increasing speed, inattention, and imprecision.



Timothy H. O'Sullivan. *Vermillion Creek Canyon.* 1872



Fratelli Alinari. *Palazzo delle Cascine, Florence*. c. 1855



John K. Hillers. *Santo Domingo, New Mexico.* c. 1875



Adam Clark Vroman. *Interior of (Mr.) Hooker's House, Sichimovi.* 1902

5. George Eastman and Alfred Stieglitz

It might be argued that the principal architect of modern photography was neither a photographer nor a scientist but a businessman: George Eastman. In the years of his rise Eastman was thoroughly knowledgeable about the technical bases on which his triumphs rested; nevertheless, his genius lay not in the realm of chemical wizardry but in his understanding of the almost ecological interdependence of technology and commerce. He understood that if photography were to become a universal activity it would require a simple, cheap, and effortless technology. He also understood that such a technology would be so expensive to put in place and maintain that it could be supported only by virtually universal use. The solution to the conundrum was clear: the whole world must become photographers *simultaneously*.

Eastman took up photography as an amateur in 1878, and found the wet-plate system recalcitrant and messy, an opinion shared by all who had tried it. In consequence he studied carefully the published experiments, chiefly from England, that sought to develop a practical dry system. The largest single step in the slow evolution toward that goal was made by Dr. Richard Leach Maddox, an English amateur who in 1871 published the results of a marginally successful experiment that produced usable dry plates.[1] He concluded his brief report by saying, "So far as can be judged, the process seems quite worth more, carefully-conducted experiments, and, if found advantageous, adds another handle to the photographer's wheel."[2] The figure of speech is unfamiliar, but Maddox clearly meant that dry plates would give the photographer a leg up. His recipe produced an emulsion that was much slower than the wet plate, but other experimenters pursued the idea, and by 1878 at least three English firms were producing small quantities of dry plates commercially. Early that year another English amateur, Charles Harper Bennett, demonstrated that the emulsion was made much more sensitive if it was aged at 90° F. for several days before it was coated onto the plate. Eastman tried this, made some adjustments of his own, and by the summer of 1878 was getting satisfactory results with dry plates that he had made at home; soon he was making them for a few Rochester acquaintances. By 1880 his plates were being sold by E. & H. T.

Anthony, the leading American photographic supply house of the day. In the fall of that year Eastman quit his job at the bank, withdrew $3,000 in savings, and started business in earnest.

By the mid-eighties the wet plate was being used only by the stubborn (and in the reproductive graphic arts, where it survived until recent years). In 1877, in the exhibition of the Edinburgh Photographic Society, one picture out of eight was made by a dry or semi-dry process; five years later, at the exhibition of the Photographic Society of Great Britain, only one picture in seventy was made in collodion.[3]

It is customary to say that the invention of the dry plate greatly simplified photographic technology. It would be more accurate to say that the dry plate so radically complicated photographic technology that it could no longer be left in the hands of the photographers. In the early 1880s photographers stopped making their own plates; a few years later they stopped sensitizing their own printing papers. The earlier craft technology had been replaced by an enormously sophisticated industrial technology; in the century since, photographers have worked with those materials that the photographic industry has seen fit to make available to them.

Those photographers who had learned their craft in the days of collodion continued, for the most part, to make pictures much like those they had made before. It is not likely that one could distinguish on stylistic grounds the landscapes that William Henry Jackson made earlier on collodion from those he made later, more easily, on gelatin.[4] But new entrants, not cursed (or blessed) with the old habits of thinking, came to a photography that had changed profoundly.

The wet-plate system was not only difficult but slow—not slow in terms of its sensitivity to light, but rather in the plodding deliberateness of the whole complicated process. The wet-plate camera might be compared to the muzzle-loading rifle. After taking one shot the photographer was disarmed, until the machine was laboriously made ready again. The Gernsheims estimate that a photographer working in the field was fortunate to make six plates in a day;[5] an experienced worker with an assistant could doubtless do better, but not a great deal better. Colonel William Prescott told his troops at the Battle of Bunker Hill not to fire their muzzle-loaders until they could see the whites of the Redcoats' eyes, but the troopers that Frederic Remington painted a century later had repeating rifles, and they fired from galloping horses at distant Indians who were also on galloping horses. Their accuracy was doubtless deplorable, but they compensated for that by firing often. Similarly, the dry-plate photographer learned that he could afford to take a chance; he had a bagful of plate-holders, loaded and ready.



Edwards and Son. *Landscape with Portrait of Alfred R. Waud.* c. 1883



Oskar Suck. *The Marketplace in Karlsruhe.* 1886

With the dry plate the photographer could leave his darkroom at home, and carry his gear easily on his back, except perhaps for the tripod, which remained an awkward appendage no matter how one carried it.

The tripod was an essential part of the wet-plate method. This was not because of the low sensitivity of the plate; even today the tripod remains an essential part of the view-camera system. With such cameras the image to be recorded is chosen—upside down and backward—on a ground-glass screen at the back of the camera. When the decision is made the shutter is closed (or the lens capped) and the image on the ground-glass disappears. Then the plate-holder is placed in the back of the camera, the sliding shield that has protected the sensitive plate is removed, and the exposure is made. The function of the tripod is not simply to hold the camera steady, but to preserve the decision the photographer made before he closed the shutter and the image on the ground-glass disappeared.

The wet-plate method was necessarily a view-camera method. Even in the case of stereographs, which in a good light were sometimes made at snapshot speeds, the tripod was necessary to preserve the photographer's conception while he prepared the plate. But with the coming of gelatin emulsions the plate was always ready, and to take advantage of this fact cameras were quickly designed that were also always ready. William Schmid of Brooklyn is said to have introduced in 1883 the first commercially produced hand-held camera. Such instruments were first called "detective" cameras, to suggest that they could make pictures surreptitiously, since no



one at that time would recognize as a camera a thing without a tripod attached to it. The Anthonys, who sold the machine, said in their 1884 *Photographic Bulletin* that "a lady might without attracting any attention go upon Broadway and take a series of photographs." The English photographer Paul Martin said, "It is impossible to describe the thrill which taking the first snaps without being noticed gave one."[6]

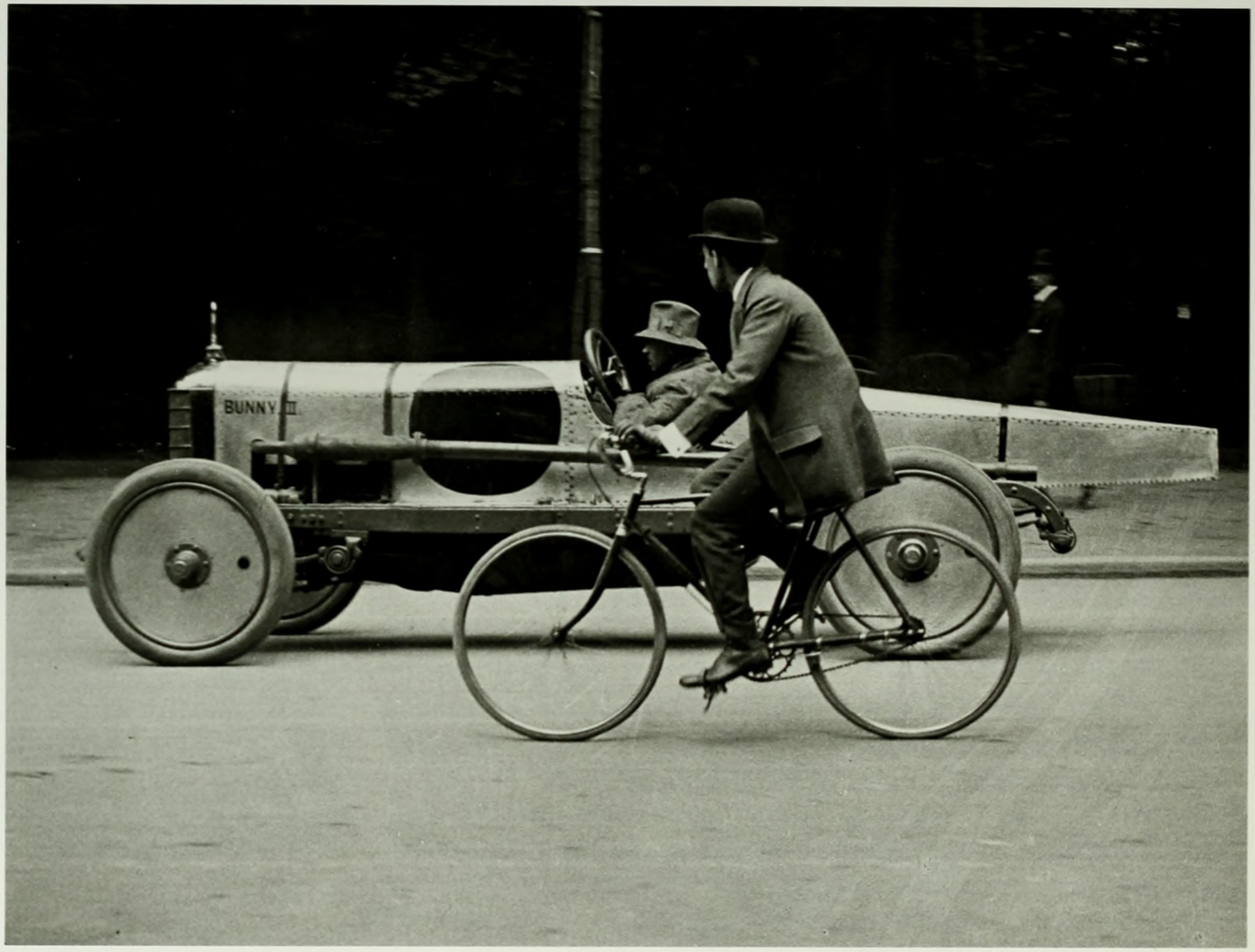
The dry plate encouraged the photographer to take chances, to risk a half-dozen poor negatives for the sake of one unpredictably good one. The hand-camera gave him a new mobility, and the opportunity to change his conception easily and intuitively. Martin's two pictures of a woman raking seaweed illustrate the easy fluidity that had come to photography's decision-making process. As he circles his subject it changes with each step; the changing lighting and background continually revise his sense of what is in fact *there*.



Paul Martin. Woman raking. 1893



Within a few years the world had come to recognize the handsomely finished wooden shoeboxes as cameras, and the appellation detective camera was dropped, to the relief of Alfred Stieglitz, who found the term odious in its suggestion that the photographer was a kind of sneak.[7] For the true sneak, or the truly shy, R. D. Gray of St. Louis designed in 1886 a "buttonhole" camera. It resembled a six-inch model of a flying saucer, and from its middle a tiny lens protruded through a buttonhole of the photog-



Jacques Henri Lartigue. *Paris, Avenue des Acacias.* 1912

rapher's vest. The camera made six exposures, each $1\frac{3}{4}$ inches in diameter, on one plate. There was of course no viewing device on Gray's camera, and what appeared on the minute negative depended on the intuitive precision of the photographer's body language, and on the slope of his vest.

The essential importance of the dry plate—and of its child, flexible film—is that it freed the photographer from the short string that tied him to his darkroom, and from the time clock of a plate that would begin to fail ten minutes after it had been prepared. There is no reason to assume that wet processes could not have been radically increased in sensitivity, but a faster emulsion speed in itself would not have produced the new freedom of response—of intuited discovery—that begins to enter photography in the 1880s.

Nevertheless, emulsion speed was of fundamental importance to many of the new achievements that characterized late-nineteenth-century photography, and the most important of these was the analysis of movement. Photographs show us what the sensitive material was able to record during a given parcel of time. Sometimes this is more than was visible to the eye, and sometimes it is less. The city streets in nineteenth-century photographs are often mysteriously empty at midday, if the traffic moved briskly enough to avoid leaving its trace on the plate during the lengthy exposures required. Conversely, the astronomer can, by panning his camera precisely on the virtual movement of the stars, record bodies too faint to be seen by the eye, even through the most powerful telescopes.

In the case of objects in motion—even moderate motion—it is difficult to know with confidence what we see, or how closely our apprehension of an event would resemble a photographic description of it. It is clear that the depiction of flying birds or running horses, or even facial expressions, or the gestures of a hand, was, before photography, largely a matter of convention, and that the painter in describing such things selected from a slowly evolving catalog of solutions that had been constructed out of intuition, trial and error, and artistic consensus.

When photographic emulsions became sensitive enough—"fast enough"—to record moving objects with reasonable precision, it became apparent that surprising discrepancies existed between the camera record and that found in realist painting. The most famous case in point, about which a million words must by now have been written, concerns Leland Stanford, Eadweard Muybridge, and Occident, Stanford's trotting horse. Muybridge was retained in 1873 to photograph the horse in motion, possibly to determine finally and scientifically whether all four feet of a horse were ever off the ground at the same time. After unavoidable delays,[8] Muybridge secured persuasive serial photographs of a running horse in 1878, with the help of a wet-plate formula of increased sensitivity. The

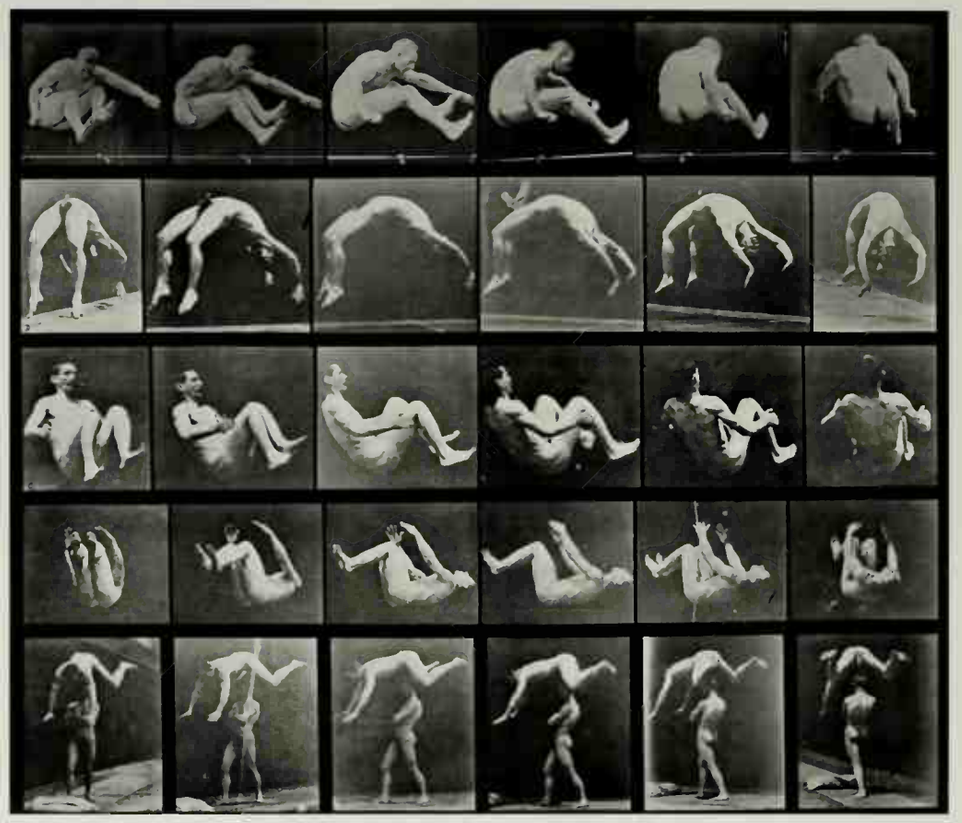


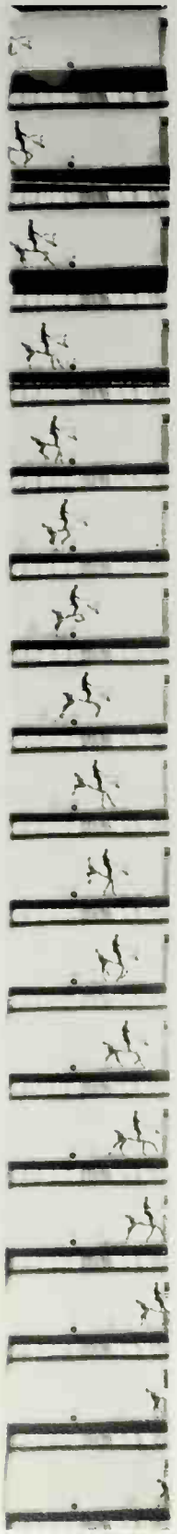


Paul Martin. *Entrance to Boulogne Harbor.* 1897



RIGHT: Eadweard Muybridge. Nude men, motion study. 1877





Etienne-Jules Marey. *Horseman Riding the Mare Odette*. c. 1887

pictures indicated that the familiar hobbyhorse position (with front and rear legs extended) that had looked right to the Assyrians and that still looked right to Edgar Degas was not in fact utilized by a running horse. In a remarkably short time Muybridge's horses began to look right to artists, and the horses painted according to the ancient conventions began to look wrong. When the photographer visited Paris he was greeted as a lion; even Jean Meissonier, arguably the best-paid French artist of the day, and a famous horse painter, threw a party for him.

It is perhaps unfortunate that Muybridge managed to describe the gaits of horses only thirty years before the introduction of the Model T Ford, which tended to dilute the practical value of his discovery. However, horses were only his point of departure. Beginning in 1884, using dry plates of improved sensitivity, he produced the great work that was published in 1887 as *Animal Locomotion*. The eleven-volume work contained 781 plates that reproduced over twenty thousand individual exposures of human beings, other mammals, and birds in motion.[9]

The Frenchman Etienne-Jules Marey, a physiologist, had also concerned himself with the analysis of motion. Marey was more of a scientist and less of an artist than Muybridge: he was interested fundamentally in the question of how animals moved, rather than how they looked while moving. His purposes required a stricter methodology and more rigorous



Ottomar Anschütz. Storks. 1884

measurements than Muybridge had achieved, but it was apparently Muybridge's success that inspired Marey to design the system that was necessary for his own work.

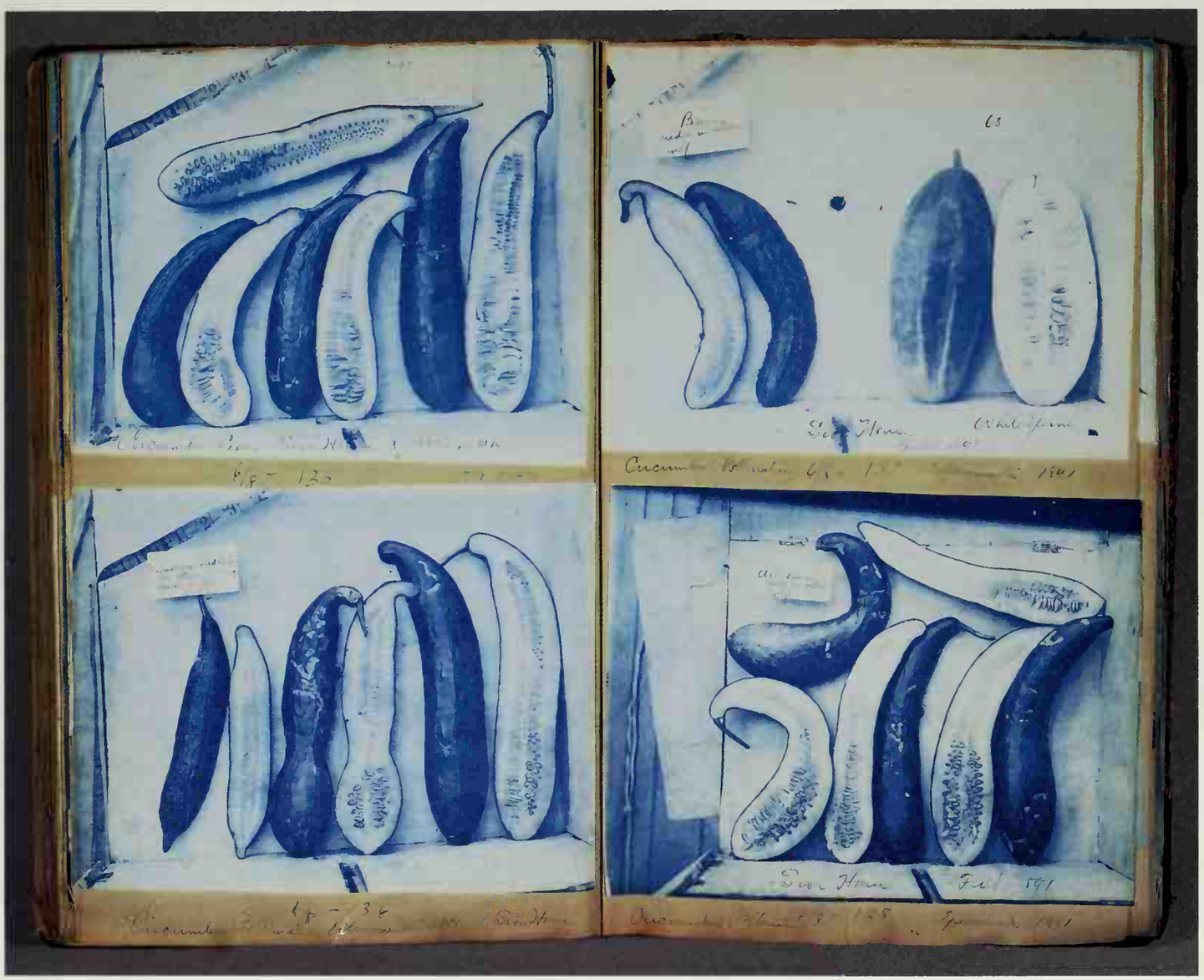
One of the distinguishing characteristics of Muybridge's system was that the sequence was made by a battery of cameras, and thus each image was from a different point of view. A sequence of his running-horse pictures, if projected as a movie, would produce an effect similar to that obtained if the horse was filmed from a moving truck. Two separate movements and a continually changing vantage point introduce ambiguities similar to the one familiar to those who ride railroads: is it our train or the one next to ours that is leaving the station?

Muybridge did reconstitute the illusion of motion by projecting his sequences with the zoogyroscope, or zoopraxiscope, a projection lantern of his own design.[10] One might therefore count him among the many who can be said to have invented the motion picture. Marey's experiments, however, made with one camera from one vantage point, are clearly more closely related to the technique of film.

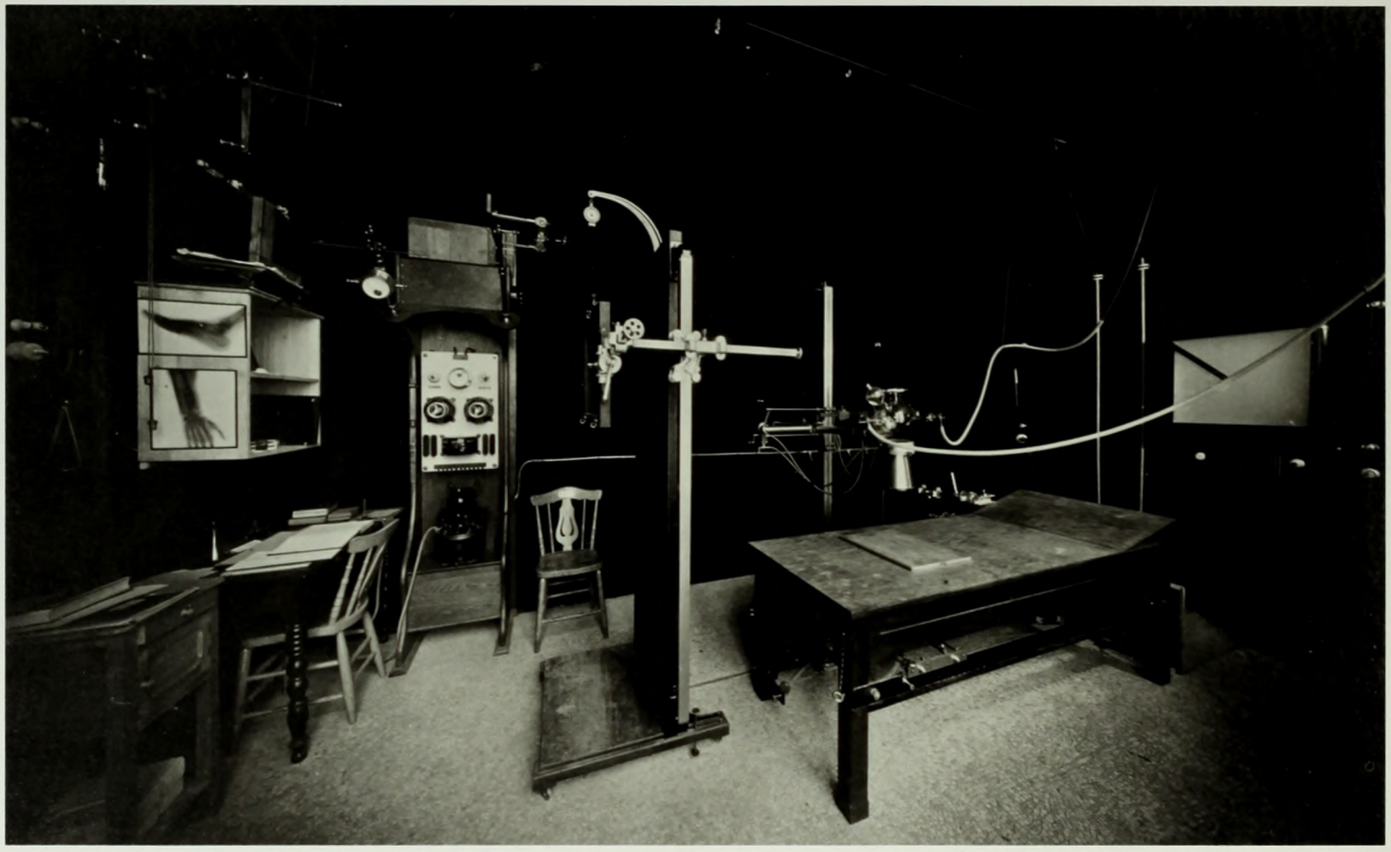
The motion picture was in mechanical terms more or less perfected only a quarter century after Muybridge had begun his work with Occident. By then one could project on a screen the image of a running horse, and again be unable to ascertain whether all four feet were simultaneously off the ground.

Professional specialization had developed during the wet-plate era, but the dry plate offered the possibility of investigating one's special subject with a thoroughness and a generosity, a liberality of spirit, that was beyond the purview of the austere and frugal collodion method. From the 1850s to the 1870s Marville photographed old Paris with wet plates; he made for the most part street scenes and general views. Beginning in the 1890s Eugène Atget photographed old Paris with dry plates; he made pictures not only of the broad prospect but of doors, door-knockers, newel posts, shop signs, iron grills, and neighborhood wells. Perhaps from the practice of looking attentively and repeatedly at similar things, and at the same things from different vantage points and in different lights, he came to see that the most interesting distinctions were not categorical but plastic and relative, meaning that one tree, or one reflecting pool, was never twice the same, and would therefore last as a subject as long as one's concentrated attention. With this realization he became, surely not intentionally, a modern artist (pp. 234, 235).

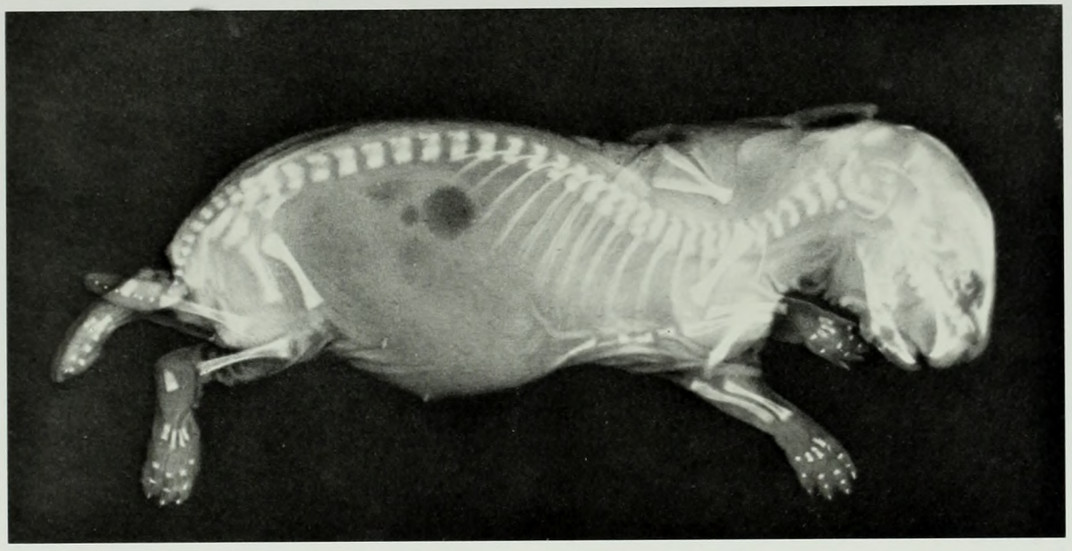
The dry plate proposed a new range of subjects that lent themselves to a method of visual notation that allowed more spontaneity and improvisation, and a more generous acceptance of discursiveness, than the wet plate.



Liberty Hyde Bailey. *Cucumber Pollination Experiments.* 1891



Photographer unknown. *Radiology Unit, Military Hospital, Grand Palais, Paris.* 1914–16



Josef Maria Eder and Eduard Valenta. *Newborn Rabbit.* c. 1896



Photographer unknown. *Group of Funeral Statues Associated with Osiris, Taken from the Serapeum of Apis, at Memphis-Saqqara*. c. 1890



Photographer unknown. *Houses at Nos. 332 and 336 Franklin Street, Elizabethport, New Jersey, May 19, 1931*



Peter Henry Emerson. *The Clay Mill.* Before 1888

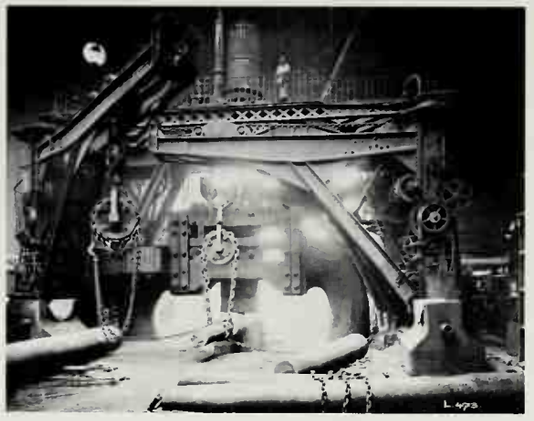
Often these subjects were more important to the photographer than photography itself. Two little-known English photographers, H. Pearson and E. Wade, photographed birds' nests and their eggs; Liberty Hyde Bailey, agronomist and educator, photographed the results of his plant propagation experiments, and produced pictures that remind us of those of both Edward Weston and Joseph Cornell (p. 135); Edward S. Curtis spent thirty years photographing the Indians of North America, and from 1907 to 1930 published more than 2,200 plates in a forty-volume work[11] that might be the most ambitious photographic book in the history of the medium, unless that prize should be awarded to Eadweard Muybridge.



H. Pearson and E. W. Wade. *Sandpiper's Nest.* 1903

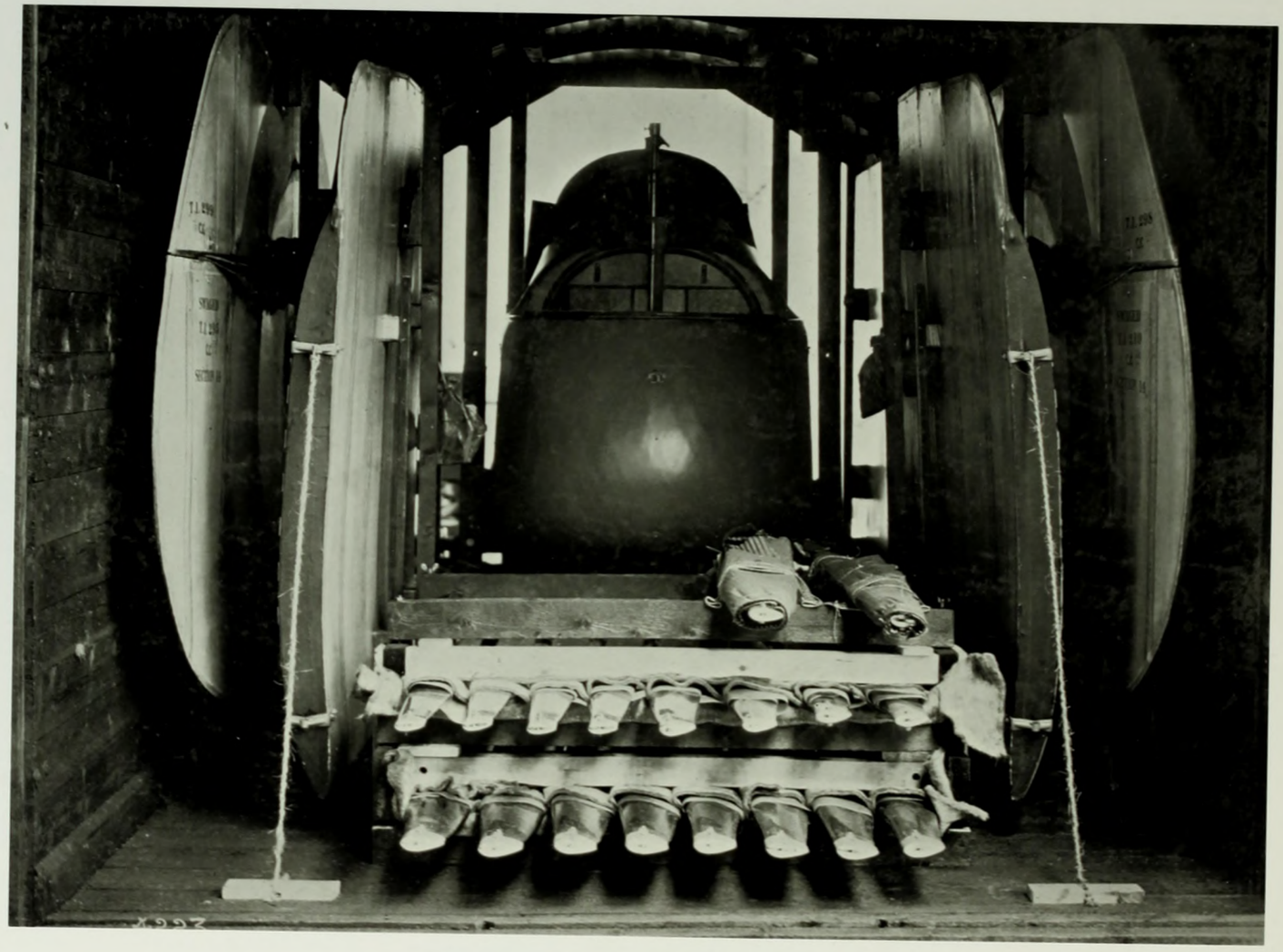
It might be said that Edward Curtis does not sit quite comfortably with the group cited above. It would seem that he wished to be, simultaneously, both ethnologist and artist, and this strikes a modern mind as an unreasonable, almost oxymoronic, ambition. Curtis might cite in his defense the work of Peter Henry Emerson, only twelve years his senior, who in a period of five years, beginning in 1886, produced four books of photographs that described the vestigial preindustrial life of parts of England that were still relatively free of smokestacks and casual tourists.[12] Emerson's interest in the character and quality of the lives of his subjects was surely genuine, but he saw no reason why his understanding should not be expressed with as much grace and economy as he could manage. Like Curtis, he surely posed his subjects, and it would not be surprising if he too chose not to photograph them if they were not in what he considered authentic native dress.

The dry plate made photography much easier, but the process was still not quite so simple, painless, foolproof, and cheap that it could hope to be universally practiced. It was no longer necessary to be a fanatic to be a photographer; nevertheless a degree of commitment was still required, and a modicum of skill and knowledge, plus a darkroom, or a room in one's house that could be intermittently converted to that use, to the inconvenience of both the amateur and the rest of his or her family.



Photographer unknown. *Last Shift of the Steam Hammer "Fritz," Fried. Krupp Cast-Steel Factory, Essen, March 4, 1911*

Thus while the dry plate was still a relative novelty, George Eastman committed himself to a system of photography that would be much simpler. He decided that the negative material should be flexible, so that it could be rolled like a window shade past the focal plane of the camera. In his first marketed experiment he used an oiled paper—recalling Le Gray's waxed-paper system—as the support for his emulsion, but the paper was not transparent enough to transmit an adequately sharp picture. By 1884 Eastman had produced a film consisting of a sensitized gelatin coated on paper, called stripping film; after exposure and processing the gelatin emulsion was soaked free of the paper and mounted on a plate of glass. The operation was a delicate one, and presumably not suited to the motor skills or the patience of all potential customers; Eastman therefore decided



Photographer unknown. *Aeroplane Packed for Transport.* c. 1915–16



Photographer unknown. *Worker with Locomotive Wheel Tire, Fried. Krupp Cast-Steel Factory, Essen.* c. 1900



George Eastman. *Portrait of (Félix) Nadar taken with a No. 2 Kodak Camera.* After 1888

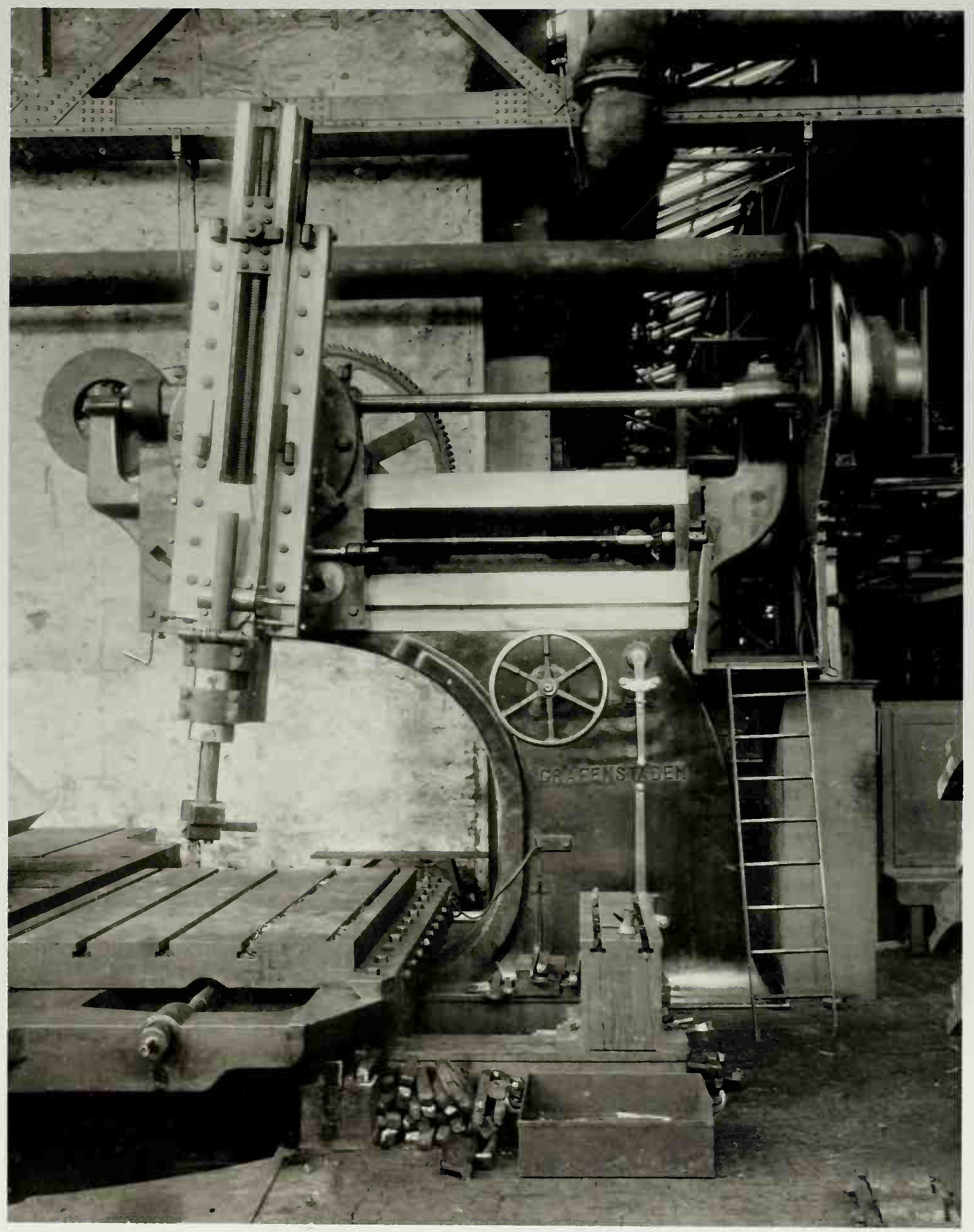


Photographer unknown. *Laboratory of the Kryz and Lakey Metal Works, Letchworth, England.* 1914–18

to do the processing himself. In 1888 he marketed the most radical of cameras: a box model that came loaded with film to make 100 exposures. When the film was exhausted the entire machine was returned to the factory, where it was reloaded and returned while the first film was being processed. At the age of thirty-five Eastman had already proved himself as a technician, a financier, and a conspicuously successful manager. He now demonstrated that he was a great pioneer packager. He explained his business strategy with a short, memorable slogan: "You press the button; We do the rest"; his advertisements reduced the practice of photography to three simple acts: *1. Pull the Cord, 2. Turn the Key, 3. Press the Button.* Although not remembered as a man of engaging wit, it is difficult to believe a man a bore who would invent the word Kodak as the name for his greatest triumph. He thought the letter K "a strong, incisive sort of letter," and put it at both ends of his invented word, filling out the middle with letters that made a word that he thought would be correctly (or consistently) pronounced in any country that used the Roman alphabet. He was already accustomed to thinking in terms of global markets.

The principal remaining problem that was to be solved before the technical vocabulary of modern photography was substantially complete (and before motion pictures were conceivable) was the invention of a transparent and flexible film base. Ambitious manufacturers and inventors had sought this since the development of gelatin emulsions, and in 1887 an Episcopal minister named Hannibal Goodwin applied for a patent on such a material.[13] His patent was finally granted eleven years later, in 1898, after he had revised his application at least seven times, its previous forms having been rejected by five separate examiners. Eastman (or, strictly speaking, Henry Reichenbach, a chemist in Eastman's employ) had in the meantime been granted a patent for a similar process in 1889, and had been producing the increasingly profitable film since that date. Goodwin died in 1900, two years after his patent had been issued, and it was acquired by E. & H. T. Anthony (soon to become Anthony & Scovill, and later Ansco),[14] who began to manufacture film and to sue Eastman for infringement. The case was finally settled in 1914, after twelve years and 5,500 pages of printed record. After the court had found Goodwin's patent sound, and Goodwin himself a "pioneer inventor," Eastman settled with Goodwin's heirs and Ansco for five million dollars, a sum that by that time was not too burdensome for Eastman's company to sustain.[15]

Most of the users of the new machines were casual amateurs who wished to make souvenirs of their picnics and their friends, and of the famous monuments that they passed on their travels. By 1899 the Kodak factory at Harrow, England, processed as many as 8,000 negatives a day.[16] Virtually all of these had been made by amateurs. Harold Senier, manager



Photographer unknown. *Safety Device on a Milling Machine, Fried. Krupp Cast-Steel Factory, Essen.* c. 1905





Hugo Summerville. *Gaines Fig Farm* (and detail). 1926

of the works, told a reporter that "amateurs who have neither the opportunity nor desire to trouble themselves with the developing portions of the art send them on to us for that purpose. Besides (and here Mr. Senier struck a note of considerable power), the process soils the fingers."[17] Mr. Senier added that the Harrow plant coated twelve million feet of photographic paper in a year, which is impressive if he meant square feet, and even more impressive if he was talking about twelve million feet of the forty-inch rolls on which the sensitive emulsion was coated.

For a generation and more, most of the new, casual amateurs were content with photographs that would scarcely cover the palm of one's hand, but more ambitious workers—the sort that joined camera clubs—needed prints at least marginally big enough to hang on a wall.

Enlarging had been practiced since the early days of photography on glass. As early as the 1860s the roofs of "solar printing" establishments were festooned with great enlarging cameras, which made big prints from smaller negatives by using the light of the sun much as a modern enlarger uses an incandescent bulb. On the slow printing papers then in use exposures ran an hour or more in the bright sun, while the camera tracked the sun's path. On gray days enlarging was impossible. Considering the number of solar enlargers that were marketed during the wet-plate period, it is puzzling that so few of the enlargements have survived; or perhaps more have survived than have been recognized as photographs. The life-size portraits of great-grandparents in gilded oval frames are often—beneath the faded ink and pastel surface—faded photographs. Extravagant claims were made for the abilities of solar enlargers, but experienced photographers knew better. If they wanted big pictures that were sharp and evenly illuminated, they used big plates. In 1886 one writer admitted that "so far, no self-contained apparatus for enlarging has been constructed that at all comes up to the requirements of perfect definition or illumination."[18]

Before the advent of the hand-camera enlarging was a peripheral issue; afterward it quickly became a central concern that was addressed by both the photographic industry and serious amateurs. (Professionals in general did not feel that they could afford to interest themselves in a new process until it had been perfected; fifty years after the introduction of the small camera, many of them still regarded enlarging as an amateur amusement.)

Enlarging would not become an altogether practical process until two requirements were met: faster printing papers, and a source of illumination that was more reliable than the sun. The first of these problems was solved with considerable dispatch by retrieving (and modifying) the principle on which Blanquart-Evrard's printing establishment of the early 1850s

was based. For a generation after the financial failure of his Imprimerie, the albumen print remained photography's standard method of making positives from negatives. Albumen paper yielded prints of great richness and subtlety. Since it was a printing-out paper, as opposed to a developing-out paper, it turned dark directly on exposure to the sun, without being developed in a chemical bath. Printing-out papers are slow, but not so slow as to make them unacceptable for contact printing—that is, for making prints the same size as the negative. In enlarging, however, the strength of the light transmitted by the lens is reduced in proportion to the increase in the area of the image; thus a 16 × 20–inch print requires sixteen times the exposure of a 4 × 5–inch print from the same negative. The beauty of Blanquart-Evrard's system was that the print required a very short exposure time, which resulted in an invisible (latent) image that was then made visible by development.

Albumen paper was slow, but perhaps an even more important reason for its decline and disappearance was the fact that once prepared it had a very short shelf life. For this reason it was normally sold only half-prepared: smoothly coated with beaten egg whites, but not yet sensitized. Before each day of printing the photographer would float the paper on a silver-nitrate solution, and dry it. Once dry plates could be bought in stores, sensitizing one's own paper must have seemed an atavistic ritual from another age.



Frank Hurley. *Shackleton Expedition, Antarctica*. 1916

The second condition to be met before enlarging could become a thoroughly normal part of the photographic process was the development of a light source that was powerful, simple to use, reasonably cheap, and not too flagrantly dangerous. Oil lamps were dim and dirty, incandescent gas mantles were cleaner but not much brighter, acetylene and limelight were bright and adventurous to use. In spite of the fact that it was unavailable at night and undependable by day, daylight remained the most common energy source for enlarging well into this century. (The 1911 edition of *Cassell's Encyclopedia of Photography* still devotes less space to enlarging by artificial light than to enlarging by daylight.)[19] The Eastman Kodak Company marketed its first enlarger with an incandescent electric light source in 1914; not until 1925 would a majority of the houses in the United States be served by electricity.[20] The modern vertical enlarger—an instrument that has finally distinguished itself from the slide projector—begins to appear in the ads of photography magazines in the 1920s, with the advent of modern miniature cameras.

The dedicated amateur who pursued photography as an art could not be expected to like the idea of photography for everyone, and advertising



Horace Nicholls. *For Queen and Country* (Funeral of soldier, Boer War). 1899–1902



Harry C. Ellis. Untitled. c. 1912

slogans such as "You press the button; We do the rest" brought him to the edge of despair. It was a common article of faith that art was hard and artists rare; if photography was easy and everyone a photographer, photography could hardly be taken seriously as an art.

Alfred Stieglitz was among those who at first viewed the new situation with some alarm. Sue Davidson Lowe, Stieglitz's grandniece, said that those amateurs who predated the Kodak felt threatened by it,[21] and in 1897 Stieglitz himself "frankly confesses that for many years he belonged to that class which opposed [the hand-camera's] use for picture making."[22] But by 1897 he had changed his mind, and considered the hand-camera an excellent thing. His conversion was perhaps due in part to his perception that "Photography as a fad is well-nigh on its last legs, thanks principally to the bicycle craze."[23]



Francis Galton. *Twenty-seven Members of the National Academy of Sciences.* c. 1885

The reception of the hand-camera by serious amateurs was thoroughly mixed. (Professionals, predictably, ignored it for years, virtually to the man.) Stieglitz thought that the key to the matter was patience, and recommended restraint: "It is amusing to watch the majority of hand-camera workers shooting off a ton of plates helter-skelter, taking their chances as to the ultimate result."[24] A little earlier an English correspondent to *Anthony's Photographic Bulletin* sputtered that "The button pusher becomes as much a photographic artist as the winder of a barrel organ becomes a celebrated musician."[25] The conservative view was perhaps the predominant one, but some writers embraced the potentials of the new system without reservation. One wrote, "There is only one way of obtaining fine negatives and that is by using many plates. . . . the larger the number of moderately poor ones you are able to throw away, the larger the percentage of successes you will have."[26] An even more radical thinker wrote "Whenever you feel the slightest interest in a subject, or when you commence to debate as to whether you had best 'waste the film' or not—make the shot, 'reflect afterwards.' . . . There is very little, if any, 'going back.'"[27]

William J. Stillman, who had done superb work in the wet-plate days, recognized the new potentials inherent in the hand-camera. As early as 1888 he wrote "In any circumstances, we must look to the Detective Camera, in some form, in some shape, for any important advance in such work as involves the extremely important conditions of unconsciousness in the subject of the photograph, and of constant readiness for securing a record of passing phenomena on the part of the operator.[28]

The hand-camera produced a new attitude toward the question of design, or composition. The viewfinders on early hand-cameras were approximate at best, and sometimes nonexistent. Eastman's first Kodaks had a "V" inscribed on the top of the box that provided a rough idea of what was included from left to right; the area included from top to bottom one

presumably learned by experience. This flaw was for the serious amateur perhaps not quite so serious a liability as it might seem, for the negatives were in any case too small for prints of the same size (contact prints) to be exhibited on the wall. It was necessary to enlarge them, and in doing so one could radically revise the original framing without reducing the size of the finished print. A writer in *The Photo Miniature* of 1900 spoke to the related issues of quick response while shooting and reconsideration of the results later:

If we are to secure records of life and incident free from that consciousness which betrays the fact that the actors in the scene were aware of the camera, we must work quickly, and this is a detail in which the hand camera is altogether superior to the clumsy camera on a tripod. . . . By subsequently enlarging such portions of a negative as may be required, we get, in an effective way, the scene or incident properly forming the picture. Many of the best pictures we see at the exhibitions are the outcome of this method.[29]

As early as 1886 one Andrew Pringle, in a contribution to *Anthony's Photographic Bulletin*, wrote, "When about to make an enlargement I first find the approximate focus and determine what part of the negative I mean to enlarge."[30] Carleton Watkins, who twenty-five years earlier had, with his mules, carried his huge camera and glass plates and darkroom apparatus into the remote Yosemite Valley, might have had difficulty understanding the permissiveness of this system. After carrying an 18 × 22–inch plate of glass into the mountains, and out again, he would surely have been determined to print it all.

The concept of composition acquires a new independence in the work of the pictorialist photographers, the term now referring not simply to the rational and economical disposition of the picture's various parts, but to a quality of *élan* in the picture's graphic structure that is unrelated to content. The hand-camera (hence enlarging, hence cropping) surely contributed greatly to the new sense of photographic design. Alfred Stieglitz's famous *Winter on Fifth Avenue* (1893) uses half the area of the original negative[31] and the cropped version is surely much more effective. By the 1890s reflex cameras of the Graflex type were being manufactured widely. These superb instruments allowed the photographer to see precisely the image that fell on the plate right side up, until the moment the shutter was released. This allowed him to compose boldly and focus selectively, since he no longer needed to worry that the subject would move after the plate holder was inserted and the focusing screen went dark.

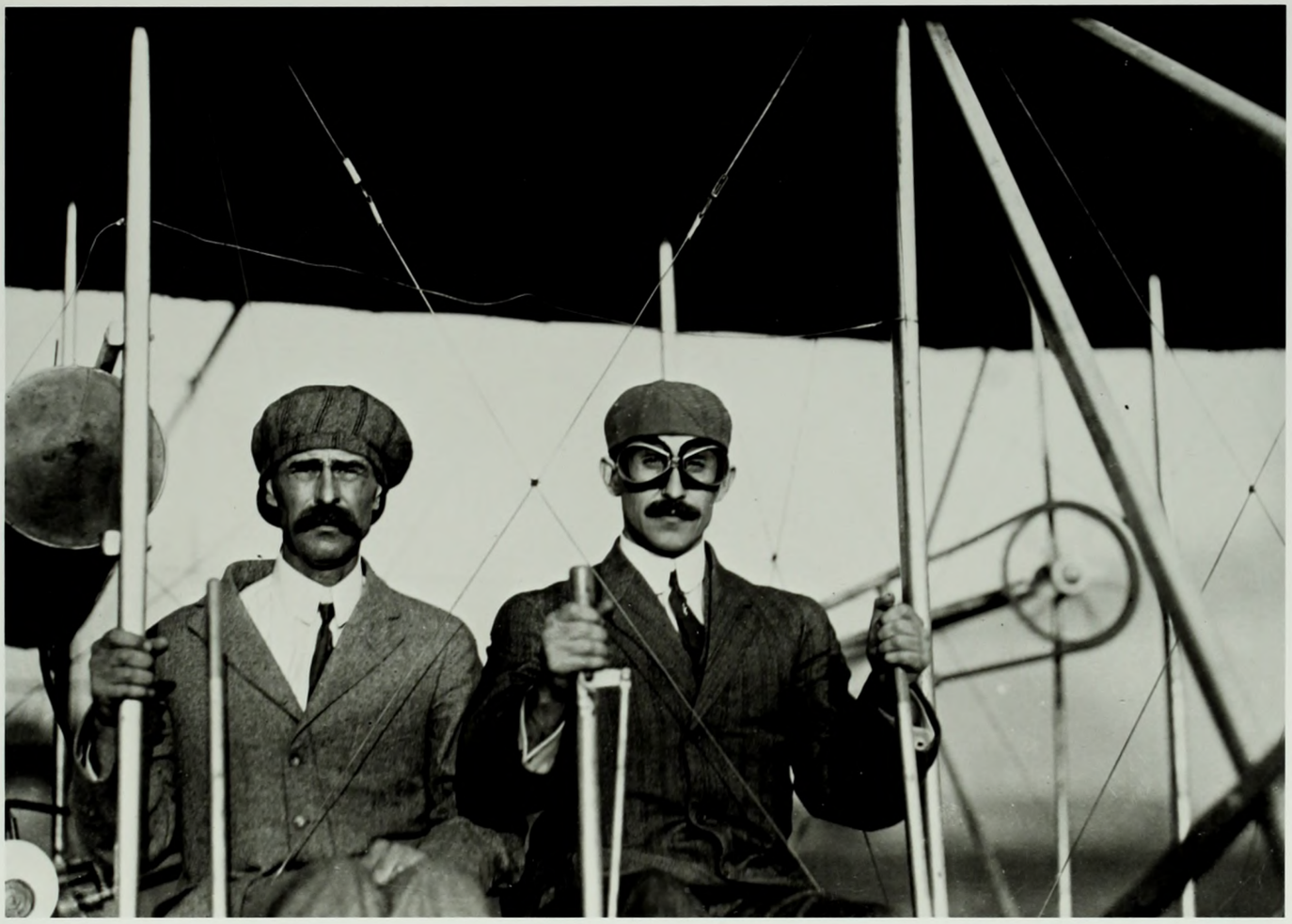
Those photographers of the 1890s who may have been familiar with advanced painting could have learned about cropping from artists such as Manet, Caillebotte, Vuillard, and Degas—most especially the last, whose



Heinrich Kühn. *The Artist's Umbrella.* 1910



Charles Dudley Arnold. *Ferris Wheel: World Columbian Exposition.* 1893



William Mayfield. *Orville and His Older Brother Rauchlin Wright at Simines Station.* 1911



Photographer unknown. *Aerial View of Lower Manhattan*. c. 1934

understanding of the "photographic" possibilities of the picture's edges as a motor of design was bolder and surer than that of any photographer of the period. Van Deren Coke states that Degas used photographs—specifically stereographs—as source material for his paintings as early as 1873,[32] extracting from them, and giving order to, their unexpected truncations, overlappings, spacial ambiguities, and inverted hierarchies. The issue, however, is complicated; similar qualities were accessible in Japanese prints, which had greatly interested Degas at least since the 1860s.

To the degree that the photographers of the pictorialist movement were influenced by recent ambitious painting, Whistler, a master of decorative arrangement and near monochromatic tonalities, was probably a more digestible source than painters of greater emotional complexity.

The most consistently inventive designers of the pictorialist movement were perhaps Alvin Langdon Coburn and Clarence White, Coburn's patterns being bold and graphic (p. 165) and White's refined and elegant (p. 158). Against all expectation, White's pictures of terminally irresolute women in hushed Victorian parlors are still good to look at, though they are supported by little except the sweet justice of their patterning and the harmony of their gray scale. White's style was formed in Newark, Ohio, and his knowledge of museum art presumably came through reproductions, in magazines such as *The Studio*.

If a photographer is to obey the dictates of Renaissance perspective conventions, the back of the camera (the focal plane) must remain perpendicular to the ground. If he wishes to include the top of a tall building he raises the lens rather than tilting the camera, so that the edges of the building will appear parallel to each other.[33] This four-square and law-abiding orientation was revised by the hand-camera, which was from the beginning pointed—intentionally and otherwise—in all directions, and which quickly demonstrated that horizons are not always horizontal and the edges of buildings not always parallel. With the hand-camera it was easy to shoot from shoe-top level, or to lean over the parapet and point the camera down into the *piazza*. It was in fact apparently difficult *not* to do these things, and very soon the world was full of bird's-eye and worm's-eye views, and pictures of buildings whose vertical edges disappeared toward a vanishing point, as railroad tracks formerly had. Very soon railroads were photographed from airplanes, and their tracks were proved to be as parallel as the sides of buildings formerly had been.

The question of whether or not the edges of buildings should be parallel was for some years heatedly debated, the traditional tripod types insisting (naturally) that they should, and the hand-camera people (who couldn't get the top of the building without tilting their cameras) claiming



Clarence White. *Spring, a Triptych.* 1898

convergence as a principle of truth and modernism. An uneasy compromise was finally reached that held that extreme convergence was acceptable, but subtle conversion unnatural.

The issue of the artistic status of photography, and thus of the photographer, was intimately related to the recent technical revolution. As long as photography was perceived as being an arcane and difficult craft, an aura of prestige clung to the practice, without reference to the quality of the work of the individual practitioner. But once photography became, in the Western world, virtually as common as literacy, it lost its craft mystique. Those who wished to advance the reputation of photography "as an art" felt themselves compelled to solve this problem by making categorical distinctions between instrumental photography, which served some social or economic need, and artistic photography, which served only abstract artistic virtue.

In the first chapter of his *Photography as a Fine Art* (1901), Charles Caffin states the modern position with admirable directness: "There are two distinct roads in photography—the utilitarian and the aesthetic: the goal of the one being a record of facts, and of the other an expression of beauty." Included on his list of utilitarian photographs are those "of machinery, of buildings and engineering works, of war-scenes and daily incidents used in illustrated papers." At the other end of his ascending scale "there is the photograph whose motive is purely aesthetic: to be beautiful. It will record facts, but not as facts."[34] Caffin also admitted the existence of intermediate motives, which would presumably produce pictures that were half-factual and half-beautiful.

The salvation of photography as a vehicle of artistic expression was seen to depend on its purification, through the instrument of societies and exhibitions that would deal only with pictures made in the service of purely aesthetic motives. The earliest of these new societies was the Club der Amateur-Photographen in Vienna, which in 1891 organized a competitive exhibition that was judged by six painters and sculptors. In London in 1892 The Linked Ring was formed by the disaffected members of the Photographic Society, to effect the emancipation of "pictorial photography . . . from the retarding and nanizing bondage of that which was purely scientific or technical."[35] In the same year the Photo-Club de Paris announced its first exhibition, accompanied by the warning that only work of real artistic character would be accepted.

In 1896 Alfred Stieglitz, an American who had studied in Germany and had been widely exhibited in the European salons, helped form the new Camera Club of New York, and did his best to make it a single-minded instrument of the new pure-art photography. By 1902, however, he had



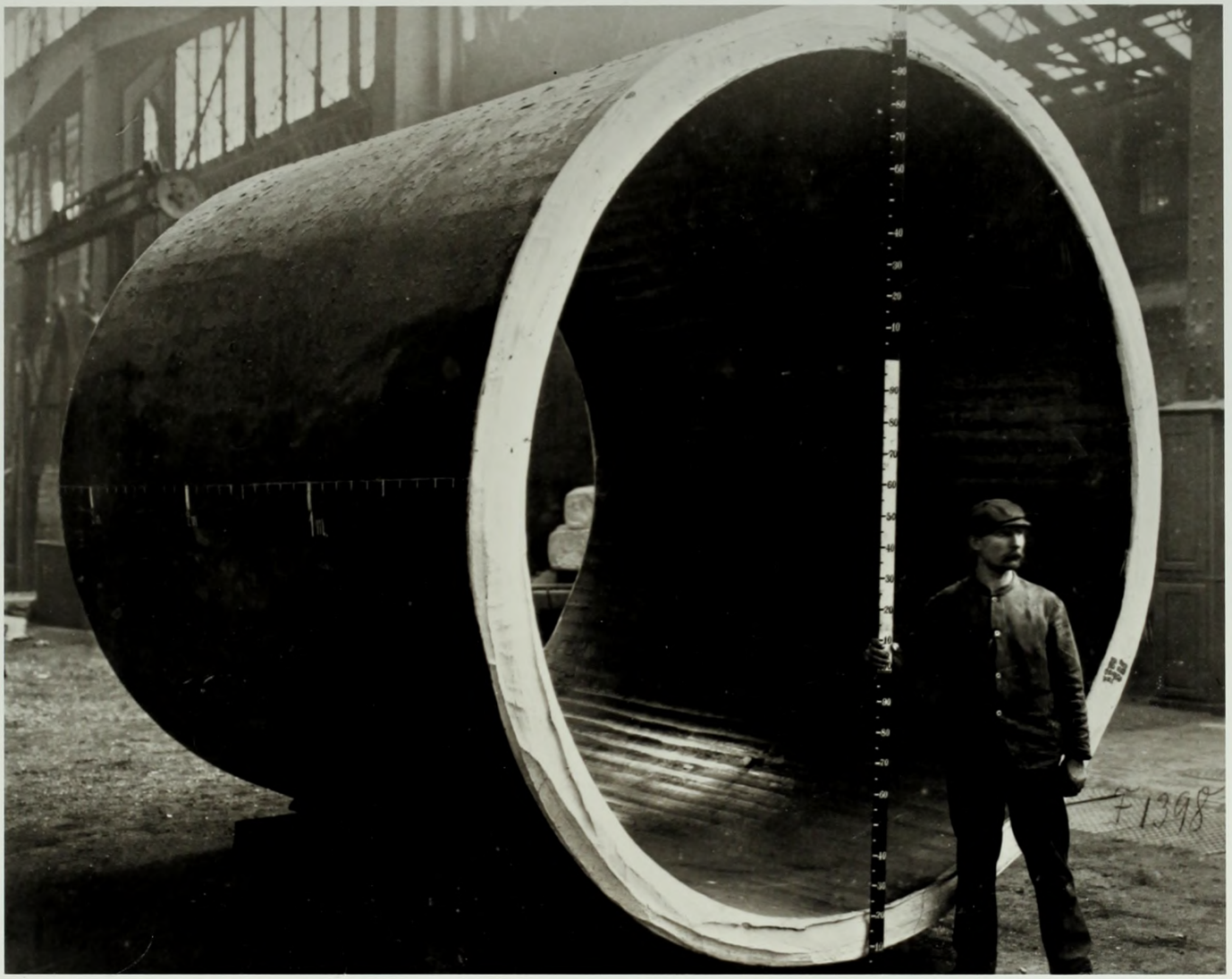
Photographer unknown. Coronado Beach, California. c. 1930

despaired of making it what he thought it should be, and so formed his own group, which he called the Photo-Secession.

Charles Caffin had said that the pure-art photograph would "record facts, but not as facts." This proved a difficult pledge to redeem, for it was difficult to expunge the factuality from photographs; in fact the facts of life seem more factual—more specific, harder, less plastic—in a photograph, where they are motionless and single-faced, than in life, where they have many aspects, and never twice seem quite the same.

But if the pure-art photographer could not altogether erase the factuality of facts, he could, and did, restrict himself to those varieties of facts that seemed most redolent of conventional artistic practice and sentiment. The range of subject matter pursued by pictorialist photographers was remarkably narrow. An analysis of the pictures reproduced in Caffin's own book may give a fair sense of the raw material that seemed consonant with the artistic ambitions of the photographers he admired in the first year of this century: of the eighty-three illustrations by identified photographers, forty-six might be classed as portraits, of either specific individuals or familiar types; thirteen more are figure studies, often with some classical, historic, or allegorical reference; thirteen are bucolic landscapes; eight are genre scenes. None is "of machinery, of buildings and engineering works, of war-scenes and daily incidents used in illustrated papers," or of subjects describing commerce, modern industry, science, or public spectacles. On the basis of content it would be difficult to identify with confidence the place or century of origin of any of the illustrations, perhaps excepting one by Clarence White that shows telephone poles and store signs, and one by Stieglitz that includes a clearly described modern baby carriage—a machine of sorts. This historical and geographic vagueness was of course intentional. For the photographers in question art existed in an ideal country of the mind, where time had long since stopped.

In their battle against excessive factuality the photographers of the pictorialist movement had two new technical improvements at their disposal. In 1896 the lensmaker Dallmeyer produced, at the request of a painter named Bergheim, a lens that softened a little the needle-sharp character of the image, without making it actually fuzzy. Those photographers who felt that Dallmeyer had not gone far enough smeared a little vaseline oil on their lens. Perhaps more effective was the popularization, by the French amateur Robert Demachy, of the gum-bichromate method, a modification of a printing process invented forty years earlier by Alphonse-Louis Poitevin, a chemical engineer and a photographer. Poitevin had demonstrated that a mixture of gum arabic, potassium bichromate, and pigment is light sensitive, becoming less soluble in water according to the



Photographer unknown. *Inside of the Turbine Tube, Fried. Krupp Cast-Steel Factory, Essen.* 1911



Edward Steichen. *Portrait of Miss Sawyer.* c. 1914

degree of its exposure to light. If a piece of paper coated with this mixture is exposed to light through a photographic negative, the coating hardens where it has been exposed; the image is made permanent by washing away the unexposed, unhardened areas. If the pigment was carbon the print would be as permanent as the paper on which it rested. Demachy noted, however, that while the print was still wet any part of the image that was not wanted could be removed with hot water. Photography, using the gum-bichromate process, became a kind of inverted painting in which the artist, using a brush charged with hot water, subtracted what he did not want, rather than adding what he wanted.

The redeeming virtue of the process was that one could repeat the operation, recoating the paper with a new mixture that contained a pigment of a different color, then reexposing it, and thus construct a real (if synthetic) color photograph. Edward Steichen's variant prints of the *Flatiron Building* (pp. 166, 167)—in which he used the process to enrich rather than dilute fact—are perhaps the masterworks of this exotic chapter in photography's history.

It is worth noting that Stieglitz's own work was generally more open to the poetic possibilities of facts than that of most of the photographers whom he championed in his splendid magazine *Camera Work*, and in his gallery, The Little Galleries of the Photo-Secession, known as 291.[36] One might venture that Stieglitz was both an artist of high talent and a man with a taste for power, and that the requirements of these two ambitions were not always consonant. To establish and preserve his authority over pictorial photography in America—and wherever else his influence might reach—he made the small concessions that a politician properly makes as the price of leadership. By 1910 Stieglitz's hegemony was so unquestioned that he was granted complete authority over an international exhibition of pictorialist photography to be mounted at the Albright Art Gallery in Buffalo, New York. The exhibition showed 600 photographs, and presumably constituted a recapitulation of what Stieglitz had represented for twenty years. It does not seem that the exhibition renewed Stieglitz's energy or ardor; after the Buffalo show his magazine and his gallery paid less and less attention to photography, and more to modern artists such as Cézanne, Rodin, and Picasso.

By 1912 the subscription list of *Camera Work* had fallen to 304 from the 1903 high of nearly 1,000. In 1917 he stopped publication of his magazine, after fifty issues, gave up his lease on 291, and resumed his life as an artist.

Stieglitz believed passionately in individual freedom, and was determined that everyone else should share this view. In 1899 he wrote that Vienna had "led the way in founding a new school of pictorial photography, . . . bringing out individualism wherever possible. . . . It was not long



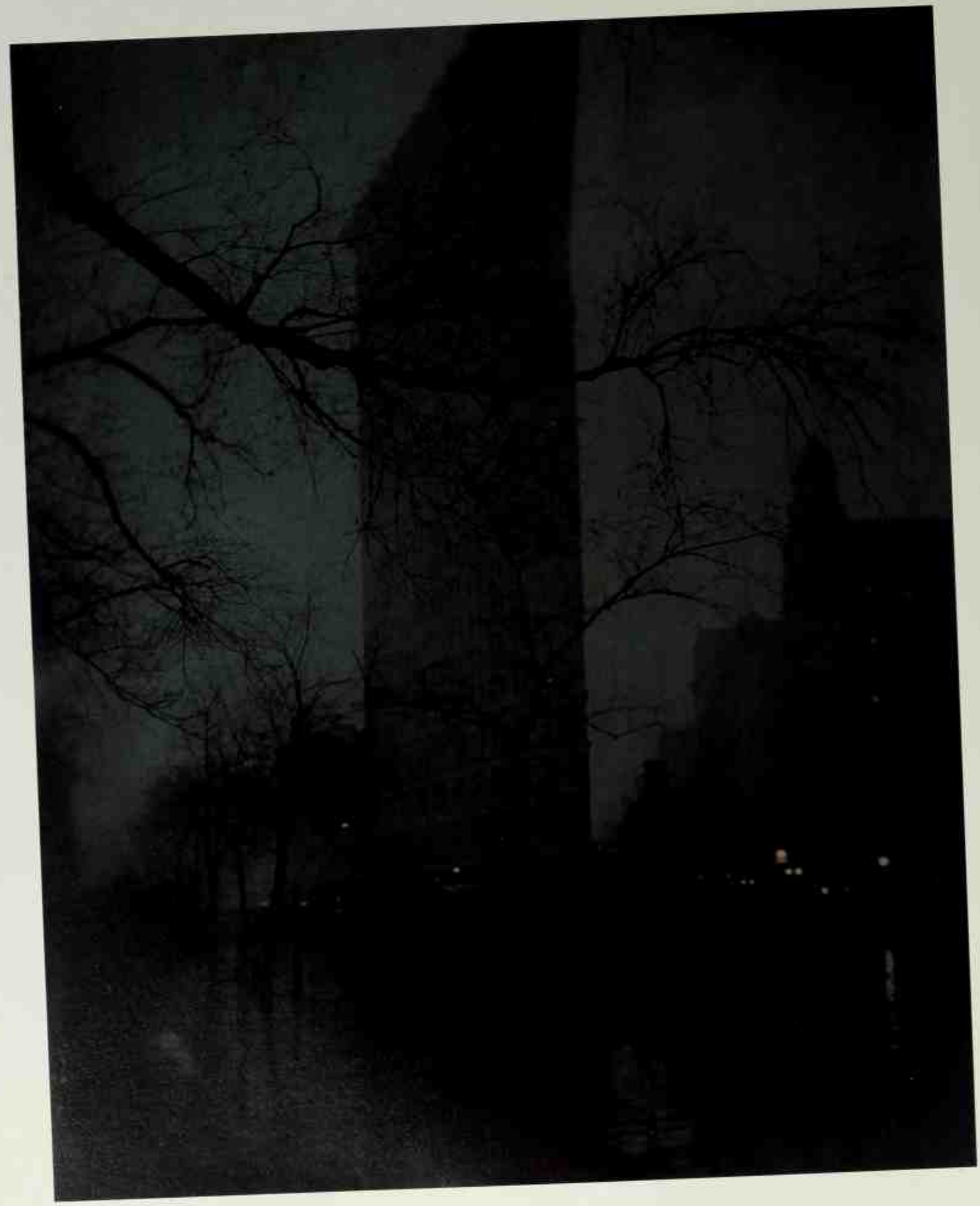
Hans Johann Josef Watzek. Portrait. 1898



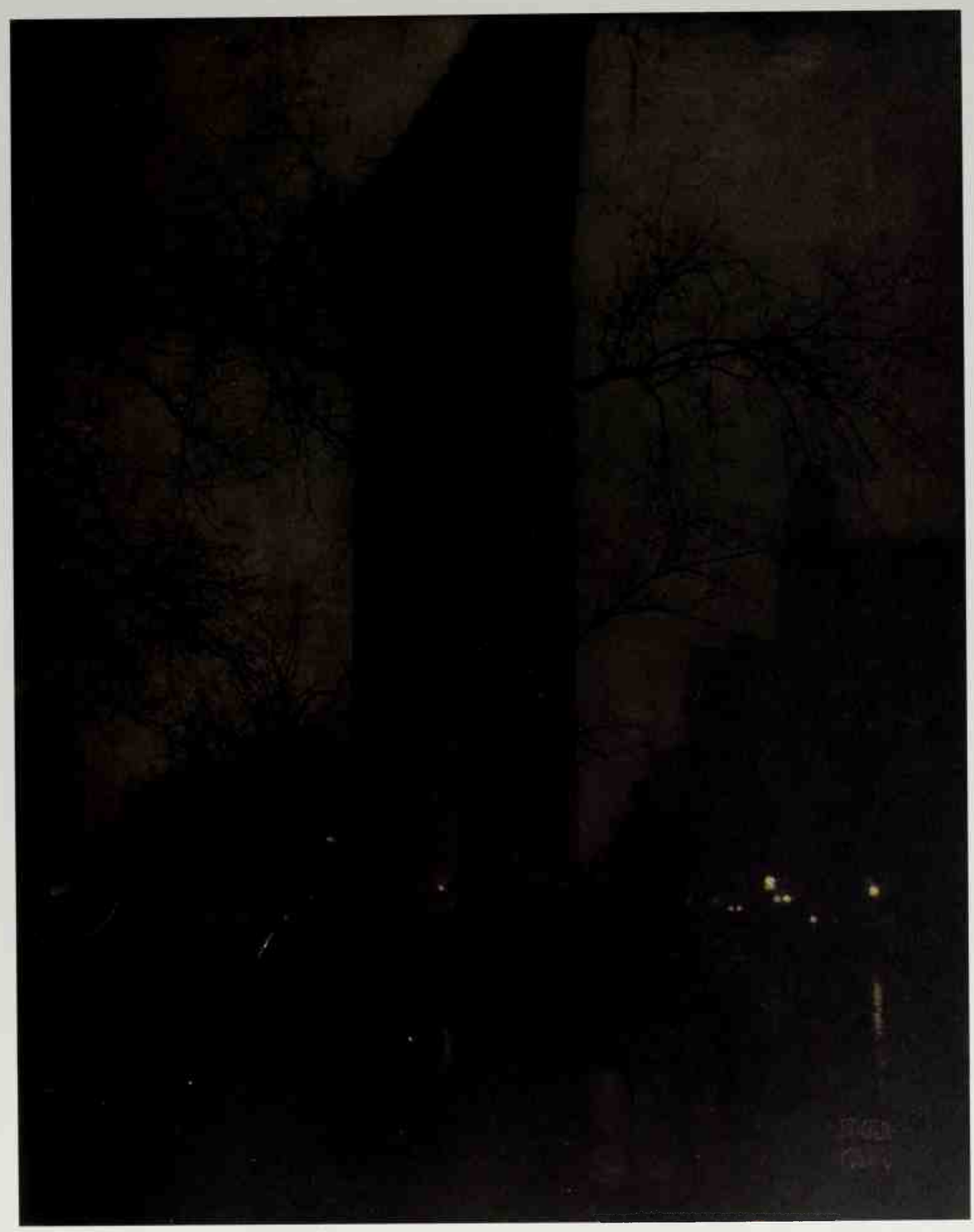
Alfred Stieglitz. *Flatiron Building.* 1903



Alvin Langdon Coburn. *Flatiron Building.* 1912



Edward Steichen. *Flatiron Building.* 1904, printed 1909



Edward Steichen. *Flatiron Building.* 1904, printed 1905

before their influence was made manifest, France and Germany falling into line."[37] It was Stieglitz's flaw that he saw nothing comic about the idea of falling into line to serve individualism.

The withdrawal of fine-art photography from the larger, more catholic photographic enterprise seems in retrospect rather like the schism of a half-century earlier, when the artists who loved the calotype separated themselves from the professionals who favored glass. The difference was that the earlier argument involved issues of substance as well as status, while the latter seemed less concerned with the practice of photography than with the public's perception of it.

But if the aims of photography's fine-art movement seem narrow, its influence was real. By defining simplistic, easy-to-understand standards by which *artistic* photography could be identified and judged, the movement relegated the rest of photography to the status of simple record-keeping. Thus in France Eugène Atget and the Seeberger brothers worked outside the ken of Robert Demachy; in Germany Waldemar Titzenthaler would have been out of place in the advanced salons; in America the work of Carleton Watkins or William Rau or Jacob Riis would not have made the point that Stieglitz was determined to make. Even within the Photo-Secession group itself a puzzling split personality was visible. Frances Benjamin Johnston was a member, and had exhibited safely unexceptionable artistic pictures in the members' group shows, but her great professional work—such as her superb essay on The Hampton Institute—would not have been appropriate for 291. It would have confused the issue.

It is interesting to note that although Stieglitz shared the city of New York with both Jacob Riis and Lewis Hine, he does not seem to have suggested, in his voluminous transcribed conversations, that he had ever heard of either of them. Riis, of course, was a much older man, and might have been in Stieglitz's eyes a hit-and-run photographer—a journalist-sociologist-politician-writer, who had in a brief span of time, and with the assistance of two friends, made marvelous pictures, none of which can with certainty be credited to any one of the three, and who is not known to have ever made a print. Hine, on the other hand, was a dedicated and committed photographer who since the first decade of the century had described the American industrial system from the bottom, in terms of the lives and faces of the workers on whose muscle and skill it rested. Stieglitz was also interested in the worker. When he was thirty-two he said, "Nothing charms me so much as walking among the lower classes, studying them carefully and making mental notes."[38] What Stieglitz imagined to be the superior naturalness and vitality of the poor was for him the raw material that might be transformed into art—an intense and concentrated sublimation of something vital but particular into something vital and universal.



Frances Benjamin Johnston. *Geography: Studying the Cathedral Towns.* 1899–1900



Lewis Hine. *Bowery Mission Bread Line.* 1906



Photographer unknown. *The Great Nave: Wounded Soldiers Performing Arms Drill at the End of Their Medical Treatment, Military Hospital, Grand Palais, Paris.* 1914–16

Stieglitz's conception of art, and the demands of his ego, required that the transformation not be hidden, that the thing he made be ravishing and independent, that it be clearly superior to the facts it incorporated. Hine's pictures are of course also transformations—are merely photographs: intuitive resolutions of problems that offer imponderably complex options—but the vocabulary of his pictures is so plain and transparent, so free of rhetoric, that we are free to regard them as life itself. The gulf that separated Stieglitz and Hine was in the end not merely a matter of dissimilar personalities and ambitions, but of divergent artistic strategies. For Hine's purposes, his strategy was perfect, and it so cleverly concealed his art that even Stieglitz was deceived.

During the years when Stieglitz had devoted his best energies to proselytizing for the cause of pictorialist photography he had assembled, at substantial cost, a collection of more than four hundred prints by photographers of most of the countries of the western world. By the 1930s, according to Sue Davidson Lowe, only some of the Steichens and most of the Strands still seemed good to him;[39] the collection as a whole was a depressing reminder of past disappointments. In the meantime the pictorialist movement, bereft of leadership and function, had deteriorated into a huge network of local salons, each of which held annual exhibitions of work that continued, decade after decade, to refine the most attenuated ideas of the original pictorialists. The triviality of this work further deflated the reputation of the originals on which it was based. When Stieglitz decided to free himself of his own collection, it had no real market value. After he threatened to destroy it, the collection was accepted as a gift by the Metropolitan Museum of Art, where it remains, a great monument to an idea that did not quite work.



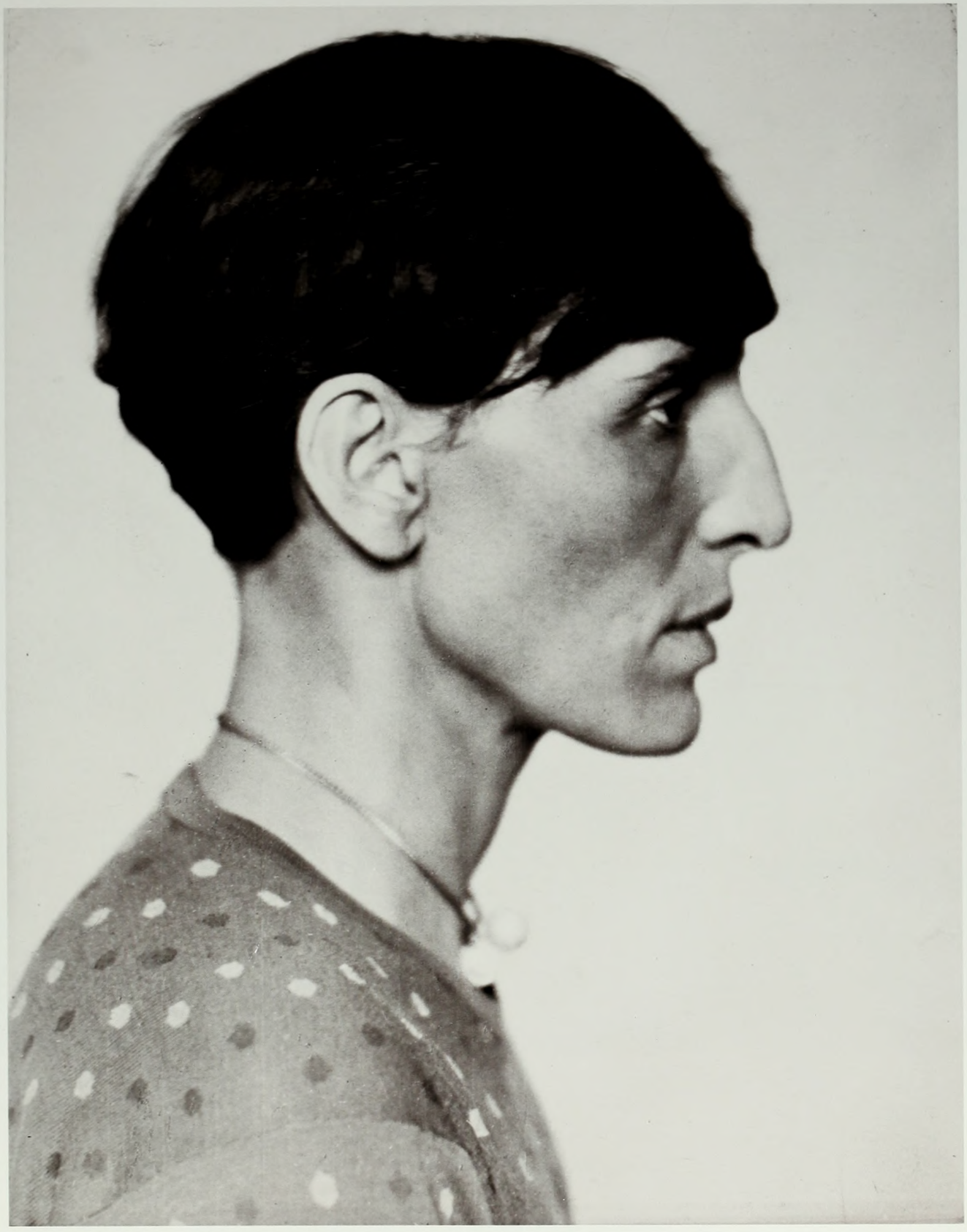
Paul L. Anderson. *Sunday Morning.* 1939



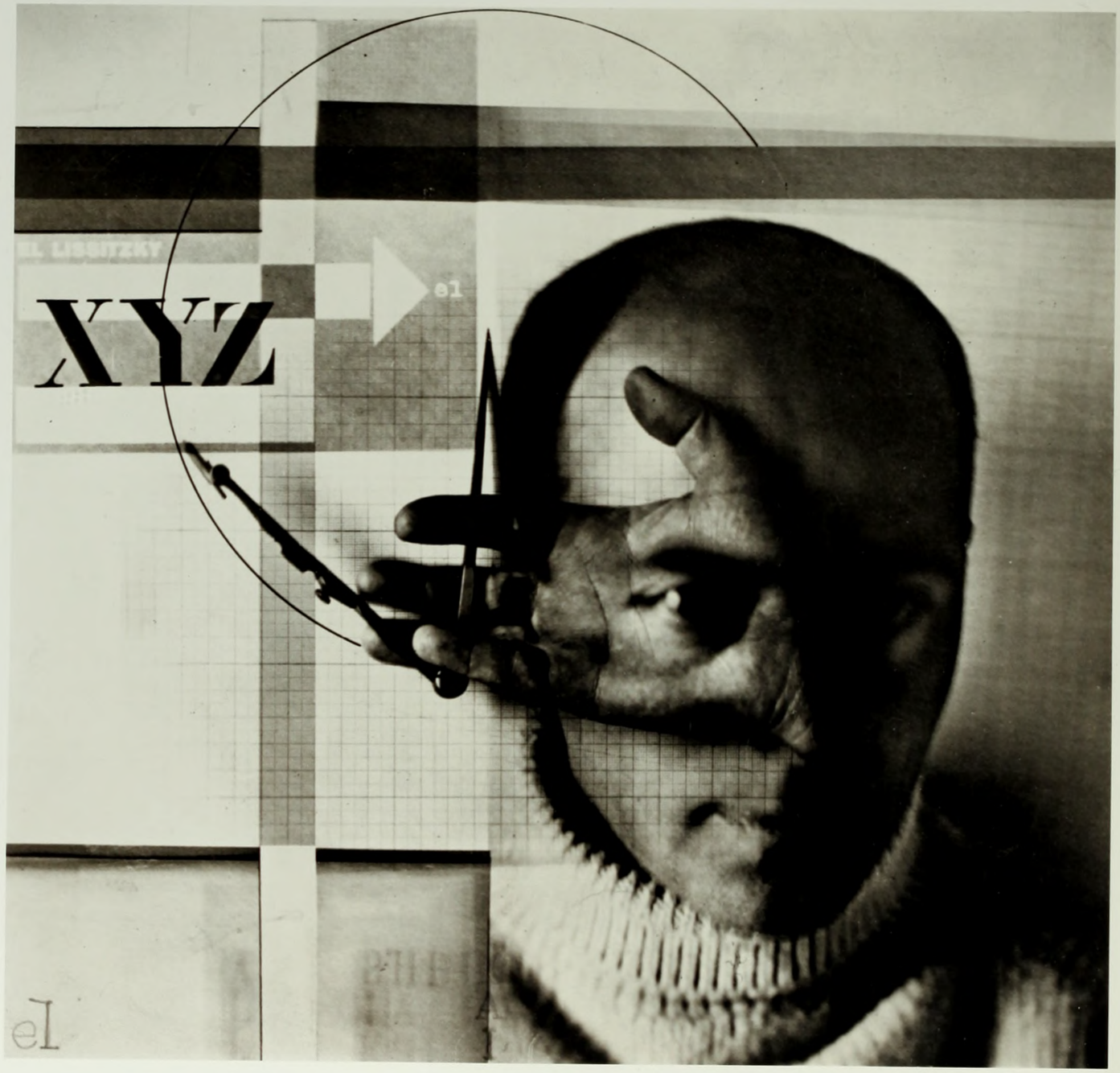
Gertrude Käsebier. *Baron Adolf de Meyer.* 1903



Hugo Erfurth. *Mies van der Rohe.* c. 1930



Hugo Erfurth. *Renée Sintenis.* c. 1925



El Lissitzky. *The Constructor (Self-Portrait).* 1924

6. Photographs in Ink

During the nineteenth century photographers struggled with two central and difficult problems. One was the specter of impermanence—the threat of the disaster that had so cruelly diminished Talbot's achievement. The second was the problem of finding a way to produce photographs in quantity and at prices that would make them competitive with lithographs and wood engravings, and thus bring photography fully into the world of publishing.

As the practical knowledge of photographic chemistry advanced, the problems of fading and yellowing were brought under provisional control; by the 1860s most photographs made by experienced professionals were likely to last as long as their buyers, at worst deteriorating so slowly that the owner's fading eyes were not likely to notice. There were nevertheless many exceptions; the stability of the image demanded close attention to a dozen details of craft, and sometimes the craftsman's attention wandered, causing thousands of photographs to turn pale or jaundiced or leprous too soon.

The mass production of inexpensive photographs also proved an elusive goal. Blanquart-Evrard had tried and failed. Photographers such as Francis Frith succeeded, within a narrow compass, by concentrating on photographs that were essentially souvenirs for tourists, and by selling them not only in bookstores and print galleries but in hotels and tea shops. Nevertheless, Frith's prints were not cheaper than Blanquart-Evrard's; his largest views from Egypt sold for ten shillings each,[1] half the weekly wage of a photographer's assistant.[2]

The obvious answer to both of these problems was to find a way to print photographs in ink. In regard to permanence ink is basically carbon, famous for its stability, and a print in ink is finished when the ink is laid on the paper; it does not require that a dozen chemical devils be exorcised laboriously from the sheet. In regard to speed and economy of production, a hand-powered press in 1850 could produce an average of 250 impressions an hour.[3] Photographic printing processes could not begin to match even that speed, and after mid-century new machine-driven presses increased output dramatically.

If the obvious answer was photographs in ink, the obvious problem

was how to reproduce with black ink a photograph's subtle and continuous scale of grays.

The standard systems of printing by which pictures are reproduced in ink do not produce true halftones, but only the illusion of halftones. These systems are binary, like computers: they can answer only yes or no—ink or no ink. If one wishes to create the illusion of a scale of grays one must find a method of modulating the size and distribution of bits of black ink, so that, in combination with the white paper, they will fool the eye.

This is true for the modern photolithographer, who can print tonal gradations that seem as smooth and seamless as the inside of a seashell, and it was true for Albrecht Dürer, who was born about the time that Gutenberg died, and who worked on both sides of the turn into the sixteenth century. In his youth he made woodcuts, in which the white part of the picture was made by cutting away slivers from the face of the wooden block. The remaining surface of the wood carried the ink, like a rubber stamp, and deposited it on the paper to make the print. Later Dürer became one of the first masters of a new method of multiplying pictures called engraving, in which lines were cut into a metal plate with a clawlike knife called a burin. In this system the code was reversed, and the narrow trough cut into the plate carried the ink, and printed black. Much finer and more varied marks, in closer proximity, could be made in engraving, which allowed a greatly enhanced illusion of middle values. But the advance was not without cost, for engraving—unlike the woodcut—was not compatible with the Gutenberg system of relief printing with movable type.

After line engraving came etching and mezzotint and aquatint, which allowed progressively freer and faster ways of suggesting real space, chiaroscuro, and tonal variation. At the end of the eighteenth century Aloys Senefelder invented, out of whole cloth, lithography, a completely new system that allowed the graphic artist to draw his picture with a crayon, with perfect authographic freedom. But like engraving and the other intaglio methods, lithography was incompatible with relief printing; if such pictures were to be used as illustrations in books they had to be printed separately, and bound into (or pasted onto) the text sheets.

The early nineteenth century saw an unprecedented growth in popular publishing. In 1833 France passed a law requiring the communes to establish schools and pay their teachers; in the same year state subsidized education was begun in England.[4] The reasons for these momentous changes surely touched on industrial society's need for skilled workers who could read technical manuals. Industrialization spawned great metropolises, which spawned newspapers in greater numbers and of larger circulation than had ever existed before.

The needs of the newly expanded middle class and the new, semi-



Francis Joseph Bruguière. Cut paper. c. 1928



Ralph Steiner. *Ford Car.* 1929

literate urban working class (and the needs of their employers) encouraged the publication of popular illustrated books and periodicals. The essential requirements of the system for illustrating such publications were these: it should be able to print pictures quickly in substantial numbers, using the same presses, inks, papers, and craft skills that were required to print texts from movable type.

The method that best satisfied these requirements was the wood engraving. (It is an unfortunate term, since it suggests a kinship with the line engraving. The wood engraving was in fact an improved version of Dürer's woodcut, which was cut into the end-grain rather than the plank of the wood.) The wood engraving had had a long and honorable history, during which its maker was often the author as well as the transmitter of the picture, but by the Victorian period his work was generally the vehicle that carried, more or less intact, a message designed by another. The skill of the nineteenth-century wood engraver was, at best, astonishing, and could produce convincing imitations of line engraving, etching, drawing, and mezzotint. It was said a little later that the wood engraver came to resemble the polyglot who learned many languages and forgot his own. But he was for half a century or more the indispensable figure when illustrations were printed with type.

The pictures that the wood engraver translated for publication were only rarely photographs; most often they were drawings, or prints after paintings. The reasons for this were partly technical. The extraordinarily subtle tonal distinctions in photographs, and perhaps more important, that lack of conceptual neatness in them that Daguerre called "nature's artlessness," made them difficult to transcribe by means of the vocabulary of lines and dots on which the engraver depended. But there were perhaps more fundamental reasons why publishers were slow to use photographs in large numbers. One reason was that photography could not supply many of the pictures that were needed. There were scores of photographs of Napoleon III, but none of Napoleon I or Napoleon II, or of Thomas Jefferson, or William IV, Victoria's predecessor, all of whom had died too soon. Nor were there photographs of the Tower of Babel, or the first dwelling of the Pilgrims in Massachusetts, or of Daguerre's Diorama, which had burned to the ground before Daguerre found time to photograph it. In photography's early days there were no historical photographs, a shortcoming that could not be corrected quickly.

Even if a person or a building or an event was available to be photographed, it was necessary for the photographer to go to the subject to make the picture, which was often inconvenient, slow, and costly. The draftsman suffered under no such handicap. In 1842 much of the first issue of the *Illustrated London News* was devoted to pictures of events surrounding a

splendid state ball, which the Queen, the Prince Consort, and the infant Prince of Wales attended. The artist, John Gilbert, later admitted that he had not witnessed any of the events that his drawings described.[5] On reflection there is perhaps no reason to think that Gilbert (later Sir John) should have found this odd. In the same year he exhibited a painting that showed Holbein painting Anne Boleyn.[6]

By 1875 the Frenchman Charles Gillot had developed a practical method of producing metal relief plates by direct photographic means. Such plates are still called "line cuts," and are capable of reproducing only solid lines and areas of undifferentiated tone. They were thus incapable of reproducing continuous-tone originals such as photographs or paintings, but they were excellent for reproducing traditional prints or drawings with strong lines. By 1880 the wood engraver was in retreat, and by the turn of the century he was suddenly an anachronism, used infrequently, as a sop to his skill and recent importance, as illustrator of deluxe books of marginal relevance. To the injury of obsolescence artists added the insult of imitation, and made ink drawings to resemble woodcuts, which were then reproduced photomechanically.

Thus photomechanical reproduction triumphed to reproduce not photographs, but works in the traditional graphic arts. Nevertheless, by 1880 most of the machinery was in place that during the next generation would allow photography to become the dominant illustrative system of the twentieth century.

Gillot's sensitized plate could be encoded by light and then etched into relief to print flat tones of ink. The remaining problem was to find a way to break the tone into bits, analogous to the engravers' dots and lines, that would by variation in their size or concentration produce the illusion of continuously graduated tone. This had been achieved several times during photography's first generation in both intaglio and lithographic systems, but not yet in relief printing.

Photography's first tentative successes had been based on two distinct principles. The work of Daguerre, and the first work of Talbot, was based on the fact that light could reduce silver salts to molecular silver. The photographs of Niépce, on the other hand, were based on the fact that certain substances, soluble if kept in the dark, became insoluble on exposure to the light. On the basis of this alternative principle Niépce succeeded, as we have seen, in making photographs in ink before Daguerre had succeeded in silver. His etched plates, however, worked well only for the reproduction of engravings, or of other traditional prints that carried their own code for the representation of halftones.

In the decades following the announcement of Daguerre's discovery

experimenters throughout Europe struggled with the problem of how photography could be married to the technology of ink. By October 1839 Daguerre had already despaired of the efforts to etch the pictures that bore his name. He wrote that he was "more than ever convinced of the impossibility of engraving a plate which will produce prints that even approach the maximum image perfection of [the daguerreotype]."[7] Three years later Hippolyte Fizeau succeeded in pulling prints from etched daguerreotypes that preserved much of the information of the original, and a hint of its character, but the process was difficult, costly, and limited, and the result not good enough.

Talbot became interested in photographs in ink perhaps fundamentally out of his distress in seeing his early chemical prints fade badly within a few months of their making. He devised a system basically like that of Niépce, except that for bitumen of Judea he substituted a mixture of potassium bichromate and gelatin, which also hardened on exposure to light. If one exposed this plate through a finely articulated fern, or a piece of lace, and then etched it, the plate would print satisfactorily; but if the subject was an oak leaf the etched area was too broad, and would not hold the ink. To solve the problem Talbot exposed the plate through not only his subject (whether found object or photograph) but also through a folded piece of finely woven fabric, which broke the effect of the light into small parcels that, according to their strength, affected the sensitive plate more or less vigorously. The finished plate held its ink in a finely patterned net of cells. Talbot also noted that it would be better to cover a sheet of glass with "innumerable . . . fine lines, or else with dots and specks, which must be opaque and distinct from each other."[8] This is an excellent definition of the halftone screen that was finally developed twenty years later. A little later Talbot replaced his primitive fabric screen with a random ground of powdered resin, fixed to the plate by heat, as the aquatint makers had done it. Talbot called his pictures photoglyphic engravings, but by 1856 his process was in all essentials what we call photogravure.

During the same years Alphonse-Louis Poitevin, we recall, discovered that Talbot's bichromated gelatin not only became less soluble on exposure to light; it also became water-repellent—just like the lithographer's greasy crayon. Thus when such an emulsion was exposed through a photographic negative, and the unhardened emulsion then washed away, the remaining image accepted lithographer's ink, while the wet stone repelled it. During the following years many variations on this method were developed, each with its own name, but all printed from a plane surface—neither incised nor raised—and all depending on the basic lithographic principle that oil (or oily ink) and water do not mix.

Throughout the latter half of the nineteenth century, photographic

publications of superior quality were intermittently produced in the planographic processes and in gravure.[9] It is perhaps incorrect to think of the prints in these publications as reproductions; they were generally made from the original negative, not from chemical prints, and it would seem that both photographers and publishers thought of them not as a means of replicating photochemical prints, but as an alternative to them. The edition size of these books and portfolios was generally modest, partly because of the relatively short lives of the plates, but mainly because the processes were expensive and the market limited. It would seem that mid-nineteenth-century photographic publications produced in ink did not greatly exceed in edition size those illustrated with silver prints. Surely no publication in ink compared in edition size to that of a popular carte-de-visite, which was produced as a silver print.[10]

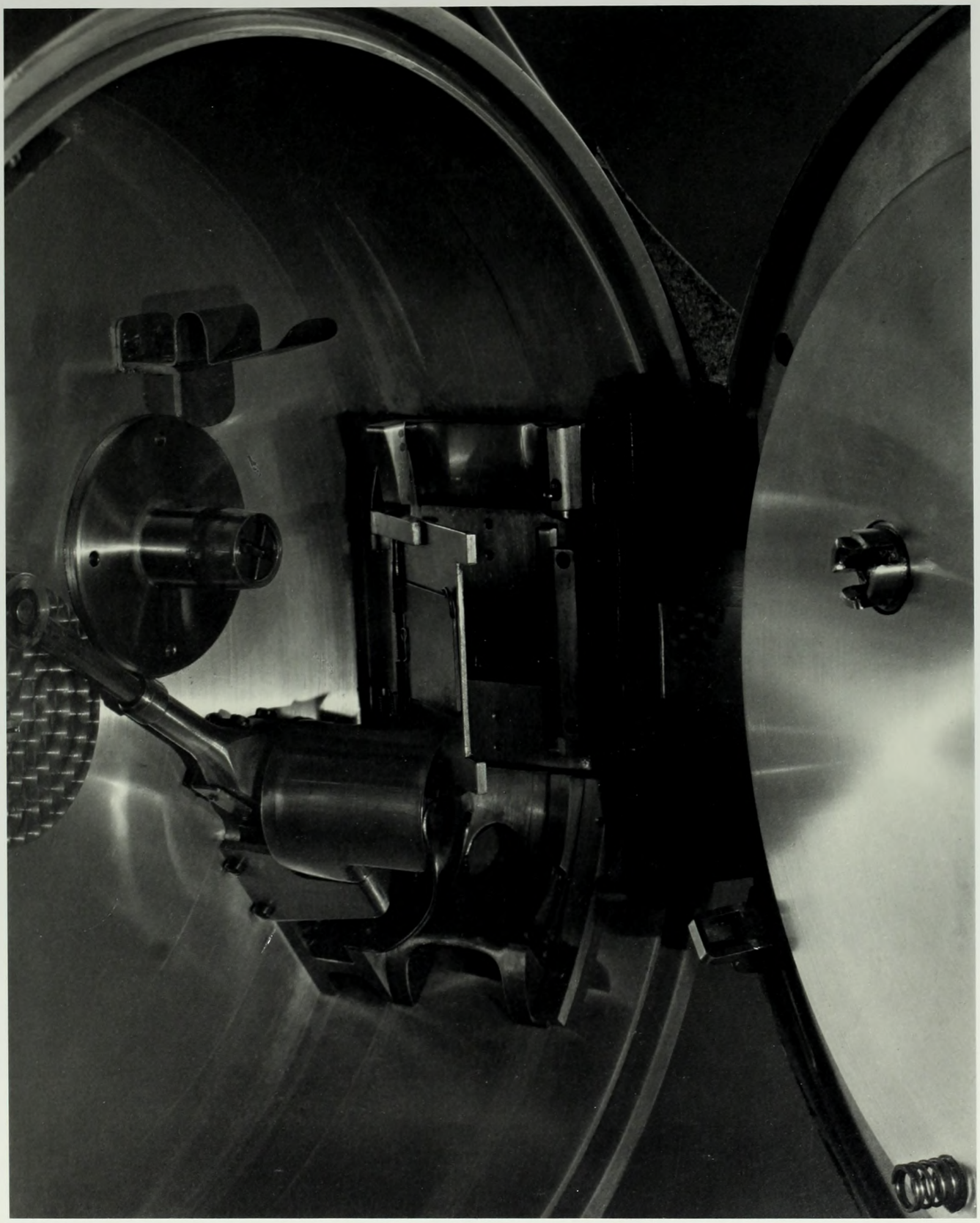
The halftone screen that Talbot had proposed in the 1860s was finally perfected for relief printing in the 1880s.[11] This development constituted a change in kind, and was of radical importance to the evolution of photography's ends and means.

Relief (letterpress) printing presses had achieved a high degree of sophistication by the late Victorian period. They were fast and would print on cheap paper, and both type and illustration blocks would survive very large runs. With the coming of the halftone block, relief printing reestablished an easy integration of words and pictures that had been absent since the development of movable type more than four centuries earlier. By 1890 any monochrome picture, whether in halftone or simple black on white, could be reproduced along with type, cheaply and in large editions.

There were four possible attitudes that photographers could take toward the new potentials of photography in ink. They could regard the new system as a cheaper and easier way of replicating photographs, different in technique from but similar in purpose to the recalcitrant chemical methods. Or they could see the new system as constituting a new medium, in which photographs and text worked together to create a third meaning. Or they could think of it as a way of combining photography with drawing and typography to produce a new species of graphic art. Or finally they could reject the new method as intrinsically inferior, and a vulgarization of real photographs, and proceed to make pictures so exquisite in quality (and often so esoteric in content) they were beyond the reach of photomechanical systems (and often beyond the interest of those the systems served).

To the degree that photomechanical reproduction came to stand as a substitute for the chemical print, it caused the death of the photographer as a small, independent publisher.

At the beginning of this century most professional photographers



Paul Strand. *Akeley Motion Picture Camera.* 1923



Jacob Riis. *In the Home of an Italian Rag-Picker, New Jersey.* c. 1889

made their living by selling photographs. Some of these were made on assignment, and others on speculation. Among the latter would be pictures of the local beauty spots, engineering wonders, historic sites, Indian chiefs, etc., which the photographer would sell out of his own studio, and sometimes in local bookstores and hotels. Postcards were printed photographically in very large quantities, and sold anywhere one could buy a cigar. Small operators did on a local level what Frith, Francis Bedford, William Henry Jackson, the Alinari brothers, and others did on a large scale for an international clientele; but as photomechanical reproduction assumed the functions they had served their enterprises changed or failed. The new system did not, however, precisely follow the pattern of the old, since the economics of photomechanical reproduction required large editions.

In 1875 H. H. Snelling had advocated the wider use of photographic (photochemical) prints for book illustration. He claimed that prints of octavo size could be sold to the publisher for fifteen or twenty dollars per thousand, and that at this price photographs would be competitive with wood engravings for editions of up to 5,000 copies.[12] The photomechanical halftone block, however, was much cheaper than the handmade wood engraving, which radically narrowed the area in which photochemical prints could compete with images printed in ink.

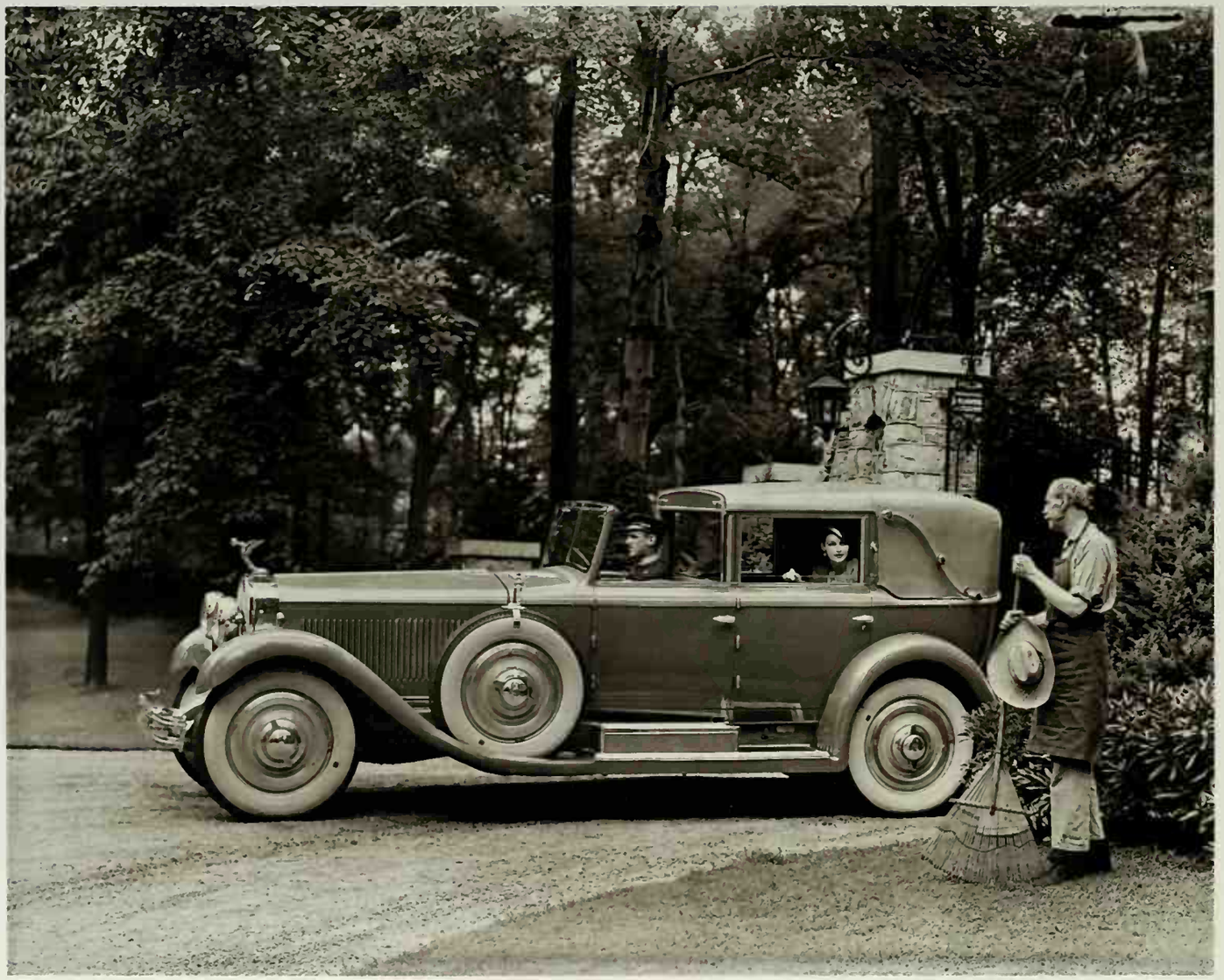
With the halftone process, larger runs were increasingly efficient, and the predictable result was larger editions of fewer pictures. By the mid-nineties William Henry Jackson found that photomechanical reproduction had already cut into the market for his silver-print landscapes, and it seemed a sound business move to join the Detroit Publishing Company, which produced seven million prints a year by a lithographic process.[13]

In spite of its great practical advantages, the halftone relief block in its early years rarely achieved a standard of reproduction quality that provided a fair approximation of the original photograph. This was important not only to those who were concerned with artistic or scientific values, but to anyone who prized photography for the realism and immediacy of its descriptive power.

In the late 1880s Jacob Riis (or Richard Hoe Lawrence, or Henry G. Piffard, or all three)[14] made an extended series of photographs that described the appalling living and working conditions endured by the new immigrant poor in New York slums. In 1890, when Riis published *How the Other Half Lives*, a majority of the thirty-six photographs selected were reproduced as translated by line drawings. Neither the line cuts of the drawings nor the primitive halftone plates made directly from the photographs preserved more than a faint echo of the authority of the original photographs. This probably did not surprise Riis, who continued to show the photographs as projected lantern slides, to accompany the lectures that



Kenyon Cox, after Jacob Riis. *In the Home of an Italian Rag-Picker, New Jersey.* 1889–90 (from Jacob Riis, *How the Other Half Lives*)



188 Grancel Fitz. Advertisement for Isotta-Fraschini automobile. 1931

he gave concerning the plight of his subjects. The magic lantern, illuminated by limelight—a system that burned lime in the presence of oxygen and hydrogen—was reasonably safe once the operator got the hang of it, and it made wonderfully sharp and luminous images, big enough for a whole auditorium of people to see. With a stereopticon (two-projector) system, one could dissolve one image into the next, and achieve effects that verged on moving pictures, but with better image quality. The later decline in status of the magic lantern is suggested by its change of name, sometime around 1930, to slide projector, but before its main functions were assumed by documentary films the magic lantern was a major method of exhibiting photographs, by those who valued them for their hard scientific content and by those who were interested in poetry. Alfred Stieglitz made superb lantern slides, and thought they were one of the very best ways to see photographs, until he lost interest in large audiences, or vice versa. Riis, in any case, was an indefatigable lecturer, and although the original edition of *How the Other Half Lives* was reprinted fifteen times over the next four decades, it is conceivable that more people heard his message than read it, and that more people saw his pictures as he had intended them to be seen—with the textures of poverty, the "misery and vice" of it, in his words, as real as life—rather than as thin and scratchy little illustrations in a book.[15]

Magazines soon did much better than books in the quality of their halftone reproduction, doubtless encouraged to do so by advertisers who were distressed to see their products represented as furry gray blurs or black blobs. More expertly made plates, careful presswork, and highly finished paper (these magazines were called slicks, as opposed to pulps) made magazine reproduction respectable, and sometimes good, by the time of World War I.

Most successful photographers who had been professionally active at the turn of the century continued, for the most part, to sell their work and support their families much as they had before the triumph of cheap photomechanical reproduction, since most professional opportunity could still be served by the old methods. Nevertheless, the new circumstances made room for a new kind of professional, who would serve radically revised potentials.

The magazines provided individual photographs much larger audiences than they had enjoyed before; the corollary was that pictures of interest to smaller audiences were not of interest to the magazines. The success of photomechanical reproduction thus changed the standards that the *subject* was required to meet.

When edition sizes for scenic postcards came to be counted in the hundreds of thousands, favorite beauty spots of merely local fame could no longer attract the necessary audience; only subjects like the Matterhorn, or

Old Faithful, or generic scenes such as "Autumn in Vermont" could command the required following. The same principle influenced the practical definition of human celebrity. In the years around 1880 the *Galerie Contemporaine* was illustrated by woodburytype[16] prints of portraits of French artists and intellectuals, made by Nadar, Carjat, and other Second Empire photographers. For technical and economic reasons, the woodburytype was not practical for very large editions, and the individual fascicles of the *Galerie Contemporaine* were probably produced in editions of not more than a few thousand. If the subjects of the publication's profiles were of interest to a larger number of potential readers, no economic advantage was served; the technological envelope had already been filled. At the height of its success *Life* magazine's circulation exceeded eight million copies, and a person who was of interest to only a few thousand of his fellows could no longer be considered a celebrity. Nature herself produced some individuals large enough in talent or achievement to interest an audience of millions—Charles Lindbergh, Babe Ruth, Jack Dempsey, Albert Einstein, Wallis Warfield Simpson—but most exceptional people needed to be presented in a way that extended their already real glamour.

Edward Steichen served this function brilliantly. Steichen was perhaps the first photographer of high talent to design a career (one of his several photographic careers) that was based on the sale not of photographs, but of reproduction rights. In 1923, at the age of forty-four, with a brilliant record of achievement as a photographer already behind him, he accepted the position of chief photographer for the Condé Nast publications. During the next decade he established standards and styles for celebrity portraiture and fashion photography that are still imitated, and seldom equaled. His pictures were with rare exceptions made in the studio, where the photograph could first be invented, and then recorded. Steichen had been the most versatile technician of the Photo-Secession period, and in his new role he added to his technical vocabulary a masterful and theatrical command of artificial lighting—a tool that was, in the form of incandescent light, even newer than the halftone screen. His use of artificial light not only emphasized the real or invented glamour of his subject, but also made the reproduction quality of *Vanity Fair* and *Vogue* look even better than it was, by making sure that the essential blocking out of volumes in space was described in terms of clear and simple distinctions in the gray scale. In Steichen's work (and a little later, in that of Cecil Beaton, George Platt Lynes, Horst P. Horst, George Hoyningen-Huene, and Yousuf Karsh) sculptural form is so simply rendered that the main structure of the picture will survive even in a xerox copy.

The makers of monthly magazines enjoy occasional moments of respite, in which they can reconsider the content and structure of their



Adolf de Meyer. *Helen Lee Worthing.* 1920



Edward Steichen. *The Maypole.* 1932



Irving Penn. *Large Sleeve (Sunny Harnett), New York.* 1951

journals, and contemplate change. But the makers of daily newspapers are condemned, like Sisyphus, to a task that is never finished and never changes. The makers of newspapers must know in broad outline what the news will be before it happens, and know also how to categorize it and what page to put it on. In the early days of the halftone block, weekly papers, with their slightly less frenzied pace and somewhat more flexible conception of appropriate content, were more likely than dailies to experiment with photographic illustration. But even in the weeklies, photography tended to be regarded as an occasional novelty rather than a fundamental tool for reporting news. Before it could become that it was necessary to hire staff photographers for local news and establish dependable sources for pictures from other parts of the world, to build and staff photographic and photomechanical laboratories, and to persuade pressmen that the new system could produce a legible image. More important and more difficult was the problem of discovering how photography could report news, or more precisely, what kind of news it could report. In comparison to the written word, photography labored under very serious handicaps as a reportorial method. The most obvious of these was the fact that the photographer had to be present at the event. Thus there were no photographs of the sinkings of the *Maine*, or of the *Titanic*, or the *Lusitania*, which were described by millions of words and hundreds of drawings.

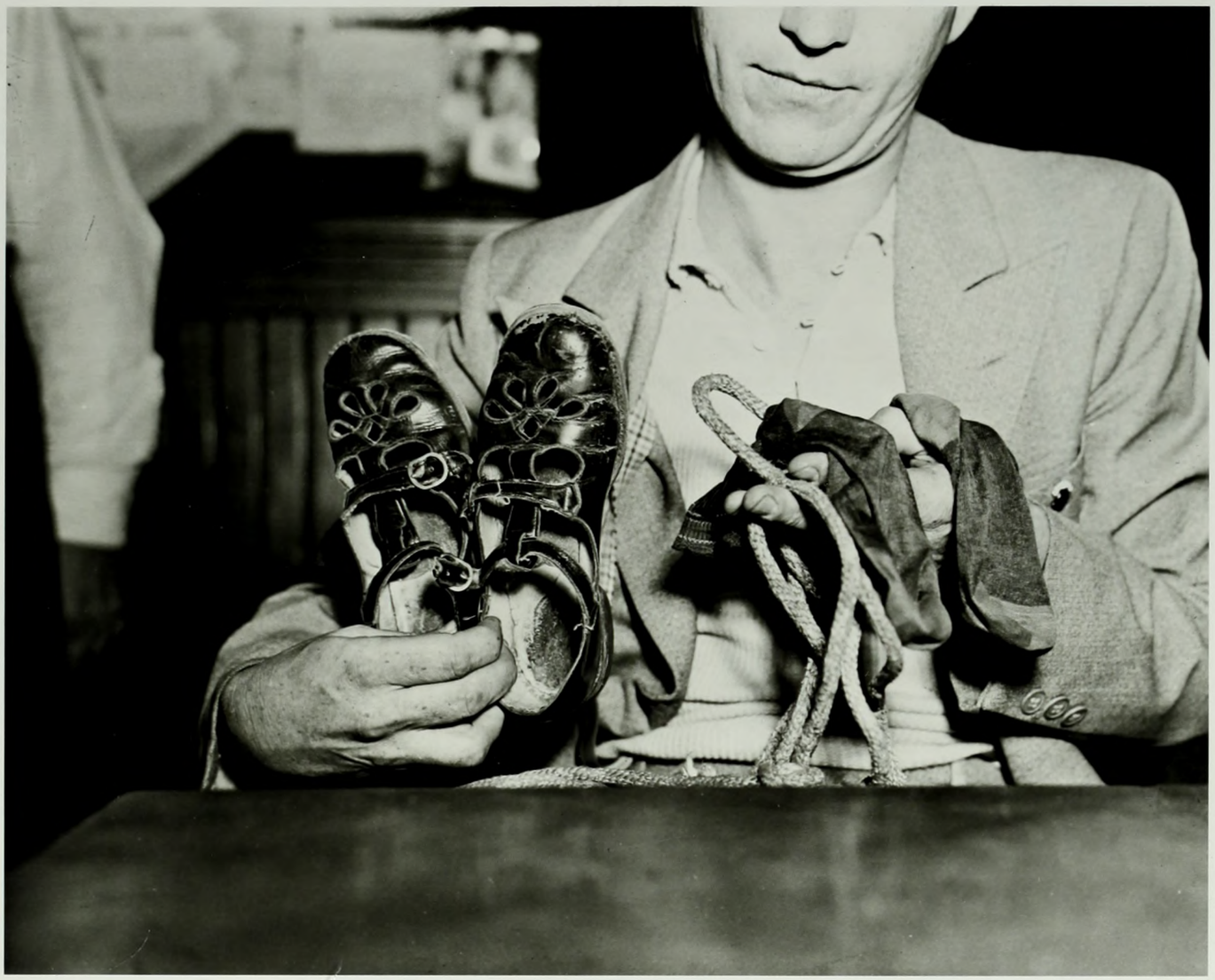
In addition photography was slow. The first photographs of Charles Lindbergh in Paris were published in the New York *Times* on June 1, 1927, eleven days after he had landed. Until the mid-thirties, and the development of telephotography, photographs of distant events lagged days behind the written report. Most important, large areas of meaning lie outside of photography's capacities. Photographers did well at the Nuremberg Rally, a staged photo-opportunity, but there are no photographs that explain the Hitler-Stalin Pact.



Weegee. *Tenement Fire, December 14, 1939*

Each method of transmitting information has its own structural prejudices, its own favorite kinds of information, which are those that it describes most easily and most precisely. News photographers found that their medium worked best when directed not toward issues of large historical moment but to ubiquitous Dickensian incident—routine felonies, pathetic defeats and exemplary victories, spectator sports, packaged ceremonies, vulgar display. Such materials were always available close at hand, and photography loved them.

The great period of news photography began after World War I, by which time most newspapers had their own staff photographs and laboratories, and were not dependent on a random supply of pictures from freelance sources. By about 1930 devices had been perfected that would synchronize the bright, brief light of a flashlamp to the opening of the



Photographer unknown. *Evidence: The sash cord which was used to strangle Paula Magagna, and her shoes and socks, the only clothing found on her body.* (New York *Daily News*, 1937)

Westinghouse

Let a Mighty Hand Start Your Ford

Forget the crank. Jump into your seat at the wheel, turn the switch, press a button, and an unseen hand sends you away, quickly, gently and unfailingly.

That's the way it works when you have a Westinghouse Electric Starting and Lighting Equipment on your Ford.

No matter what the weather, you can always count on a quick start, for the Westinghouse is a 12-volt system, with lots of power to produce high cranking-speed and overcome the resistance of a stiff motor.

With the Westinghouse system, you always have lights that burn without interruption and can be turned on full or dimmed from the seat by means of a push-button switch.

Adjustable brackets, compensating sprocket and a driving-chain three tons strong insure freedom from chain troubles. There are no gears to get out of order.

Westinghouse is proud to put its name on this equipment, so you can be sure it's right, through and through. That's the only kind of a system you can afford to put on your car.

Write or phone the nearest distributor now for full information. He will put you in touch with a dealer in your vicinity.

WESTINGHOUSE ELECTRIC & MANUFACTURING COMPANY
Automobile Equipment Department
SHADYSIDE WORKS PITTSBURGH, PA.

Price: $85 complete with battery and everything else necessary

Distributors:

Atlanta, Ga.
Alexander-Seewald Co.
Baltimore, Md.
The Richardson Garage.
Boston, Mass.
Motor Parts Co.
Buffalo, N. Y.
Motor Parts Co.
Charleston, S. C.
C. O. Franke & Co.
Chicago, Ill.
Westinghouse Sales-Service Station.
Chicago, Ill.
Motor Car Supply Co.
Cleveland, Ohio.
The Auto Electric Equipment Co.
Cleveland, Ohio.
Westinghouse Sales-Service Station.
Denver, Colo.
Shafer Auto Supply Co.
Halifax, Nova Scotia.
Motor Sales Co., Ltd.
Houston, Texas.
Tel-Electric Co.
Indianapolis, Ind.
Central Rubber & Supply Co.
Kansas City, Mo.
The Equipment Co.
Little Rock, Ark.
Rose-Lyon Hardware Co.
Louisville, Ky.
Louisville Auto & Supply Co.
Minneapolis, Minn.
Reinhard Brothers Co.
Nashville, Tenn.
Hirsig Co., Inc.
New Orleans, La.
Shuler Rubber & Supply Co.
New York, N. Y.
Westinghouse Sales-Service Station.
Norfolk, Va.
Reliance Electric Co.
Oklahoma City, Okla.
Severin Tire & Supply Co.
Omaha, Neb.
Powell Supply Co.
Philadelphia, Pa.
Motor Parts Co.
Pittsburgh, Pa.
Pittsburgh Auto Equipment Co.
Pittsburgh, Pa.
Westinghouse Sales-Service Station
Richmond, Va.
Reliance Electric Co.
Salt Lake City, Utah.
Intermountain Electric Co.
Springfield, Mass.
Motor Parts Co.
St. Louis, Mo.
Phoenix Automobile Supply Co.
Washington, D. C.
Record Auto Supply & Service Co.
Wichita Falls, Texas.
Western Auto Supply Co.



Photographer unknown. Advertisement for Westinghouse. 1916

camera's shutter, and it immediately became a standard part of the news photographer's working strategy. The flash did more than provide light; it defined a plane of importance, in which the subject was described with posterlike simplicity and force, and beyond which the world receded quickly into darkness. The lack of naturalness in these pictures was not a shortcoming but a source of their melodramatic power. It is as though terrible and exemplary secrets were revealed for an instant by lightning.

The most famous and one of the best of the photographers of news photography's golden age was Arthur Fellig, called Weegee (after Ouija, the board game that predicts the future) because of his apparent omniscience concerning when and where bloody mayhem would next appear. Although intuition was doubtless part of it, Weegee also had a police radio, and slept in his clothes, ready to answer its call. Weegee's pictures are called news photographs, but even when they were new most of the petty hoodlums and victims and mean cops and prehistoric onlookers that they describe were anonymous and invisible, were bit players who moved the world only along its oldest, most familiar paths. When we look at his pictures today it is clear that he was not a reporter but a fabulist.

Books and newspapers and magazines had existed before photographs, and the invention of the halftone block did not obligate the publishers of these older forms to revise radically their sense of the fundamentally literary nature of their enterprises. When photographs were first reproduced in such publications they served as discrete and ancillary material, as illustration had in general served since the Renaissance. But the new technical possibilities encouraged alternative conceptions, and the notion that graphic elements and text might be integrated in an organic intimacy, as they had been for the eighth-century Celts.

The halftone block caused a fundamental change in the working methods of journalism, and a new and more flexible relationship between images and words. In the case of wood engraving, for example, the size and the boundaries of the image—and thus the basic design of the page—had been determined before the engraver began his work. With the arrival of photomechanical systems, the size of each completed element was routinely changed in the act of rephotographing it. In these circumstances the authority of both the illustrator and the writer was abridged, and the design of the page became an art of assemblage, in which the graphic designer—a new species of artist whose basic tools were scissors, paste, and the proportion rule—arbitrated the claims of the several participating crafts.

By 1892 the American illustrator William Hamilton Gibson had contrived pages on which type and halftone illustration were printed from a single plate.[17] By the beginning of the Edwardian period news illustrations



László Moholy-Nagy. *The Law of Series.* 1925



Albert Pfeiffer. *Musketeer Podolski.* 1913–15



Charles Norman Sladen. Untitled page from a personal album, "July 1913,"
Great Chebeague Island, Maine. 1913

and advertisements routinely combined photography, drawing, and type on a single page.

In a technical sense the mixture of photography with other media was virtually as old as photography itself. Watercolor tinting of daguerreotypes began no later than 1842,[18] and a quarter-century later paper photographs were often so heavily colored that their photographic base was effectively hidden. By the turn of the century the free mixing of photography with other graphic techniques was a common feature of many varieties of popular art. Characteristically, these works made no effort to preserve the naturalistic coherence of straight photographs, but were assembled, like nonsense verse or patchwork quilts, in the spirit of playful pastichery. Sometimes, as in *Musketeer Podolski* (p. 198), the function of the picture was emblematic, like that of a diploma or a baptismal certificate, rather than descriptive. Picture postcards described in superficially naturalistic terms transparently Munchausian lies, as in *A Carload of Red Apples* (p. 202). Charles Norman Sladen, a wood-engraver turned choirmaster, combined photographs with ink drawing and watercolor to produce a series of unique albums commemorating his summers in Great Chebeague Island, Maine (p. 199).

When newspapers first began to incorporate photographs into their pages they were seldom trusted to bear the entire weight of illustration, with good reason, since they were often static file shots of the ship before it sank, or a conventional head shot of the victim before the outrage was committed. Drawing and calligraphy and flashy graphics provided the drama, while photography added a suggestion of documentary authenticity. By 1900 the New York *World* had developed the assemblage potentials of the photomechanical vocabulary with extraordinary boldness.



Photographer unknown. *"Durable Dane" and His New Manager.* c. 1912

The same mixed-media approach was useful for advertising. A photograph might describe perfectly the aspect of the better mousetrap, but the caption (and perhaps a drawing of a happy, healthy baby) explained why the mousetrap was necessary.

Thus both the technical vocabulary and the mind set that was open to the free and willful mixing of graphic systems were in place well before the time, about 1920, when Dadaists and Constructivists brought to the new idea a high-modernist sensibility, and gave it a name, photomontage.

One of the artistic problems that photography had found difficult to solve was that of the didactic picture. Among all the photographs of the several wars that photography had described, it is difficult to think of a picture that unambiguously distinguishes the heroic soldier from the villainous one, or even a picture that clearly identifies winners and losers.

The photographs of Jacob Riis often show us people in deep distress,

THE UNITED STATES GROWING FASTER THAN ANY OTHER NATION ON EARTH.

THE NEW CENSUS WILL SHOW 75,000,000 PEOPLE.

Our Marvellous Increase in the Past Century Brings Us Next to Russia in Point of Population, and Certain to Overtake and Pass Her Ere Long.

More Babies Born in This Country than in Any Other Whose Figures Are Known —The Chances of Marriages at All Ages.



THIS CUT SHOWS GRAPHICALLY HOW THE UNITED STATES WAS RISEN IN RANK ABOVE THE GREAT NATIONS FROM TAIL ENDER OR NOT TO NO 1 IN 1800. ONLY RUSSIA IS HIGHER NOW, AND EVEN RUSSIA WILL SOON BE PASSED.

"INCREASING FAR MORE RAPIDLY THAN ANY OTHER NATION," SAYS DIRECTOR MERRIAM.

The results of the twelfth census will be scanned with great interest not only by the people of the United States but of the entire civilized world.

The percentage of increase in the United States in population has heretofore been much greater than in any other nation in the world, in some decades exceeding 30 per cent. In the census of 1890 the population over the previous census showed a gain of almost 25 per cent.

It is quite interesting to note that, so far as statistical information is afforded, some of the greater nations which pretend to make close inquiry concerning their population has made any such advances as ours. For example, between the years 1891 and 1895 England showed a percentage of increase amounting to 11.6 per cent. Canada 11.9 per cent. and France 1.3 per cent. Even in the congested population of Italy there is shown a bare increase of 4.9 per cent., and in Germany, one of the most advanced of nations, only 8.25 per cent.

It is quite evident, it can be seen from this, that the United States is increasing far more rapidly than any of the other civilized nations. The tradesman reasons for this are many, and statisticians would withdraw various theories why the growth of our own country should be so rapid.

Of course it is to be said, on the one hand, that we have given ample inducements to the way of affording foreigners the advantage of our laws and opportunities, and doubtless many have come to our shores for these reasons, accounting for a large increase.

WILLIAM R. MERRIAM,
Director of the Twelfth Census.



THIS CUT SHOWS IN ROUND NUMBERS THE NUMBER OF BABIES BORN IN ALL THE GREAT COUNTRIES OF THE WORLD EXCEPT RUSSIA, A CORRECT FIGURE FOR WHICH MAY BE OBTAINED UNTIL THE COMPLETION OF FOREIGN STATISTICS IN 1901 OR 1902.

GROWTH OF THE WORLD'S GREAT CITIES.

	1801.	1851.	1891.	1901.
London	959,000	2,000,000	4,211,003	4,900,000
	1820.	1850.	1890.	1900.
New York	50,000	516,000	2,492,591	3,597,202
Paris	553,000	1,200,000	2,345,000	2,536,000
Berlin	(1855)	1,315,000	(1895)	1,677,304
St. Petersburg	(1833)	843,000	(1897)	1,267,023

Between 1800 and the New York grew to 60,000. The population, however, was soon reversed. In 1800 Philadelphia had but 340,000 and New York 60,000. Her present population is 1,200,000, which makes an increase of 29.87 per cent. in the latest estimates of its Health Board, the past ten years.

The Metropolitan District being 3 million larger. New York has increased in ten years 39.90 per cent. and London probably less than 20. Her census is to be taken next year.

No other great city in Europe has increased as rapidly as London. The population of Paris in 1800 was 2,345,000, and at present is estimated at 2,536,000. This shows an increase of less than 10 per cent. In Berlin the growth has been more slowly. Her present population is 1,677,304, which is an increase of but 1,000,000 in the past forty years. The present population of Germany is 52,279,901.

Russia alone now surpasses the United States in the number of her people.

Sentimental young persons are not the only ones to take an interest in marriages, as it is wed to marry at twenty in order to be edered at thirty.

Under twenty the proportion of marrying females is much smaller.

Men average about four years later than women in their marrying proclivities, which is as it should be, according to the common consent of mankind. Nine per cent. of them marry at twenty-four, and more of them marry between twenty-four and twenty-nine than during any other half decade.

In statistics, as in society, an unmarried woman becomes an old maid—or a girl bachelor, as she calls herself nowadays—at thirty; whereas an unmarried man of thirty would scoff at the idea that he was out of the marrying race.

The decline of the spinster from forty to fifty is a little more rapid. The girl of from twenty to twenty-five has forty-one chances of marriage to her one and the giddy young thing between fifteen and twenty has twenty-two.

Widows besides being dangerous are numerous. They exist in the proportions of one to every five married women, and three to every one widower. The women at any age will find them per cent greater opportunities to matrimony.

From marriage to birth is an easy transition. The Sunday World presents on this page a picture of the nurseries of nations. It shows at a glance in what proportion different countries are replenishing the earth.

The biggest baby of them all, of course belongs to Uncle Sam. It represents the 2,400,000 babies born in the United States every year. Its fifth comrades are sympathetic of the increase generally of Germany, Great Britain, Italy and Japan, as she calls herself nowadays—at thirty; whereas an unmarried man of thirty would scoff at the idea that he was out of the marrying race.

The decline of the spinster from forty to fifty is a little more rapid. The girl of from twenty to twenty-five has forty-one chances of marriage to her one and the giddy young thing between fifteen and twenty has twenty-two.

Widows besides being dangerous are numerous. They exist in the proportions of one to every five married women, and three to every one widower. The women at any age will find them per cent greater opportunities to matrimony.

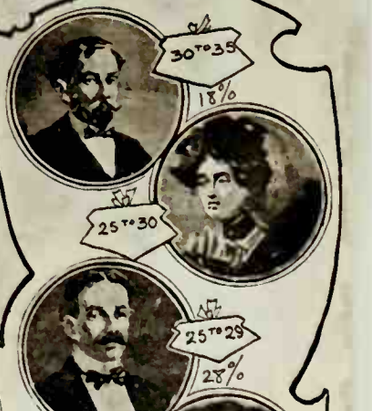
From marriage to birth is an easy transition. The Sunday World presents on this page a picture of the nurseries of nations. It shows at a glance in what proportion different countries are replenishing the earth.

The biggest baby of them all, of course belongs to Uncle Sam. It represents the 2,400,000 babies born in the United States every year. Its fifth comrades are sympathetic of the increase generally of Germany, Great Britain, Italy and Japan, as she calls herself nowadays—at thirty; whereas an unmarried man of thirty would scoff at the idea that he was out of the marrying race.

The decline of the spinster from forty







New York, 60,000 in 1800.

It is difficult to realize how rapid is this increase in population without a comparison with the growth of the great cities of Europe. The population of American cities has increased more rapidly than in European cities without a break during the past century, although since the Franco-Prussian war the German cities have paralleled our growth.

In 1800 the population of New York was but 60,000. At the same date London had grown to 1,000 New York had grown to 250,000 or had increased more than eight times in size. London in the same period had grown to 1,000,000 and had but a little more than doubled in size.



CHANGES OF RAIMENT AT ALL AGES SHOWN UPON THE FORM OF A LADDER. THE MAN OF MIDDLE AGE STILL OPTS TO ABIDE AT THE TOP, AND THE BACHELOR OF 30 TO 40 YEARS IS AWAY AHEAD OF THE MAID OF LIKE AGE.

A CENTURY'S GROWTH OF AMERICAN CITIES.

	1800.	1850.	1890.	1900.	P.C. Inc.
New York	60,000	515,000	*2,492,591	3,437,202	37.90
Philadelphia	69,000	340,000	1,046,964	1,293,697	23.57
Chicago	—	30,000	1,099,850	1,698,575	54.14
New Orleans	17,000	116,000	242,039	287,104	18.65
Cincinnati	8,000	115,000	296,908	325,902	9.75
St. Louis	—	—	451,770	575,238	27.33
Indianapolis	—	—	105,436	169,164	60.48

*Including portions not then in city, but since annexed.



Many statisticians study the question from a mathematical point of view, and have found out a great deal about it.

The Chances of Marriage.

First, dear madam, if you are twenty years old you are at the zenith of your matrimonial chances. Twelve per cent of your sex get married at your age, and the older a woman grows after she has passed it the smaller grows her chance of wedding a husband.

Up to twenty-five she is still what an insurance man would call a "good risk," for more women become given between twenty and twenty-five than in any other five years age-period.

Between twenty-five and thirty the average falls off at an accelerating ratio that is saddening to contemplate.

Besides, the woman of thirty, as sung by poets, is in ninety-nine cases out of one hundred a wife, a widow, of a grass widow. Very likely she was married at twenty or before. It is the woman who has suffered that has the power to

Europe Not In It with Us.

With these European data for comparison, the United States records reports with a new interest. New York's rate of increase is much less than that of several other large cities. The percentage of increase for Chicago in ten years has been 54.14. In 1870 Chicago had but 300,000 population, but by 1890 this had increased to 1,099,850. This is as all the world knows, the most rapid growth on

more rapid. From a population of 1,325,000 in 1870, it grew to have 1,677,000 in 1890, the last census. Smaller German cities have grown more rapidly. St. Petersburg has grown rapidly by comparison with other European cities, though she is hopelessly outclassed by American records. In 1800 she had a population of 50,000 and in 1897, the last Russian census she had grown to have 1,267,023.

The increase in the population of the United States as a whole is also far beyond that of any other country. The population of the British Isles in 1801 was 16,250,000, which was increased by 1851 to 27,500,000 and in 20,000,000 in 1891. The United States had less than 7,000,000 in 1800, while by 1890 it had grown to 62,622,250, and in 1900 to 76,000,000. The estimated population in 1900 is 76,000,000.

In other words, the United States has increased ten times in population while England's has merely doubled. The population of France has increased seven

THIS TOP SHOWS THE PROPORTIONS OF MEN AND WOMEN IN DIFFERENT DISTRICTS AND WILL BE PUBLISHED NIGHT BY SUNDAY.

THIS TOP SHOWS AT A GLANCE HOW IMMIGRATION INCREASES THE MEN AND WOMEN OF MARRYING AGE IN THE UNITED STATES. IT WILL BE PUBLISHED NEXT SUNDAY.

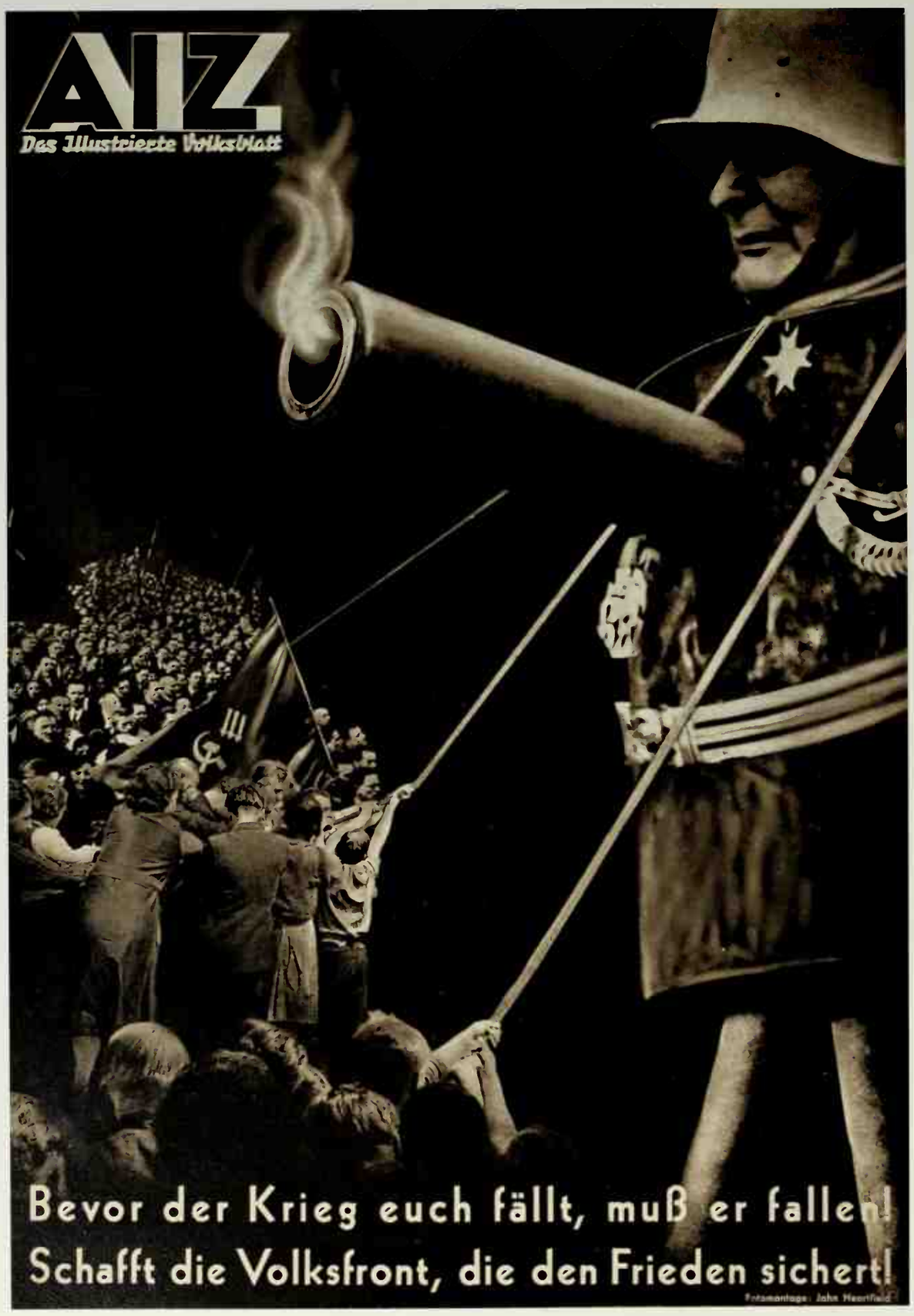
Photographer unknown. Population chart. (*The World*, 1900)



Edward H. Mitchell. *A Carload of Red Apples.* 1910



Herbert Bayer. *Lonely Metropolitan.* 1932



John Heartfield. *Before the War Defeats You.* (Back cover from *AIZ*, 1936)

but without captions they do not tell us whether the fault is with a cruel economic system, or inadequate governmental intervention, or the inherent weakness of the subjects.

Photomontage solved such problems. John Heartfield, one of the most prolific of the photomonteurs, said that a photograph plus a spot of color could be a new kind of art,[19] and he was right. Depending on its context and position a spot of red could be a rising or a setting sun, or a fruit, or a drop of blood, or a warning; if one added also a slogan or a fragment of poetry the ambiguity of the photograph could be overcome, and its meaning—or at least a meaning—made perfectly clear. This made the photomontage a very useful technique for commercial advertising and political persuasion.

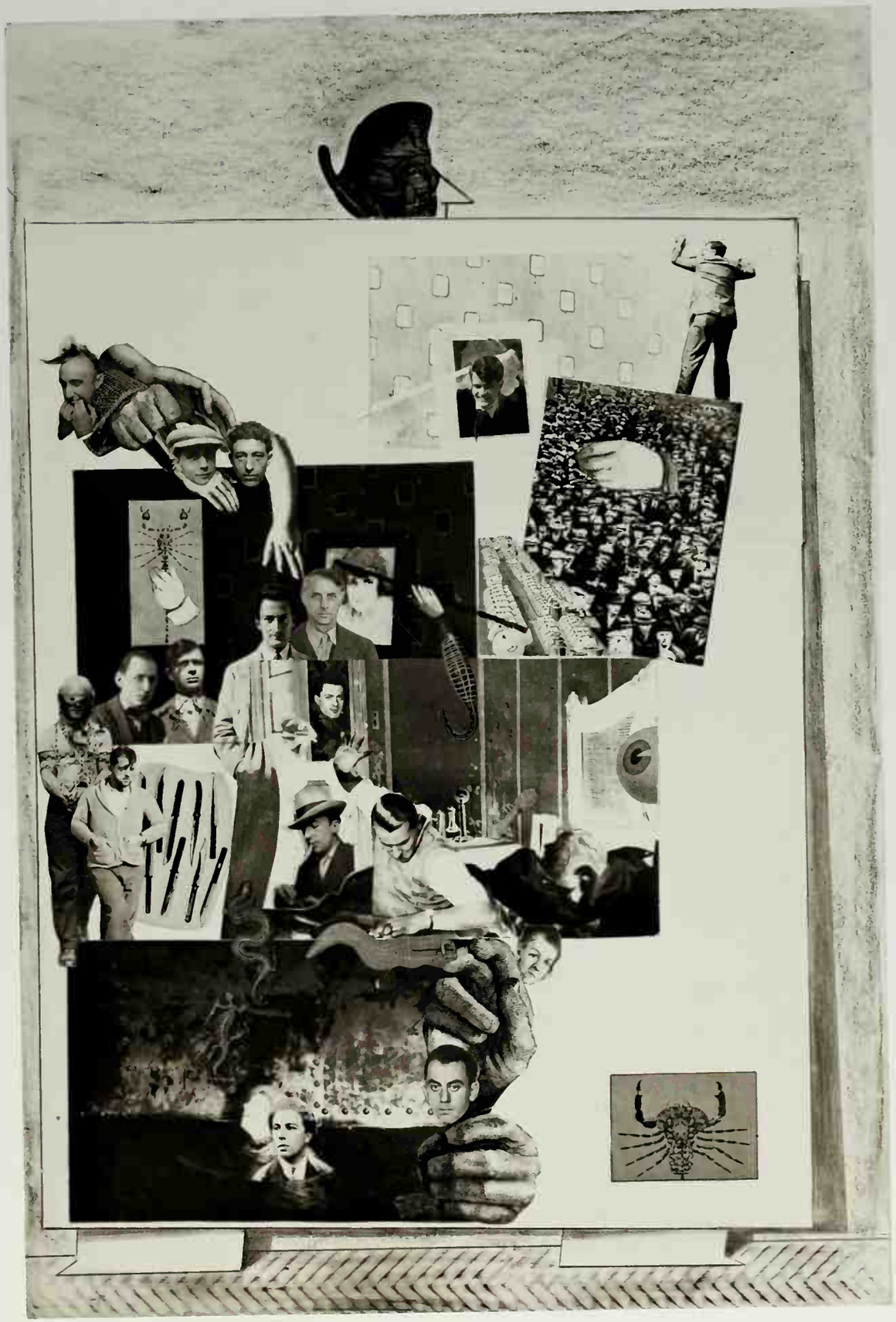
Much of the most vital and inventive work produced during the first decade of modernist photomontage was directed toward political ends. The work and career of the Russian Alexander Rodchenko are in many respects emblematic of the movement. Rodchenko was an avant-garde painter who, about 1921, seems to have despaired of cleansing painting of its bourgeois preoccupations, and who turned to new modes of creation that might contribute directly and materially to the construction of a new society based on socialist principles. (Ossip Brik said: "Former popes and monks make the most convinced campaigners against religion. . . . The best fighters against painterly aestheticism are former painters.")[20] The words art and artist were themselves suspect; Rodchenko and like-minded colleagues preferred to think of themselves as members of a new species of scientific engineer, who solved objective, impersonal problems. The first of the Constructivist slogans (in the Productivist Manifesto of 1921, written by Rodchenko and Varvara Stepanova) said: "Down with art, long live technical science."[21]

The vitality of photomontage in Russia and Germany may have been due in part to the existence in those countries of authoritative pedagogical structures that were sympathetic to modernism as a potentially useful social force, and that saw the integration of the arts into the fabric of everyday life as an ethical good. In Russia the State-sponsored school Vkhutemas (Higher State Art-Technical Studios) energetically supported the proposition that artists, properly educated and motivated, could make an important contribution to the success of the Revolution. By 1930 the authorities decided that they had regrettably chosen the wrong people, who, in spite of their protestations, had turned out to be much like prerevolutionary artists—still interested in formal invention and magic. Vkhutemas was closed in 1930, after a life of ten years.

In Germany the Deutsche Werkbund and the Bauhaus received more limited and tentative official support for their similar—if somewhat less single-minded—ambitions, until the victory of Hitler's National Socialist



Yakov Guminer. *1917*. 1927



Max Ernst. *Loplop Introduces Members of the Surrealist Group.* 1931

Party in 1933, after which national support for the arts took, as in Russia, a different direction.

In Germany and Russia the idea of art as a variety of science was, during the 1920s, so strong that it affected even the aspect of work that was fundamentally personal and anarchistic in content. The photomontages of László Moholy-Nagy are more clearly marked by Freud than by Marx, and their titles—*Leda and the Swan*, *Jealousy*, *Look Before You Leap*, *Love Thy Neighbor*, etc.—reflect the personal, psychological, and sexual nature of his concerns. Nevertheless, the rigorous, resolutely modern graphic structure in which his ideas are imbedded suggests a world of scientific measure and clinical objectivity, and thus claims for his pictures an impersonal, social meaning as well as a private one.

In France during the 1920s no comparable official authority represented the relationship between advanced art and the ambitions of the state, and perhaps for that reason photomontage there was a marginal issue, pursued in a dilatory manner, without an exceptional practitioner or the support of a theoretical base. Man Ray, Raoul Ubac, Max Ernst, and Salvador Dali (all expatriates or foreigners) and the Frenchman Maurice Tabard experimented intermittently with photomontage, using it as a personal tool in the service of capricious ends, an application that was perhaps at odds with its didactic nature.

An alternative kind of photomontage, which involved neither the mixing of techniques nor the integration of the caption into the picture, was the multiple exposure, in which time itself was recomposed, by recording separate moments, transparently, one on top of the other in the same picture. Man Ray's Rayograms were a special kind of multiple exposure. These pictures (like Moholy-Nagy's photograms) were photographic monoprints produced by using found objects as a substitute for a photographic negative, as the matrix that filtered the light directed to the sensitive paper. To produce a sense of transparency and space, objects would be added or subtracted or moved between successive exposures; often light was also moved, so the shadows cast by stationary objects would move across the picture.

By the mid-thirties artists such as Herbert Matter and Herbert Bayer had successfully directed a sophisticated mastery of the techniques of modernist, mixed-media photomontage to the needs of the competitive consumer economy. In spite of periodic efforts by independent artists to reclaim the form as a resource useful outside the world of ordinary commerce, it remains today the special dominion of advertising, available to others, at their risk, only as a tool for satire.



Man Ray. *Rayogram.* 1923



Alexander Rodchenko. *Assembling for a Demonstration*. 1928

To recapitulate: the photographer of the early twentieth century could regard the new potentials of photography in ink as a way of producing more photographs faster and at a lower unit cost; or he could see the new technique as a means of integrating photography with other pictorial systems; or he could see it as a way of combining pictures and text with a new elasticity and intimacy, to produce a whole that was different from the sum of its parts. This third option was the goal of the new picture weeklies that appeared during the years between world wars.

The photo magazine idea was primarily an invention of Germany in the 1920s, with some infusion of editorial and photographic talent from what had recently been the Austro-Hungarian Empire.[22] The *Berliner Illustrierte Zeitung* had existed since 1890, but in the 1920s reformed itself to exploit the potentials of photojournalism. The *Münchner Illustrierte Presse* and *AIZ (Arbeiter Illustrierte Zeitung)* were founded in the early 1920s. All three magazines were suppressed in 1933 when Hitler came to power. During their short lifetimes their working process depended heavily on improvisation and intuition, with small staffs led by strong editors. Stefan Lorant later recalled his role as editor of the Munich Illustrated as that of prima donna, individualist, orchestra conductor, and sole arbiter of the magazine's content. He never consulted with the photographer about picture selection or layout.[23] Nevertheless, his photographers were not locked out of the editing process as completely as Lorant may have thought, and surely not as completely as they would be in years to come, for in the 1920s a photographer was as a rule still responsible for his own processing, and thus could cull out the pictures that he did not want considered. The number of pictures made on assignment was tiny in comparison with later years; until the end of the decade most photojournalists worked with small-plate cameras that made negatives 4.5 × 6 or 6.5 × 9 centimeters, and it was rare to carry enough plate-holders to make thirty-six exposures—the number on a single roll of 35mm film.[24] Clearly, most of the editing was done before the plate was exposed. André Kertész, recalling his work during the same period for Lucien Vogel, editor of *Vu*, said that he worked without a shooting outline, without research, without a writer, even without a clear idea as to where the kernel of the story might lie. His memory was perhaps blurred a little by nostalgia and regret, but he remembered an assignment from Vogel as sounding like this: "André, since you have never been to the Bordeaux country, I think you should go there and see what you find."[25] When the job was finished Kertész would present Vogel with twenty or thirty prints, depending on what he had found, and Vogel would choose eight or twelve to make his story. Arrangements were surely not always as casual as this, but the recollections of the other photographers of the time support the general thrust of Kertész's story.



Martin Munkacsi. *Vacation Fun.* 1929

In the early days of the photo magazines each issue was, in principle, an experiment. Nevertheless, the necessity of producing a new issue each week was an enormous burden. In 1934 Stefan Lorant, by then editor of London's *Weekly Illustrated*, published a revised version of a picture story on the Italian dictator Benito Mussolini that he had first published in 1931, when he was editor of the Munich Illustrated.[26] The subheading of the 1934 story read, "These pictures were taken by special permission in the Dictator's study by a 'Weekly Illustrated' photographer," all of which was perfectly true since the photographer, Felix Man (a.k.a. Hans Baumann), had also fled Hitler's Germany, and now worked for Lorant in London. If Mussolini had in three years become a little fatter, or balder, with a face a little more lined with worry, or if he had moved to a smaller but more comfortable office, these details were perhaps not adequate reason for depriving the magazine's readers of the sense that they were privy to the world of the moment.

Even much later, the retreading of old photographs in the guise of new ones was not uncommon, but the more basic answer to the problem of feeding the voracious appetites of the newspapers and the picture weeklies was to increase the picture supply. By the 1920s most newspapers of moderate circulation were prepared to make and print halftone blocks, but few attempted to produce their own photographs, except of local subjects. The new situation created the opportunity for picture agencies that would send to their subscribing papers, on speculation, those pictures that the agency editor thought the local editor might want. In 1933 there were approximately fifty photographic news services with offices in New York.

Government-sponsored information pictures—propaganda photographs—were distributed in a similar fashion, except that the pictures and reproduction rights were free. What has come to be the most famous of such programs was the creature of an agency loosely tied to the United States Department of Agriculture. The Farm Security Administration (surely a more reassuring name than the Resettlement Administration, which it was first called) was one of the several agencies responsible for helping farmers who had been impoverished by mechanization, soil erosion, drought, and the economic disaster of the Great Depression. Within this agency was a tiny photographic group called the Historical Unit, and it is probably true that Rexford Tugwell, the economist-scholar who ran the FSA, hoped that the work of the photographers would be of interest to the future; nevertheless, no provision was made for the preservation or cataloging of the work until it was transferred to the Library of Congress in 1946, years after its real work was finished.[27] In the 1930s Tugwell (a conspicuous member of the group of Roosevelt advisors called the Brain Trust) was accountable to political issues as well as economic ones, and to

MUSSOLINI

WHAT IS HE PLANNING?

These pictures were taken by special permission in the Dictator's study by a "Weekly Illustrated" photographer

EVENTS of the past few days have focused the eyes of all Europe on Mussolini, the Italian dictator.

The shooting of Dr. Dollfuss, Chancellor of Austria, by Nazis set the whole world thinking of those events in Europe, twenty years ago, which embroiled Europe in four years of war.

* * *

To-day Mussolini holds the scales of European peace in the balance. For Dollfuss was not only a political sympathiser with Mussolini. He was his friend.

The German confederates of the Nazis who murdered Dollfuss know that Hitler, their leader, and Mussolini are at loggerheads over the question of Austria's independence. Does the Italian dictator intend to strike? And if he does, what of the rest of Europe—can the other countries keep out of this quarrel?

Some say Mussolini will not strike in vengeance alone.

But Hitler covets Austria, and Dollfuss was murdered in cold blood because he would not tolerate dominance by Hitler.

So what if Hitler now decides to go ahead with his ambitious plans?

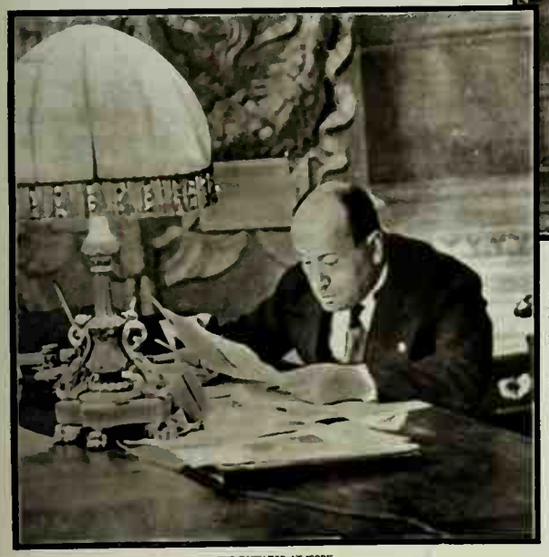
The moment a German Nazi steps across the Austrian frontier in aggression—will Mussolini strike?

The answer can only be "yes." The war won for him a part of Austrian territory, and he will not stand by and let it be taken from him.

* * *

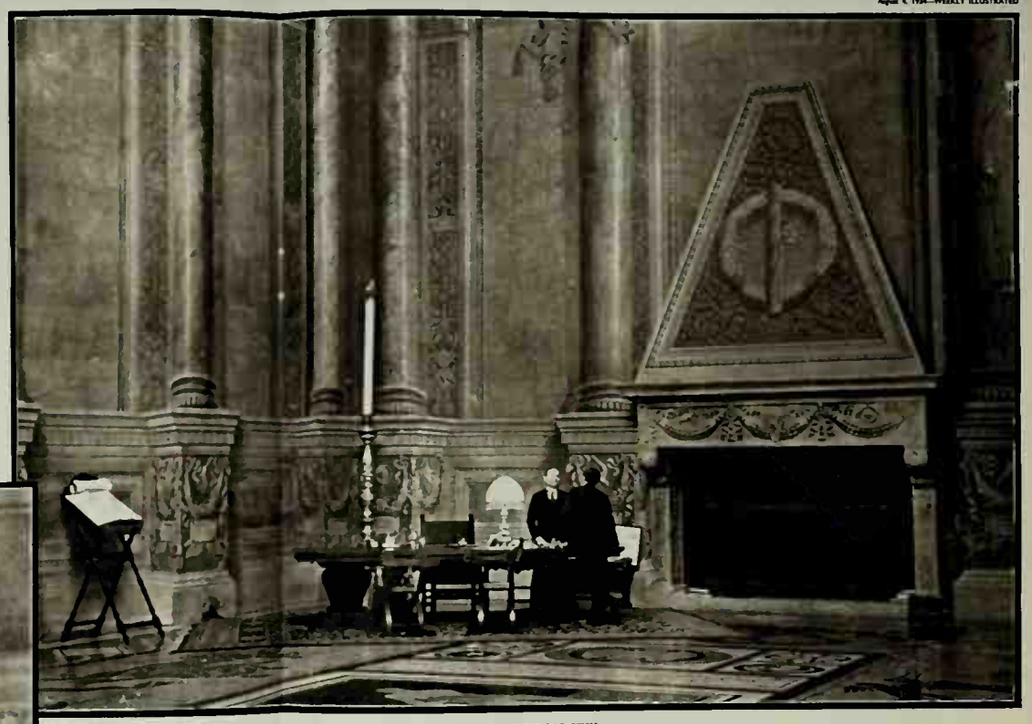
Thus the democratic countries of the world have before their eyes the amazing spectacle of three different brands of Fascism up in arms against each other, with the dread prospect of a bloody clash.

Europe is watching Mussolini with anxious eyes.



THE DICTATOR AT WORK

Mussolini would not sit for special photographs, but allowed the cameraman to take his pictures at random.



IN THE TEMPLE OF FASCISM

Signor Mussolini in his great study at the Palazzo Venezia, in Rome. Of such size is the room that a visitor entering the door takes nearly a minute to reach the Dictator's desk, which stands in the corner. The fascist emblem can be seen over the mammoth fireplace.

Fascism has risen to power in Germany, Italy, and Austria, along paths strewn with brutality, murder, and oppression.

Are neighbouring countries going to be dragged into another age of horror because the greed for power remains unsatisfied?

* * *

Now the nations of Europe are reiterating their pledges—"We stand by Austria"—"We shall see no bloodshed"—"There must be no victimisation of Austria"—and so on.

Troops are on the move. Secret planning, accusations, denials and counter-accusations—where is it all leading? Again we look at Mussolini—the man who cursed Europe with the first Fascist régime and who now sees his rivals close behind him.

* * *

The pictures here show Mussolini at work in his magnificent suite at the Palazzo Venezia, in Rome. The haughty mask, the pose of the Mighty Leader, is forgotten, for the Italian people cannot see him in his study.

That is why these pictures are of particular interest, for Mussolini's face is seen as it really is—and not as the Italian people believe it to be.



THE MAN WITHOUT THE MASK

These remarkable pictures show Mussolini as he really is. The eternal mask which he wears in public is off. Here he is seen at his desk, thinking, listening, reading—the busy politician forgetful, for once, that he must wear a fierce expression to please his followers.

Felix H. Man. "Mussolini: What Is He Planning?" (*Weekly Illustrated*, 1934)



Walker Evans. *Church Organ, Alabama.* 1936

the degree that FSA photography was intended to serve a practical political purpose it was that of helping to preserve the fragile coalition of urban poor and rural poor that had brought the Democratic Party to power. It was to do this by making pictures that would explain to the industrial cities and commercial towns the plight of the farmers. The mechanism for circulating those pictures was the nation's newspapers, who were supplied free prints and captions by the agency.

The FSA documentary project was based on the idea that the systematic recording of the visible world provides information that is useful to the understanding and perhaps to the improvement of that world. That idea was as old as photography, in fact older; a principal motive of Baron Taylor's heroic, multivolume *Voyages pittoresques* had been the cultivation of a broader awareness of and sense of responsibility for France's architectural patrimony. What was new when the FSA project began was the idea of a documentary *style*—an approach and an ideal that sought pictures that would look ingenuous and free of guile: that would seem not merely honest but artless. This was of course an aesthetic choice and an artistic strategy.

The idea of simple honesty as a style would seem to presuppose an earlier style involving fancy practice, sophistry, rhetorical devices, and posturing, and that is perhaps a reasonably fair description of much, or most, photography with artistic ambitions in 1930. Photographers born at the turn of the century reached their majority at a time when it was still generally thought that a photograph of the everyday, midday world that was clear and sharp all over was not to be judged as art; it was simply a record. The photographer of that generation who changed that, more than any other, was Walker Evans, who photographed the commonest of things in a style that seemed as transparent and disinterested as that of an insurance photographer.

By 1928 Evans had returned to New York from his brief, desultory student year in Paris, and was becoming seriously interested in photography. To familiarize himself with the state of the art he visited the public library and studied the entire run of Stieglitz's magazine *Camera Work*. Among the 500-odd photographs reproduced over the fifteen years of the publication's existence, Evans found only one picture that he really liked—Paul Strand's *Blind Woman*, the most frontal, bluntly composed, least artful of Strand's street portraits of the preceding decade. Evans's own mature style would be even more severe, understated, and impersonal. The roots of that style lay in Evans's distaste for what seemed to him the egotism, materialism, and mindless excess of American life during the affluent 1920s. To a remarkable degree the style proved serviceable as a tool for expressing the bitter poverty of the 1930s.

The success of FSA photography was largely due to the presence in the

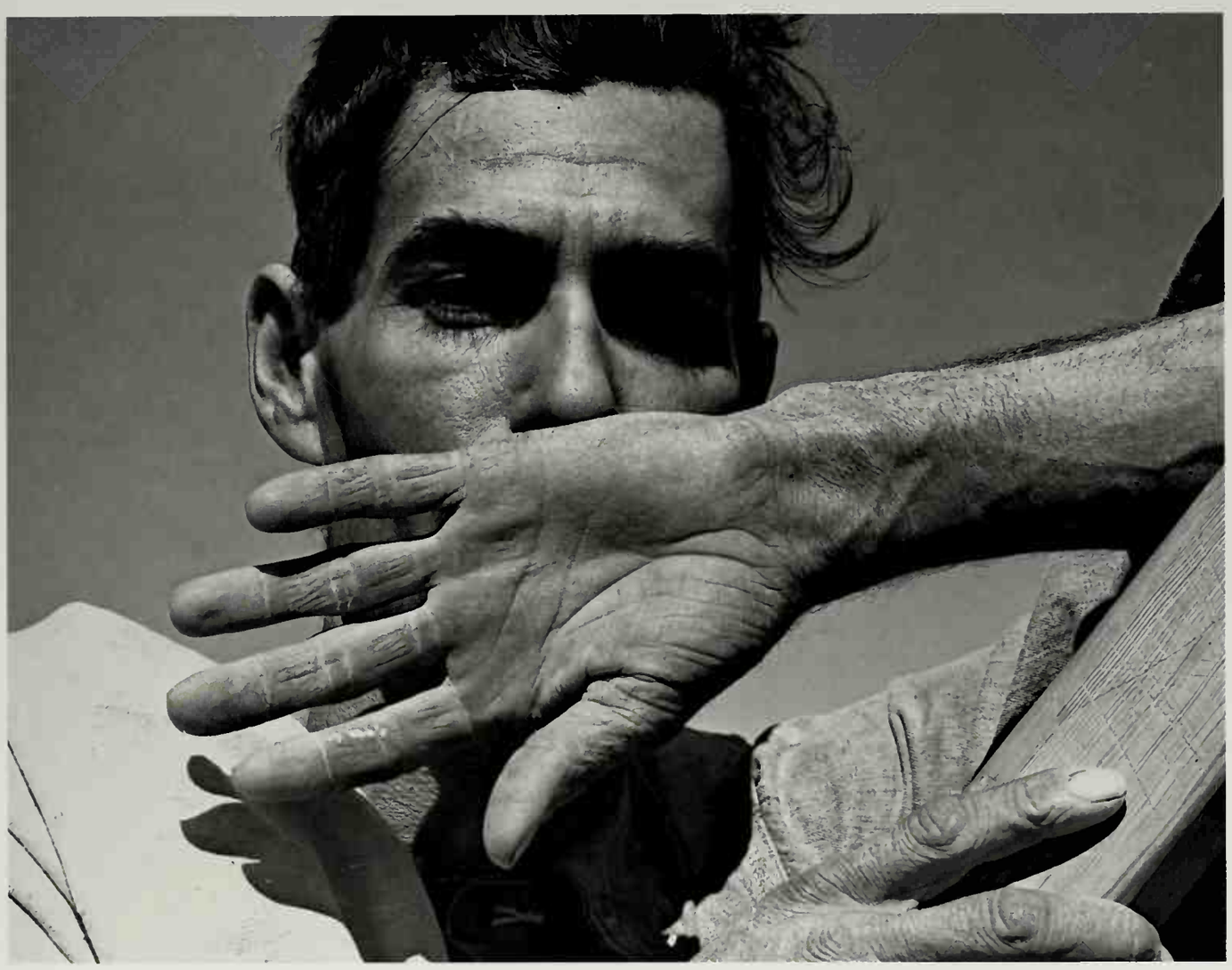
group of two photographers of original genius—Evans and Dorothea Lange. Unlike Evans, Lange was committed to the proposition that her work should be socially and politically useful, and most of her best work will accept gracefully the superimposition of an appropriate moral. Almost all of her pictures are primarily of people, and a remarkably high percentage of those people are handsome, even if troubled and worn. We see them—and were meant to see them—as people of exceptional value, proud and independent and competent, who are unlikely to ask for help, but who clearly deserve it.

Evans and Lange were of very different temperaments, but both were highly intelligent and independent. Their minds and their photographic ideas were formed before they came to the FSA, and both carefully attended their own agendas. Evans, especially, made little pretense of paying attention to the picture requests circulated by Roy Stryker, the unit's administrator, and perhaps did not successfully conceal his conviction that Stryker's young protégés in the unit had stolen and corrupted his style. When confronted with a cut in the unit's budget, Stryker dropped Evans from the group, early in 1937, after approximately twenty months of work. Lange was fired from the unit more than once, nominally for various infractions, but in fact for excessive independence; however, she was a better diplomat than Evans, and each time persuaded Stryker to reinstate her.

Stryker was constantly aware that the survival of the unit depended on the tolerance if not the support of Congress, but within the boundaries of that ultimate truth he seems to have done his best to protect the group from picture-by-picture scrutiny by the various Congressional committees that could legitimately claim an oversight function. He was aided in this by the chaotic indeterminacy of New Deal programs, and by the fact that no one had kept a precise record of who had used the FSA pictures, and to what ends. No thorough study has yet been made of the use to which American newspapers put the FSA handouts, but it seems likely that both pro- and anti-administration papers could have found material to suit their purposes, since they were free to write their own captions.

It is impossible to appraise the success of the FSA photography project in political terms, beyond observing that if it did not help, it apparently did not hurt; the Democratic Party remained in power for an additional ten years after the Historical Unit was dissolved in 1942, and its remaining staff folded into the Office of War Information, where its propaganda function was less ambiguously framed.

The question might also be asked whether the high creative level of FSA photography helped or compromised its nominal function as a disinterested conduit of simple visual facts. The answer might be that the



Dorothea Lange. *Migratory Cotton Picker, Eloy, Arizona.* 1940



Bill Brandt. *At "Charlie Brown's," London.* c. 1936

project's persuasive function was not handicapped by the quality of its work, since few people in the 1930s realized that art could speak in so plain and self-effacing an accent. After *Dragnet*'s Sergeant Friday,[28] and a thousand TV documentaries (and scores of exhibitions and books that have celebrated the artistic value of the best of FSA photography) the same strategy might not work again.

As the weekly picture magazines became larger and more successful they could no longer be directed by the improvisatory intuitions of gifted, strong-minded individuals. Like newspapers, they became increasingly dependent on a rational bureaucratic structure, within which several departments would be responsible for dividing the news of the world into relatively simpler problems—international politics, national politics, science, sports, art, parties, etc.—that could be dealt with by teams of specialists working within a committee system.

The most ambitious example of the picture weekly organized according to the principles of the modern business corporation was *Life* magazine. *Life* began publishing late in 1936, and was an instant success; by 1940 its circulation had reached three million, and its decline—from a peak circulation of eight and one-half million copies—did not begin until 1969, by which time television could provide superficial reportage and conventional commentary more quickly than the picture magazines.

The 1934 prospectus that described the forthcoming magazine to potential advertisers explained clearly how *Life* would differ from earlier picture magazines:

Pictures are taken haphazardly. Pictures are published haphazardly. Naturally, therefore, they are looked at haphazardly. . . . almost nowhere is there any attempt to edit pictures into a coherent story—to make an effective mosaic out of the fragmentary documents which pictures, past and present, are. The mind guided camera. . . . can reveal to us far more explicitly the nature of the dynamic social world in which we live.[29]

The photographer would no longer be a loose cannon in the corridors of history, but a disciplined member of a team, whose collaborative effort would be directed and edited by men in positions to see and understand the large picture.

Whatever its advantages, this view of the photographer's function was not likely to be well served by photographers such as Walker Evans, André Kertész, Brassaï, Bill Brandt, Henri Cartier-Bresson, Berenice Abbott, László Moholy-Nagy, Lisette Model, and Dorothea Lange, each of whom assumed, in spite of important differences in their photographic styles and world views, that the meaning of their work was their own responsibility,



Henri Cartier-Bresson. *Santa Clara, Mexico.* 1934



Brassaï. *Three Masked Women.* 1935



André Kertész. *Montmartre.* 1926



Ansel Adams. *Rocks and Grass, Moraine Lake, Sequoia National Park, California.* c. 1932

and that the mind that directed the camera should be their own. Of this group, Kertész, the oldest, was forty-two in 1936; Cartier-Bresson, the youngest, was twenty-eight. None made a major contribution to the magazine, although periodic efforts were made to accommodate the unorthodox perspective and style of Cartier-Bresson.

The exemplary *Life* photographer was perhaps Alfred Eisenstadt, who could work anywhere with quiet effectiveness, and photograph anything in a style of unobtrusive competence that seemed almost value-free. Margaret Bourke-White was also an exceptionally successful member of the magazine's regular photography staff, in spite of the fact that her style was by no means as self-effacing as Eisenstadt's. Bourke-White had begun as a specialist in architectural and industrial subjects, and she brought to reportage a love of broad, posterlike effects. The flat patterning and dramatic lighting that characterize her work produce a sense of emotional distance even with the most highly charged of subjects, as though the people in her photographs have carefully arranged themselves on the other side of the proscenium arch.

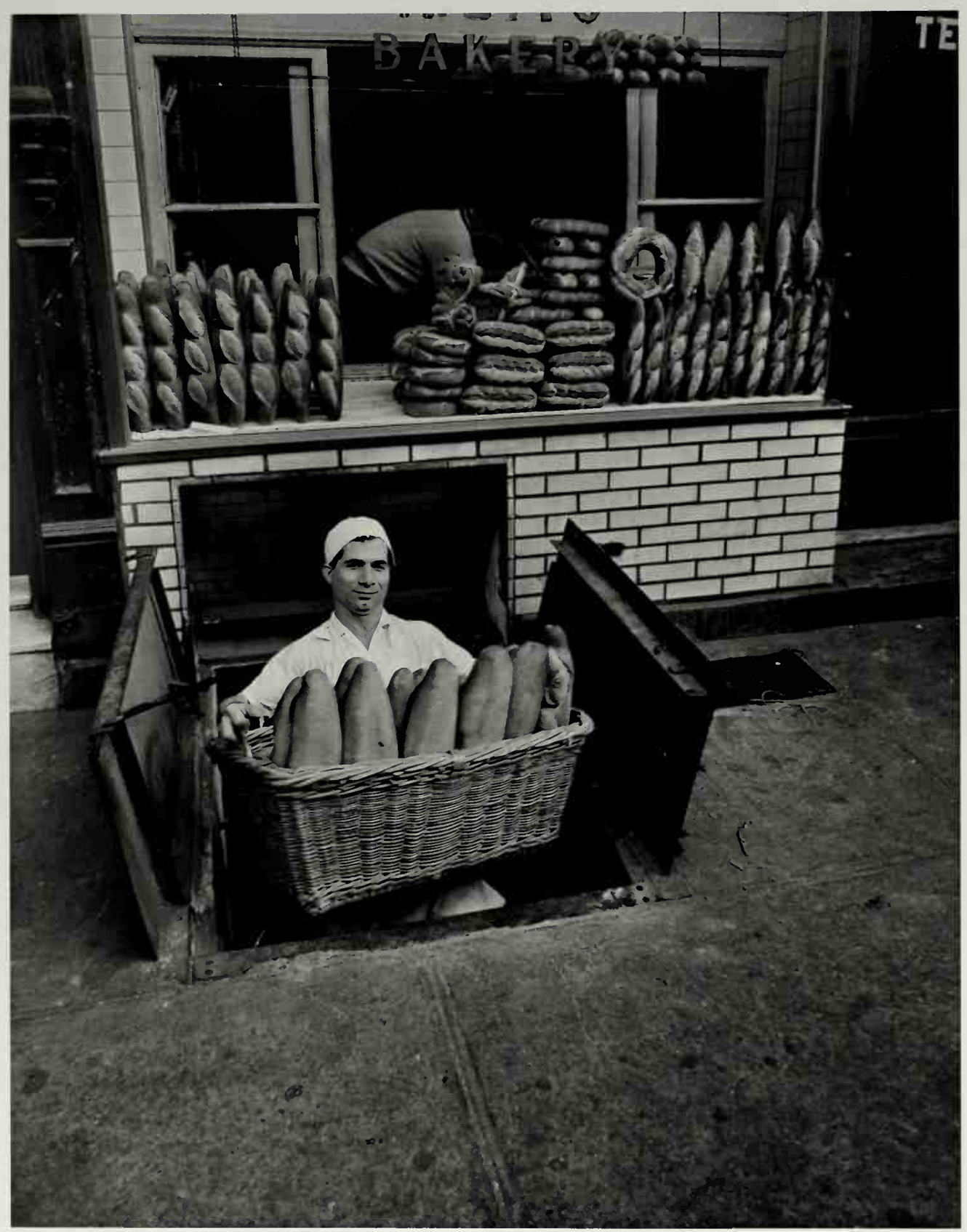


Margaret Bourke-White. *At the Time of the Louisville Flood.* 1937

At the height of its influence, Time Incorporated, the parent organization of *Life*, exuded a sense of power that seemed almost imperial, and that elicited psychological responses ranging from love to hate on the part of its staff. Walker Evans, remembering his days as a writer for *Time* in the mid-forties, said, "there was a certain satanic naïveté in the very top editorial direction of Time Incorporated, perceptible only from below: intelligent, gifted employees were expected to work hard and long hours under crushing pressure at many tasks no man with a mind could put his heart into."[30]

Of all the photographers of talent who worked in the shadow of this impressive authority, W. Eugene Smith seemed the one temperamentally least fitted to do so. Nevertheless, in the brief period between 1948 and 1951 he made the photographs for at least three essays that stand among the most memorable examples of the attempt to produce a new kind of journalism out of the wedding of photographs and words.[31]

In his early 1920s Smith had produced, with apparent good spirit, routinely reassuring pictures of the quotidia of insular American life. During World War II he was a war correspondent in the South Pacific, and was seriously wounded at Okinawa in 1945. After recuperating he returned to work with an intense dedication to the idea that the photojournalist was responsible to a standard that went beyond factual accuracy and pictorial effectiveness. Smith said that the photographer was responsible for producing a series of pictures that by the justice of their evidence and the grace of their form would convey the psychological and moral truth of the subject.



Berenice Abbott. *Zito's Bakery, Bleecker Street, New York.* c. 1937

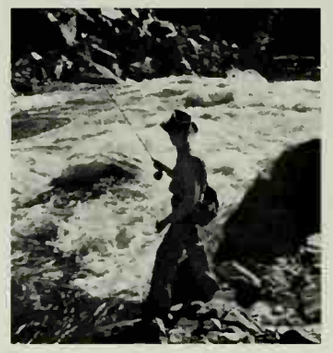
AN ACCIDENT INTERRUPTS HIS LEISURE

Dr. Ceriani's moments of relaxation are rare and brief. Last month, taking a chance that he would not be missed for three hours, he asked two employes of the Denver and Rio Grande to take him out on a railroad gasoline car to Gore Canyon. There he fished alone in the rapids of the Colorado, working expertly over the white water for almost 30 minutes. Suddenly he saw the car coming back up the canyon far ahead of time, and automatically he commenced to dismantle his fishing rod. Ceriani had no feeling of resentment at the quick end of his excursion; he merely stood still waiting for the car to reach him, wondering what had happened and hoping that it was not serious. When the car arrived Chancy Van Pelt, the town marshal, hopped off and said, "Little girl at the Wheatly ranch got kicked in the head by a horse. Can you come now?"

Lee Marie Wheatly, aged 2½, was already in the hospital when Ceriani arrived. While her parents watched he looked for signs of a skull fracture, stitched up a great gash in her forehead and saw that her left eyeball was collapsed. Then he advised the Wheatlys to take their child to a specialist in Denver for consultation on removal of the eye. When they left Ceriani was haggard and profoundly tired. He did not remember that he had been fishing at all until, on his way out of the emergency room, he saw his rod and creel lying in the corner where he had thrown them.



AT 4:15 two friends start to give fisherman Ceriani a ride to Gore Canyon in a railroad motor car.



AT 5:00 Ceriani begins his day's fishing in the boiling, trout-filled rapids of Colorado River.



AT 5:30 Kremmling's town marshal has come after Ceriani and they start back to take care of an emergency case.



THE CHILD'S PARENTS watch in anguish (*left*) while Ceriani examines their daughter. The hospital's two nurses, one of whom is on duty in the hospital at all hours, had tried to check the flow of blood from her forehead and had given her a dose of phenobarbital while Ceriani was on his way back from fishing trip.



HAVING DONE HIS BEST for the child, Ceriani is worn out and tense as he completes the emergency treatment. He has stitched the wound in her forehead so that she will have only a slight scar, but already knows that nothing can be done to save her eye and tries to think of a way to soften the news for her parents.

CONTINUED ON NEXT PAGE 119

W. Eugene Smith. "Country Doctor." (*Life*, 1948)

This was a stern and demanding standard, and one that defied precise measurement; one man's moral truth could seem to another like arrogant pontification. It was in addition a goal served with difficulty by the committee system. Smith resigned at least twice from *Life*, in 1941 and 1954, in protest over the magazine's handling of his work; for his integrity, or intransigence, as well as his talent, he became a hero to photographers who had never met him, and his name came to serve as an escutcheon for the ethical ideals that many photojournalists intended to serve, as soon as they were a little more secure.

To be simultaneously a socially responsible journalist and an ambitious artist is difficult enough; to serve also as the designated conscience for one's guild is perhaps too heavy a burden. As Smith's ambitions became grander and more beatific it became harder for him to resist the temptation to make every moment momentous, every commonplace a portent of damnation or salvation.

In 1972 *Life* closed its doors; many of the other magazines that had supported photojournalists had already done so, or would shortly. The reason usually given for their failure is the rise of television, and this is doubtless correct, at least in the commercial sense. But one might say that the magazines had failed on creative grounds before television became a competitor, and that if they had succeeded on those grounds they might also have survived. It is difficult to identify a photo essay from the best days of the experiment in which consistently superior photographs and rigorous writing augment and transform each other, to achieve that new means of expression to which editors, photographers, writers, and art directors paid continual lip service.

The possibilities of such a compounding were more adventurously essayed in three books published between 1941 and 1950: *Let Us Now Praise Famous Men*, by Walker Evans and James Agee; *The Inhabitants*, by Wright Morris; and *Time in New England*, by Paul Strand and Nancy Newhall. Although different in style and substance, each book demonstrated that the relationship between words and pictures is complementary rather than supplementary. The pictures did not act as illustrations, nor the text as captions. Paul Strand wrote to his collaborator Nancy Newhall, "It would be impossible in any real sense to illustrate the text."[32] Walker Evans said, "I had an agreement with James Agee that we would go our own ways. He knew me well. I knew him well and we paid no attention to each other . . . but it was understood that things would go together."[33] The goal—or at least the result—was an association of pictures and text in which each element was independent, and the two together only barely consonant. Wright Morris, understanding the difficulty of yoking words and pictures, said that Agee's words and Evans's photographs were in conflict: "The



Helen Levitt. *New York.* c. 1942



Manuel Alvarez-Bravo. *Daydream.* 1931



László Moholy-Nagy. *Repose.* 1924–31

words soar into the empyrean, but the photographs, happily, remain earthbound. To that extent, the counterpoint is more fruitful than if the words and images were on the same plane."[34]

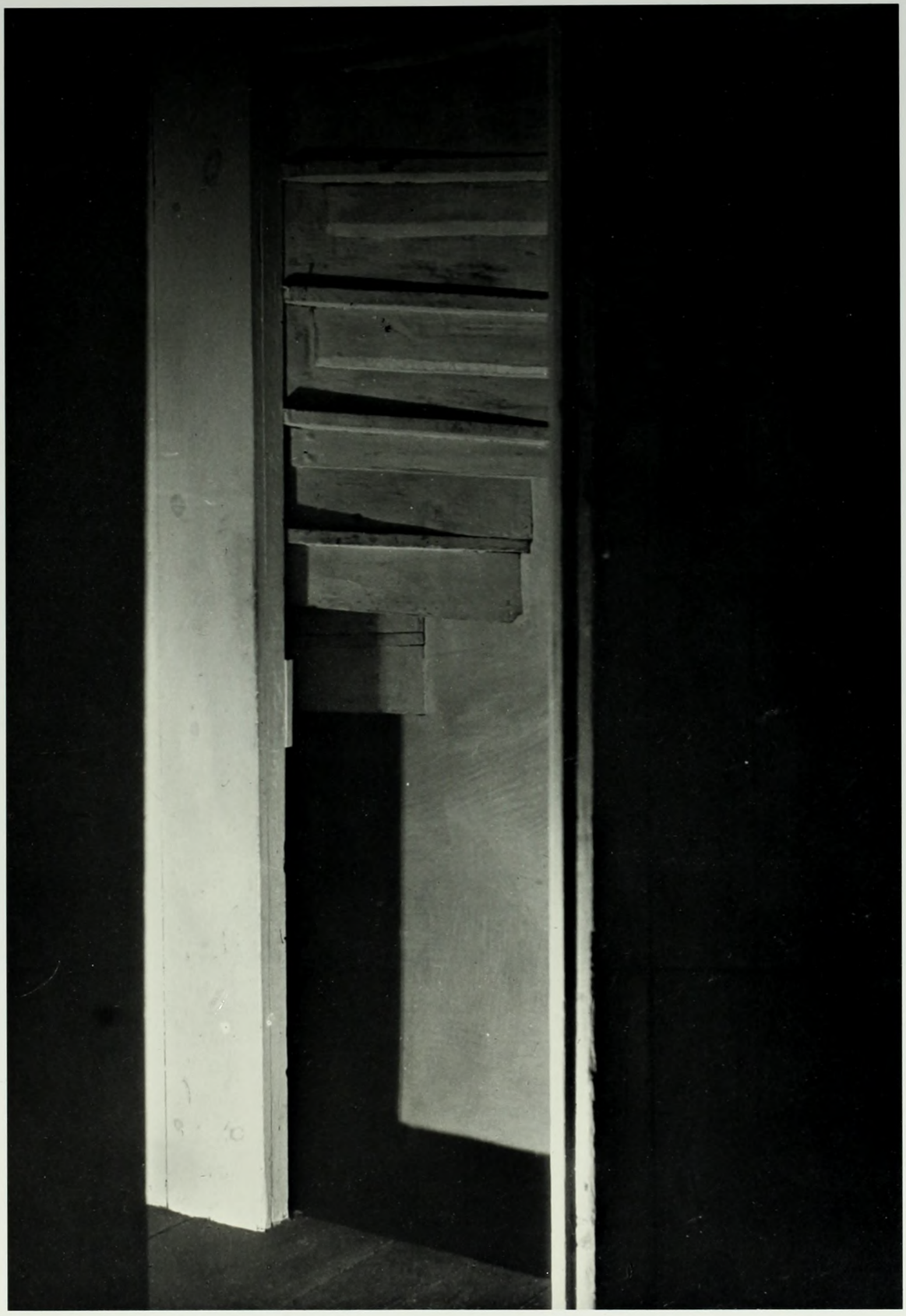
Photographers born in this century grew up with photomechanical reproduction, and most of them regarded it as a normal part of the photographic process. Those who were a little older, and whose values were formed before the ascendance of the halftone block, might have viewed the new process with some ambivalence, or even seen it as the substitution of a badly flawed system for a perfect one. Photographers who did not wish to participate in the photomechanical revolution in any of the several ways sketched out above could instead change their way of working to make pictures that halftone reproduction could not adequately imitate.

During the 1920s Alfred Stieglitz, August Sander, and Edward Weston—all mature photographers who had been justly celebrated for their earlier work—revised their styles, radically or subtly, and adopted a technical vocabulary that had been the hallmark of commercial photography: full-scale negatives that yielded brilliant prints on smooth, hard-finished papers that revealed maximum detail and tonal nuance. The change in direction exemplified in the work of these exceptional artists was international and apparently intuitive, with theoretical rationales trailing behind the fact of change.

The shift can be explained as an expression of a central idea of the time that was variously described as fidelity to the nature of materials, or functionalism, or the machine aesthetic. But these phrases and catchwords are vague and general; as specifically applied to photography one of the sharp-pointed, particular things that the general idea encompassed was the fact that photography in ink could imitate quite well the soft resolution and grayed tonality of high-art photography of the previous decades, but it could not then match the razor-sharp edges and long, oyster-smooth gray scale, reaching almost from real black to real white, that was the technical ideal of the professional nuts-and-bolts photographer.

Until the early 1920s Edward Weston had been a successful photographer of the pictorialist school, well known for his prize-winning photographs of softly drawn figures in pearly-gray showers of light, and for his romantic portrait studies. His pictures were soundly constructed, handsomely executed, and conventional in conception. By the 1920s similar if inferior work was reproduced endlessly in the photography magazines, which Weston said gave their readers just what they wanted.

For a photographer of Weston's ambition it was essential to find new ground, an open position removed from the formulaic prettiness and congregational security that characterized the decline of pictorial photog-



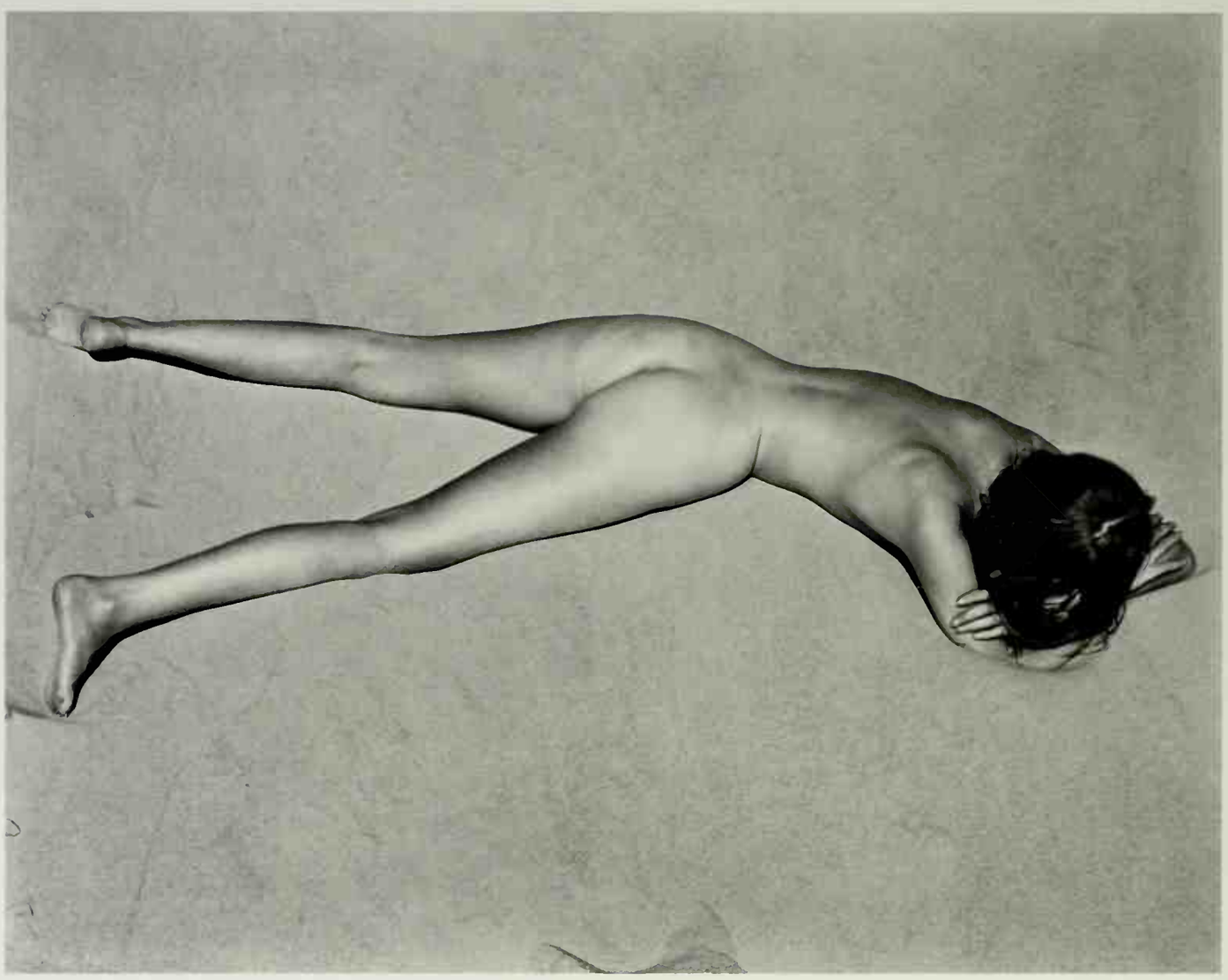
Charles Sheeler. *Stairwell.* 1914



Eugène Atget. *Saint-Cloud, juin 1926*



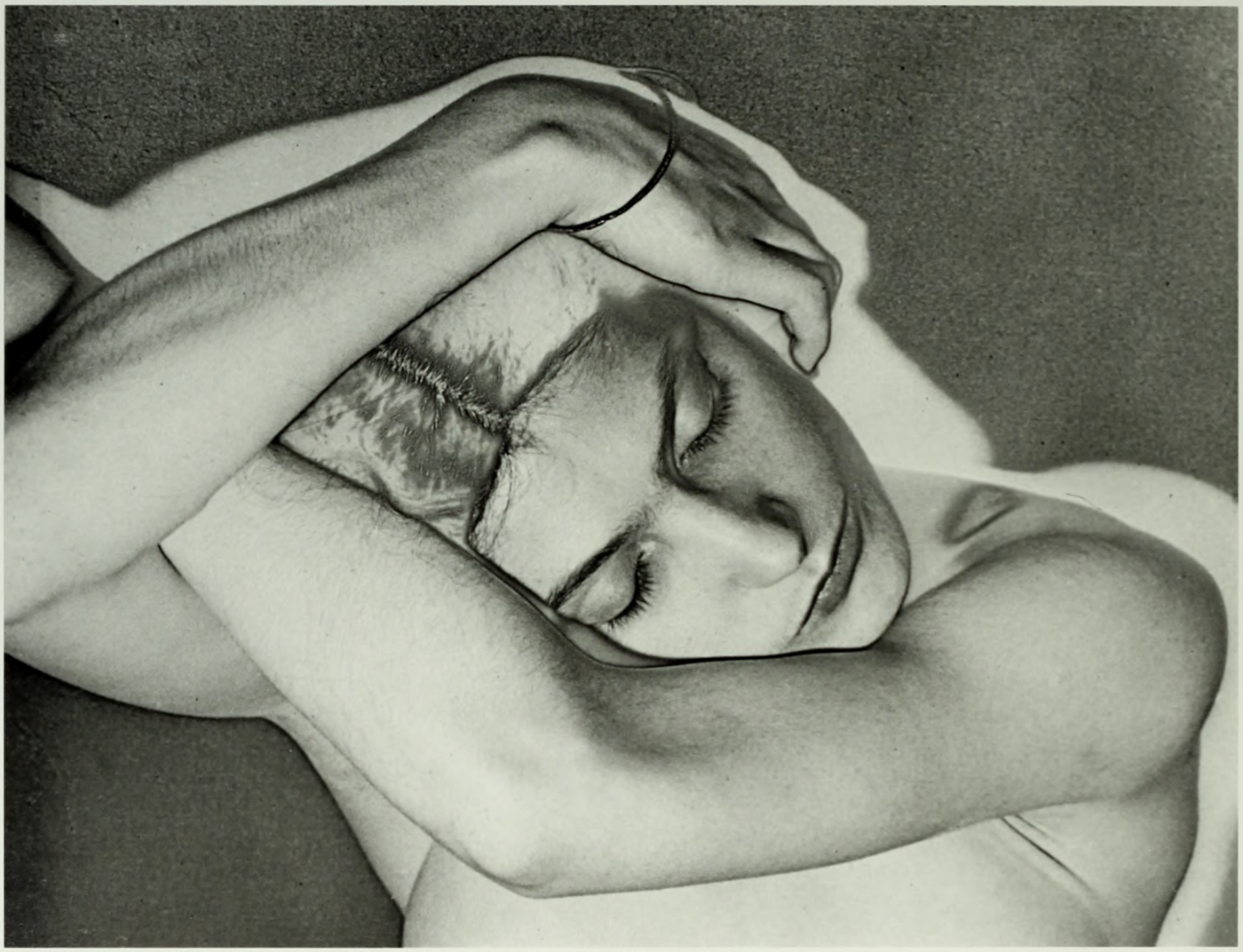
Eugène Atget. *Saint-Cloud.* 1915–19



Edward Weston. *Nude on Sand.* 1936



Edward Weston. *Nude on Sand.* 1936



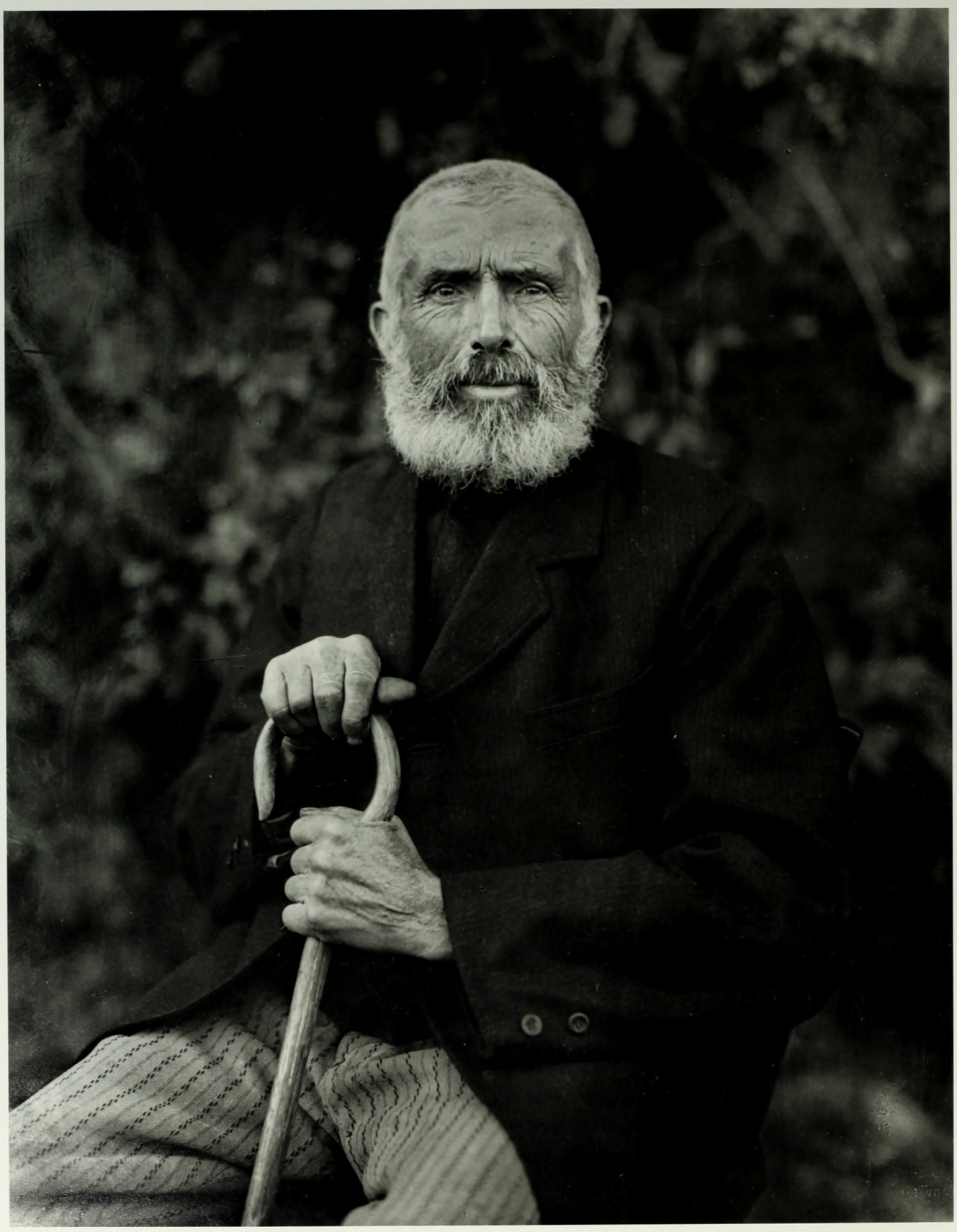
Man Ray. *Sleeping Woman.* 1929

raphy. It was perhaps necessary for him to distance himself a little even from the basic pictorialist preoccupation with individual expression.

The change in his work came gradually and incrementally, and continued for a quarter-century. In 1922 he made two remarkable photographs of the Armco Steel plant in Ohio. All noise, dirt, and disarray, all the complexity of real life and human effort were stripped away, until the subjects became patterns, geometric symbols expressing a pure and Olympian power, the disembodied platonic essence of industry. Weston's idealization of his motif was complete, but it was now a *modern* idealism, clean and spare and muscular in aspect. During the next ten years Weston's work, excepting his portraits, continued to favor a similar kind of high-modernist abstraction. His nudes were faceless; his landscapes truncated fragments of earth or sky, without horizon or location; his seashells and vegetables were universes in themselves, surrounded by a great void. Weston's technique reflected the change in his vision, but surely his vision was also influenced by his growing affection for a style of craft that emphasized the particularity of things. In 1927 he confided to his diary that he would like to do an exhibition of prints all made on glossy paper.[35] In 1930 he wrote, "It is just a logical step, this printing on glossy paper. . . . I want the stark beauty that a lens can so exactly render, presented without interference of 'artistic effect.'"[36] Three years later he was full of confidence and ready to begin his mature and greatest work. The psychological support of a diary was no longer necessary, and its entries became infrequent and mostly perfunctory, but in 1933, as the journal nears its end, he makes a remarkable confession. Writing of the days before 1920, he noted, "I used to affect a flowing tie and feel myself very much the 'artist.' . . . Even as I made the soft 'artistic' work with poetic titles I would secretly admire sharp, clean, technically perfect photographs in showcases of very mediocre photographers."[37]

Little by little Weston's subjects became more and more specific—less universal, and more clearly a celebration of a particular experience in a particular place at one moment. By the late 1930s his nudes had faces, his landscapes had horizons and location, and his portraits—especially the late portraits of his own children—tell us something of the essential ecology of other lives. Until he was stricken with Parkinson's disease in the mid-forties his work became progressively bolder, and more useful to his successors.

Like Weston, August Sander was a professional photographer who made his living primarily by making portraits at the request of the sitter. Before World War I he had begun to make portraits of subjects who had not solicited his attention, but whom he sought out because they interested him as characteristic types, and perhaps also as endangered species. The



August Sander. *The Earthbound Farmer.* 1910



August Sander. *Young Girl in Circus Caravan.* 1932



Alfred Stieglitz. *Georgia O'Keeffe.* 1920



Alfred Stieglitz. *Georgia O'Keeffe.* 1933

first of these pictures described the prosperous small farmers—technically peasants, since they did not own their own land—who still survived in Westerwald, near Cologne, much as they had before the age of revolutions. A little later Sander's attention was drawn to other types who did not come to his studio: laborers, beggars, petty bureaucrats, gypsies, students, and many others. Gradually the idea came to him that he might do something like an encyclopedia of the types and roles and classes that constituted his world, a Germany that was still a mixture of Goethe and Bismarck. The idea, in principle, was typical of the nineteenth-century Teutonic affection for sorting and cataloging, a Linnaean approach to knowledge that has given us systematic biology, art history, phrenology, and worse. Sander's immensely ambitious project was perhaps impossible in principle, and in the event was unsuccessful in practice, perhaps because Sander himself, an artist rather than a theorist, continued to revise the outline within which all Germans should fit. His program was nevertheless a superb artistic project, for it brought him to good material, and required him to look and think clearly. The greatness of Sander lies not in his outline, but in his pictures, which give us not only generic types but unique individuals.

As his idea assumed control of his work, his work came to take on the character of scientific documents—clear, laconic, and precise, and seemingly uninflected by a taste for aesthetic luxuriance or personal expression. Such goals had become invisible, for they were not on the surface, but deep in the bones of the idea.

It has been suggested that the change in Stieglitz's work after 1910 was due to the influence of modern painting.[38] Between 1908 and 1914 Gallery 291 had shown work by Matisse, Cézanne, Picasso, and Braque, in addition to the American modernists, and it would be witless to think that intimate and prolonged exposure to such work had left no mark on Stieglitz. It should also be noted, however, that Stieglitz had continually learned from younger photographers—in his thirties from Clarence White and Steichen, in his forties perhaps from Coburn, in his fifties, without doubt, from Paul Strand. In 1916 he wrote to R. C. Bayley that Strand was "a young man I have been watching for years. . . . he has actually added some original vision to photography."[39] One measure of Stieglitz's greatness (and one reason for his remarkable longevity as a creative photographer) was his ability to absorb and make his own lessons imbedded in the work of younger men, and to submit those lessons to a more intense pressure, and wrest from them a simpler and denser description of life than had been hinted of in their first formulation.

As Stieglitz aged he shed, article by article, the petty, competitive ambitions of his youth, until finally there remained only the irreducibly simple arrogance of an alien prophet, who would through his own hyper-

optic eyes know the secrets of life. In 1925 he wrote Sherwood Anderson: "I have been looking for years—50 upwards—at a particular sky line of simple hills—how can I tell the world in words what that line is—changing as it does every moment.—I'd love to get down what 'that' line has done for me—Maybe I have—somewhat—in those snapshots I've been doing the past few years."[40]

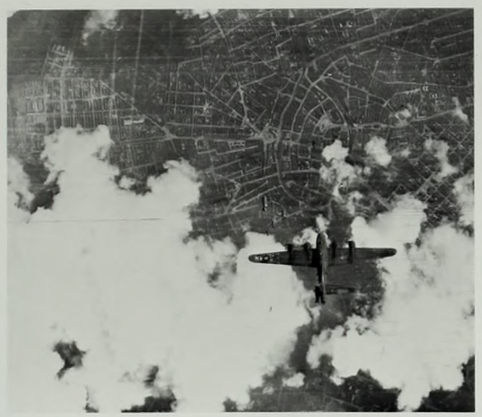
Earlier he had written to Strand, "How lax the standard was even when I thought a standard had been partially established. There was too much thought of 'art' and too little of photography."[41]

By this time Stieglitz had stripped his technique of all luxury and indulgence. To describe in a photograph the meaning of a familiar horizon, only the simplest craft would suffice.



Josef Albers. *Paul Klee, Dessau.* 1929

Automatic camera. Accident, B-17 raid over Berlin. 1944–45







Eliott Erwitt. *Fontainebleau Hotel, Miami Beach.* 1962

7. After the Magazines

During the early decades of this century the role of the photographer was profoundly revised by the technical and commercial success of photomechanical reproduction. By the 1930s photography in ink had achieved virtual hegemony over professional practice, except only in the sleepy backwater of studio portraiture.

The new technology offered great advantages to educators, advertisers, politicians, and others interested in very large audiences. In truth, photographers were also interested in large audiences, doubtless partly for economic reasons, but perhaps more fundamentally because they gave photographers the heady pleasure of seeing themselves as significant players in the world of large affairs.

On occasion large audiences were needed because they were being asked to vote right. As early as 1909 Lewis Hine, who sought child-labor legislation, was pleading with his fellow social workers to recognize and adopt the lessons of advertising:

Long ago the business man settled, in the affirmative, the question, 'Does Advertising Pay?'. . . I wonder, sometimes, what an enterprising manufacturer would do if his wares, instead of being inanimate things, were the problems and activities of life itself, with all their possibilities of human appeal. Would he not grasp eagerly at such opportunities to play upon the sympathies of his customers as are afforded by the camera?[1]

Even when there was no clear social issue at stake, a large audience could be seen as more democratic than, and thus intrinsically superior to, a small one. In 1928 Edward Steichen told a group of advertisers' representatives, "When I was putting my soul onto canvas, and wrapping it up in a gold frame, and selling it to a few snob millionaires who could afford it—after I got to thinking about it, I did not feel quite clean. But now I have an exhibition every month that reaches hundreds of thousands of people through editorial and advertising pages."[2] Steichen's statement was clearly tailored to flatter its audience, but it would be a mistake to consider it as wholly cynical. A large audience *was* exciting for a photographer, as for a juggler or a tenor.

In 1950 Irving Penn, then thirty-three years old and the most admired photographer in the world of fashion, said,

The modern photographer, having, as most creative people, the urge to communicate widely, is inevitably drawn to the medium that offers him the fullest opportunity for that communication. He thus works for publication. He is, in fact, a journalist. . . . For the modern photographer the end product of his efforts is the printed page, not the photographic print.[3]

Penn's statement fairly crackles with a sense of confidence and competence and excited impatience for the next assignment. It stands as a souvenir of the sense of vital function—one is tempted to say the sense of destiny—that supported advanced professionals during the second quarter of this century, and for a few years longer.

In advertising *caveat emptor* still seemed a reasonable and serviceable guideline, but in the editorial pages a somewhat less cavalier attitude toward the issue of veracity had gradually insinuated itself. With the development of photojournalism the photographer's new authority—perceived or real—began to raise questions concerning his or her ethical responsibility. In 1948 W. Eugene Smith wrote,

Photographic journalism, because of the tremendous audience reached by publications using it, has more influence on public thinking and opinion than any other branch of photography. For these reasons, it is important that the photographer-journalist have (beside the essential mastery of his tools) a strong sense of integrity and the intelligence to understand and present his subject matter accordingly.[4]

Whatever the exact intended meaning of this statement, it clearly recognizes the photographer as a person of potential power, for good or ill.



Roy De Carava. Untitled. 1959

It is difficult to know with precision what killed the sense of importance enjoyed by successful photographers during the halcyon days of the magazines. One might guess that it was killed little by little, as photographers discovered their authority was largely illusory, and that the illusion failed when the photographer's intuitions and convictions did not match those of the amorphous, imprecisely defined committee that construed consensus.

As early as 1946 the photographers' cooperative Magnum Photos was formed to increase the authority of the photographer vis-à-vis the magazines, in reference to issues such as assignments, picture editing, and control of accompanying text. The magazines were by then seen to be not only an unprecedented opportunity but an adversary. Other comparably structured cooperative agencies followed Magnum; all were founded on the unspoken assumption that there were a limited number of photographers who could fill the magazines' needs. But as those needs became



Lee Friedlander. *Colorado.* 1967



Irving Penn. *Cigarette No. 37*. 1972

more codified and predictable the assumption became increasingly questionable.

In advertising as in journalism, interesting problems and imaginative solutions came to be increasingly the province of idea men and art directors, not photographers. One of the memorable ads from the last years of the magazines' hegemony was produced by Doyle Dane Bernbach for Volkswagen. In it the familiar Bug was shown in archaic profile view, and silhouetted, one inch long on a sea of white paper. Beneath it was the two-word text: *think small.* The brilliance of the concept — a *cri de coeur* against fat rhetoric—required that the photograph be one that could be made by any competent mechanic, or at least look like it. Nothing imaginative would have served.

It might be said that by the 1950s editors and art directors had come to think in terms of the principle of collage, even when that form was not explicitly evoked; that is, the content of a given photograph came to be less interesting than the ways in which that content could be revised by careful adjustment of the context in which the picture was placed. This was a very interesting problem, but photographers were generally not asked to contribute to the solution. In 1964, fourteen years after he had spoken with such ringing confidence of the symbiotic relationship that existed between the modern photographer and the magazines, Irving Penn confessed to an informal meeting of fellow-professionals and apprentices that things had changed: He said, "The printed page seems to have come to something of a dead end for all of us. . . . I've learned the discipline of not looking at the magazines when they come out, because they hurt so much." He also said, "I've heard from [Alexey] Brodovitch you can make a first-rate book with terrible pictures. . . . The magazines, the art directors, I think, have driven the photographers back to the fine arts."[5]

Within the next few years Penn had begun to experiment with platinum prints, a process that allowed tonal distinctions of unmatched subtlety, and that was therefore stunningly irrelevant to the needs of magazine reproduction. By 1972 he had produced in this historic medium a suite of pictures that might be considered an act of homage to the great dead days of *haute couture:* pictures of cigarette butts, twenty times life-size, so exquisitely described that they suggest the costumes of princes and jesters.

A half-secret change in the nature of the ambitions of magazine photographers had begun to occur during the 1950s. It can be seen in the work of Bill Brandt. During the 1930s and 1940s Brandt had produced an unsparing (if mordantly romantic) portrait of the English circumstance—a record of the state of a threadbare but stubborn class structure. Perhaps no photographer had come so close, in the guise of journalism, to picturing the moral condition of a people (p. 218). At the end of the war he retired

to his studio to make nudes, and during the next fifteen years devoted much of his energy to this series of progressively mysterious, unfamiliar pictures. The last of them suggest eroded relics washed up by the sea, and unremembered erotic rites.

Throughout most of the 1960s the magazines still seemed healthy; most still had record circulations, and paid their photographers better than ever, but the photographer's faith in their usefulness to his own ambitions was failing. The magazines had seemed to promise the opportunity to reshape the world a little, but after a short generation that promise had faded and working for the magazines had become, for most photographers, merely profitable. Soon most of the magazines that had seemed to represent the photographers' highest hopes had failed, or had revised their ambitions downward, settling for profitability rather than influence.

The most ambitious and the most successful photography exhibition of the period was—like the magazines—based on the principle of collage. *The Family of Man* opened at The Museum of Modern Art in 1955, and was subsequently seen (in one of nine similar copies) at forty-one institutions throughout the world. The exhibition was conceived and directed by Edward Steichen, and was, among other things, that remarkable artist's last major work of the imagination. Jacob Deschin of the New York *Times* recognized that it was "essentially a picture story to support a concept . . . an editorial achievement rather than an exhibition of photography in the usual sense."[6] The exhibition succeeded brilliantly at producing a simple and emotionally coherent effect through the skillful integration of 503 photographs and an impressionist text consisting of brief quotations from the Bible, Lao-tzu, Shakespeare, folk-sayings, etc.

It was inherent in the conception of the exhibition that the individual photographs in it were not seen as discrete statements but as threads for a tapestry woven by a master designer. In this sense it ran counter to the emerging ambitions of advanced photographers, who were getting tired of supplying component parts for someone else's story.

Penn and Brandt had responded to their disaffection with the magazines by approaching their professional and their creative lives as separate issues that sometimes overlapped. Other photographers who had become bored or outraged by their own work as it appeared in the magazines revenged themselves by adapting advanced photojournalistic style to the needs of their own anger. The most influential of these were Robert Frank and William Klein.

Both Klein and Frank were expatriates, Klein an American in Paris and Frank a Swiss in New York; as young men both had made their living primarily as fashion photographers, which may possibly have exacerbated their sense of being witnesses of an alien world. Klein made some profes-



Bill Brandt. Untitled, from "Perspective of Nudes." 1953



William Klein. *Moscow.* 1959



Shomei Tomatsu. *Okinawan Victim of the Atomic Bomb Explosion in Hiroshima.* 1969



Robert Frank. *Parade, Hoboken, New Jersey.* 1955

sional use of his alienation (real or feigned) by photographing fashion as though the model had by chance been snapped by a passing street photographer. Later he produced books on New York, Rome, Tokyo, and Moscow, executed in a style so harsh in accent and so disengaged in spirit that his pictures remind us less of the cities in which they were made than of blowups from newsreels of Hamburg and Hiroshima.

Frank's most important work, although less obviously nihilist in manner than Klein's, expressed a more complex distress and a deeper anger. His enormously influential 1958 book *The Americans* subverted the comfortable assumption of a fundamentally progressive and happy America, and replaced it with the image of one that seemed not vicious but empty. The Swiss photographer and painter Gotthard Schuh wrote of these pictures that one found in them,

not a smile, not a flower, no vegetation, no beauty, anguished and wooden faces, wedged in between parts of machines, standing waiting in front of filling stations and in bus compartments, hard-featured and apathetic at the driving wheel, bored in the interior of their luxury car. . . . Never before have I seen such a shattering picture of humanity in the mass, individuals barely distinguishable from one another, all aimless as if in a vacuum.[7]

The anger in Frank's book was met by a reciprocal but unformed anger by many of those few who took cognizance of the work. The angriest responses came perhaps from American photographers and editors and curators who could hardly have been offended by the nominal content of the book. These ordinary roadside bars and strip developments and political rallies and lunch counters and shopworn streets with their anonymous inhabitants had all been photographed before, over and over again; but they looked different in Frank's pictures: shabbier, and somehow suddenly hopeless, which was of course a quality that came from the lineaments of the pictures themselves. The primary point was not that Frank's pictures disregarded the conventional standards of photographic technique; these standards had been under siege for years, and only those who were ready to be called old fashioned still insisted that a photograph should unambiguously describe the surfaces, volumes, and spaces that were included within the frame. The more distressing new quality in Frank's pictures was their equivocating indirection, their reluctance to state clearly and simply either their subject or their moral. Like a prophet reciting enigmas, Frank seemed to photograph around the periphery of the true subject, showing us things tangential to it, but seen in its reflected light. The very design of his pictures seemed ambivalent and unresolved; he had recognized that the armature of classical geometry underlying Cartier-Bresson's pictures produced work in service to the virtues of harmony and measure, qualities



Diane Arbus. Untitled. 1970–71



Daidoh Moriyama. *Stray Dog, Misawa.* 1971

that were not central to Frank's view of life, especially to his view of life in America.

Not instantly or unanimously, but inevitably, younger photographers came to recognize the force and authority of Frank's style. They did not necessarily understand the need that was mother to that style. By the 1960s young photographers who preferred Leicas to view cameras drove second-hand Ford cars across America like pilgrims, favoring the same routes that Frank had taken, and making photographs of truck stops and motorcyclists and The Road. But the larger lesson that was available in *The Americans* did not concern the iconography of the Beat life-style; it was rather that the meaning of a photograph was a function of its aspect. It was a lesson learned best and exploited most boldly by Garry Winogrand, who much later told his students that there was no special way that a photograph should look, meaning that there was no special thing it should mean.

During the 1860s professional photography had begun to replace the amateur structure that had—excepting the daguerreotype portrait—dominated the medium's priorities. For the next century professional perspectives largely defined the standards that photographers pursued or (occasionally) reacted against. But by the 1960s the role and the influence of the professional had been eroded by the committee system of group journalism, by the documentary film, by television, and by the increasing competence and confidence of the casual amateur. This last change was due largely to the cameras that the amateur used, which in the 1970s would automatically determine the correct exposure and focus the image; some models would even refuse to make pictures if conditions did not meet their standards. Most of the pictures made by the operators of these machines were not of compelling interest, but they were often adequate, in the eyes of their makers, to the needs they served. Wedding pictures, yearbook pictures, portraits that marked promotions and retirements, pictures of houses for sale and houses damaged by fallen trees, and pictures of the presentation of awards were increasingly made by photographers who did not call themselves photographers. Perhaps little of high value was lost in the change, but the new circumstances did require fewer professionals, and resulted in a smaller gene pool of photographers who worked every day, as Marville and Watkins and Atget and Sander and Weston had.

By 1960, more or less, the casual amateur worked predominantly in color; a little later he worked almost exclusively in color. The massive size of this snapshooting market encouraged the photographic industry to devote their best talents to satisfying its needs; this resulted in the production of color materials that were finally good enough to win the serious attention of serious photographers.



Garry Winogrand. *Circle Line Ferry, New York.* 1971



Eliot Porter. *Trees and Pond, Near Sherborn, Massachusetts, April 1957*

Since the beginning of photography, scientists, theorists, and critics had looked forward to photography in color. Photographers seem to have been less interested in this theoretically perfect medium, perhaps because the existing, imperfect one offered more than enough interesting problems to keep them occupied. It is worth noting that when photography was less than a decade old, and its techniques were still primitive, photographs were made (by Hill and Adamson in Edinburgh, and Southworth and Hawes in Boston, and Bayard in Paris) that still delight us as pictures. In the case of color photography, on the other hand, the primitive period, which lasted a century or more, produced little work that remains of compelling interest, except on technical grounds.

From a technical standpoint, however, photography in color was from the beginning an interesting problem. The first tentative approach to a solution sought a substance that would take on and hold the colors of the light that shined on it, rather as sand records footprints. The Reverend Levi Hill of Peekskill, New York, claimed in 1850 that he had managed to produce such a substance on daguerreotype plates, but he had apparently neglected to make good notes, and was afterward unable to replicate the substance, thus anticipating in photographic terms the tragedy of "The Lost Chord."[8]

A more useful approach to the problem, as it worked out, was to make color photographs on ordinary black-and-white plates. This was done by making the same picture three times, through three color filters that would among them record (in theory) the entire reach of the visible spectrum. An exposure made through a red filter will record the red in the subject and be blind to the green and blue; one made through a blue filter will see blue but not yellow; green will transmit that color but filter out its complement, magenta. If one should then print those three negatives on new plates (making positive transparencies) and project those three transparencies from three projectors onto the same screen—coloring the light of each projector by directing it through the same color filter that was used to make the corresponding negative—one will produce something resembling a modern color photograph. The principle involved here can be seen working in rear-projection television sets. It is called additive color, and concerns the mixing of colored light: red, blue, and green light, mixed in the proper quantities, produce white light. If, on the other hand, one starts with white—the white page of this book, for example—one subtracts from that complete and perfect color by putting down pigments or dyes that absorb certain parts of the spectrum, and reflect back the remainder. In this case one lays onto the paper not red, blue, and green ink, but the complements of these colors: cyan (blue-green), yellow, and magenta.[9]

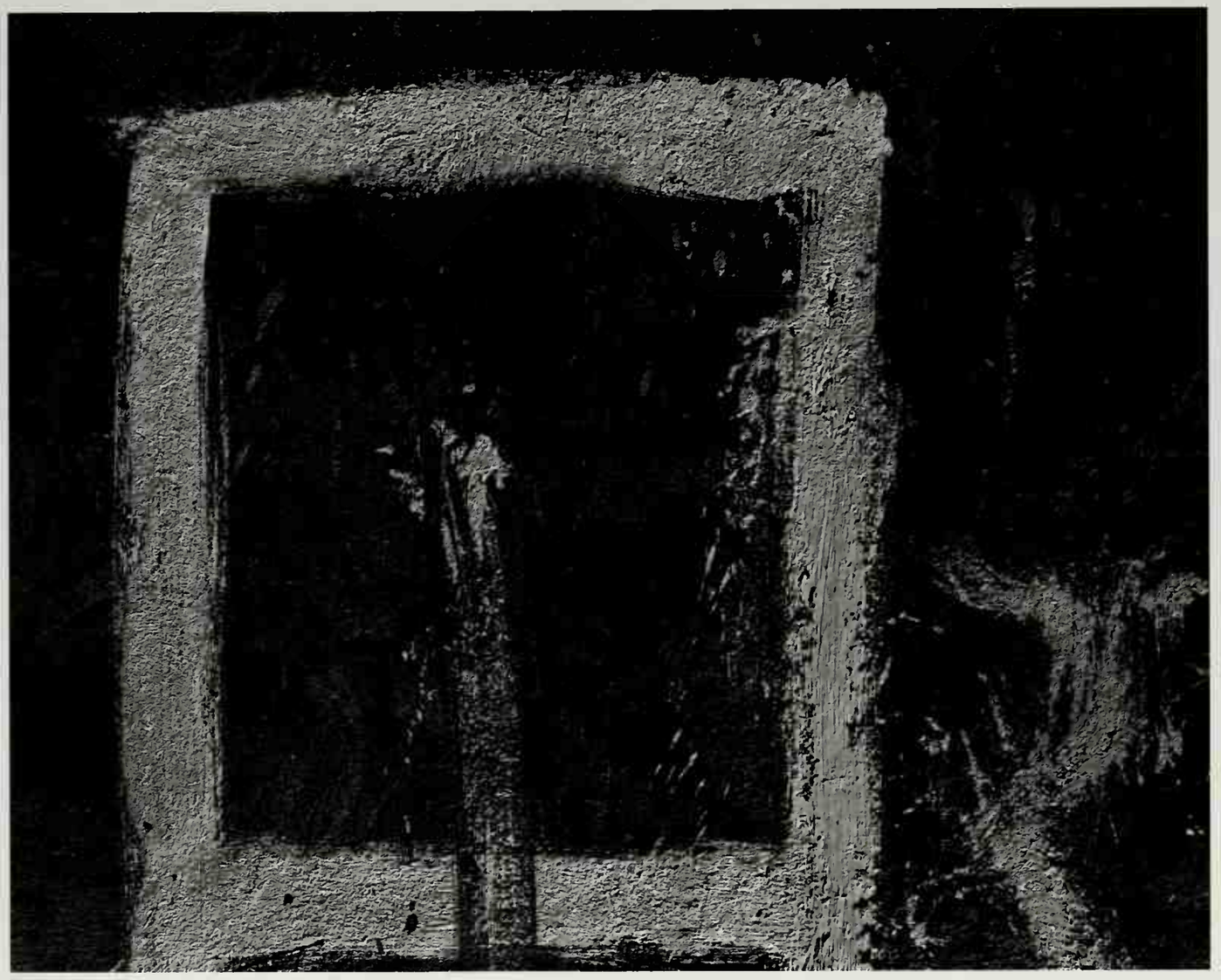
The history of photography in color is long and complex, and has had

(until recently) very little to do with our sense of the essential achievements of the medium. As recently as the 1960s perhaps only Eliot Porter and Ernst Haas, among photographers then prominent, would carry from the proverbial burning house their color work before their black and white. Part of the trouble with color photography before that time was its clumsiness and its costliness, which meant that it was generally practiced only in the studio, and only for rich clients. This meant that color was primarily the province of advertising, which in turn meant that most color photographs reflected the creative sensibilities of advertising men.

In 1937 the Eastman Kodak Company first marketed a more or less foolproof color film for still cameras in which three emulsions, each with its own filtering dye, were sandwiched together in a single parcel. The film, called Kodachrome,[10] made it easy to produce color transparencies that were brilliant, sharp, luminous, and reasonably inexpensive. Prints made from these transparencies were either costly or miserable in quality, and often both. The solution was the slide projector, which after World War II became part of the standard equipment of the middle-class home, and an instrument for testing the commitment of one's friends. The color slide, sensationally beautiful at its best, never quite escaped the stigma of amateur theater; even today most people over forty have drawers full of Kodachrome slides, almost as brilliant as when new, and friends perhaps not quite equal to the test.

For the serious photographer, the trouble with color photography was not simply that it was clumsy and costly, it was also that it was colored. A large part of the experienced photographer's skill lay in his or her ability to ignore the accidents of color—the lavender necktie or cerulean sky—and see the scene in its fundamental monochromatic truth. Those magazines that believed that it was their function to tell the truth did not consider the possibility that the truth might be told in color. Ads were in color. In *The Wizard of Oz* (1939) the reality of the Kansas farm was shown in black and white; the fantasy of Oz was shown in color. Later, a generation that had been conditioned to accept even gangster movies and the evening news in color were able to overcome photography's deep historic commitment to the beauties of monochrome. By 1970 younger photographers were beginning to see color not as a decorative gloss on the facts—the beauty part—but as content.

A symptom of the changing perception of photography's function might be detected in its rapid adoption during the 1960s into the curricula of art schools and—especially—the art departments of universities. In the years before World War II educators, like the public at large, doubtless regarded photography fundamentally as a useful and specialized craft, and as such



Aaron Siskind. *Uruapan, Mexico 4.* 1955



Jan Groover. *Untitled.* 1975

beyond the ken of institutions of higher learning. As its utility gradually became less self-evident it was perhaps easier to regard it, at least marginally, as one of the beautiful arts.

The addition of photography to the liberal-arts curriculum was a phenomenon particularly marked in the United States: in the three years between 1964 and 1967 the number of colleges and universities that offered at least one course in photography increased from 268 to 440.[11] In Europe, in schools such as Hans Finsler's Kunstgewerbeschule in Zurich and Otto Steinert's Folkwangschule in Essen, pedagogical styles continued to emphasize a relatively rigorous concentration on conventional craft virtues, and students of photography were more likely to be educated with future commercial artists and graphic-arts specialists than with painters and traditional printmakers. In the United States art education after the war was deeply influenced by the thought and the example of László Moholy-Nagy, whose New Bauhaus (later the Chicago Institute of Design) adapted the principles of the German school to very different American circumstances.[12] Moholy's books, especially *Malerei, Fotographie, Film* (*Painting, Photography, Film*; 1925, revised 1947) and *Vision in Motion* (1947), provided American art educators with not only the sketch for a new curriculum but with a suitably impenetrable academic rhetoric. In practice, however, Moholy seems to have regarded photography almost as a natural act, roughly analogous to breathing, and like it something to be practiced without undue calculation. He also regarded photography as a tool that all artists—indeed all educated people—would use, whatever their specialties, and he approached photographic education from this perspective. A remarkable number of the photography teachers who established the new programs of the 1960s had been students of the Institute of Design,[13] and they preserved that school's basic posture, teaching photography not as a professional specialty but as the visual *lingua franca* of modern life.

The rise of photographic education produced a new class of photographic role model: photographers who were famous, like mathematicians, within a circumscribed segment of the academic world. In Germany Otto Steinert was such a figure, and in Switzerland Hans Finsler, though each is perhaps remembered less for his pictures than for his influence as a teacher. In the United States, as early as 1950 Harry Callahan and Aaron Siskind were highly respected as artists by that small world that looked at photographs in museums—when that was possible—and in the marginal, generally noncommercial galleries that were hospitable to photography. In terms of the quality of their work Siskind and Callahan were exceptional; they were, however, typical of photographers who taught in American art schools in the sense that it would have been difficult to regard their work as



Minor White. *Rochester.* 1954



Harry Callahan, *Aix-en-Provence*. 1958

anything but art. Callahan's calligraphic grasses and Siskind's wall scrawls served no function but an art function, and could not also or alternatively be considered the record of the culture of a place, or a call to action. If all art has political content a part of the message of this art was that private life took precedence over public affairs. The frankness of the message was discomfiting to those critics and photographers who preferred a photography that was committed to good works, or that could without too much difficulty be so interpreted. Moholy himself had spoken endlessly, if often opaquely, of the centrality of art to the social enterprise, but Callahan and Siskind—the two men who came to epitomize the attitude of Moholy's school toward photography—produced work that was resolutely aesthetic in its perspectives.

Nevertheless, Callahan and Siskind regarded art itself as a traditional and thus a social activity; one's work was assumed to stand on the shoulders of earlier artists' work, and was thus part of a great chain of artistic achievement.

By the 1960s Minor White seems to have designed a circuit of artistic communication that dispensed with the need for tradition—a social construction—and required only the artist and any random viewer. As a teacher and as editor of the influential journal *Aperture*, White dilated on Stieglitz's proposal that some of his pictures (of clouds, etc.) were in fact *equivalents* of his inner feelings and mental states. White claimed that *his* photographs also mirrored the viewer, whether or not the viewer knew it. He said that the photographs "presented here by the author...will function as mirrors of the viewer, whether he admits it or not."[14] The claim is impossible to refute, and in fact not easy to understand.



Andy Warhol. *Black and White Marilyn.* 1964

The introduction of photography into art schools and university art departments had a number of unanticipated effects. One of these byproducts was an increased fraternization between photographers and practitioners of the traditional plastic arts. This intimacy encouraged a mutual borrowing of ideas and techniques across borders that had been well guarded since the experiments of the 1920s, except in the world of commercial art. The results of this new communalization of means were broad and deep-going. Qualities intrinsic to photography's visual vocabulary—selective focus, the blur described by moving objects, tonal abbreviations caused by under- and over-exposure, the specifically photographic character of drawing produced by high-contrast processing, and multiple exposure (both overlapping and sequential)—were adopted and adapted by many painters and printmakers during the 1960s, most notably by Robert Rauschenberg and Andy Warhol. It was also discovered that photographs, or bits of photographs, could be silkscreened or lithographed or cut and pasted into pictures made essentially by hand, just as machine-



Richard Avedon. *Brigitte Bardot.* 1959



Paul Caponigro. Untitled. 1964

made cigar bands, theater tickets, wine labels, and pieces of corrugated cardboard could be, to the picture's possible benefit. In historical practice it has proved more difficult to invert the process, and improve good photographs by drawing or painting on them, or by cutting them into pieces and rearranging the parts, although one can by these methods make interesting pictures out of boring ones. Photographs are made not essentially by hand but by eye, with a machine that records with unforgiving candor the quality of mind informed by that eye. Second thoughts that veil that candor do not often make the picture better.

During the 1960s and for much of the 1970s photographic education was a growth industry, and the work of its star performers was of interest even to those who were perhaps not deeply interested in photography, but who were interested in trends. For the first time since the triumph of photomechanical reproduction a visible market in photographic prints appeared and survived. In the early 1930s the Julien Levy Gallery had exhibited and attempted to sell work by advanced French and American photographers, as well as by Surrealist painters. But although the photography exhibitions did attract some favorable attention, they were economically disastrous; no one except Levy bought pictures, even at ten dollars a print.[15] Forty years later, without warning, it was suddenly possible for a photographer to contemplate the possibility of making a living, or at least a substantial part of a living, by selling prints to individuals and institutions that wanted them for no "practical" purpose, but only for delectation and study, and to preserve them for future delectation and study.

In 1969 the Witkin Gallery opened in New York with an exhibition of five very dissimilar young or middle-aged American photographers.[16] The gallery was notable for the wide variety of contemporary and historical work that it showed and offered for sale. Although the gallery's standards were high, it could hardly be said to have had an aesthetic position, and if this relaxed perspective made the place seem more like a superior jumble shop than a modern art gallery, the fact perhaps worked to its advantage. Witkin and his clientele were interested in photography as a distinct and independent issue, related to but also separate from the issues encompassed by the traditional plastic arts, with their special languages and special anxieties. A few years later the character of photography's presence in commercial galleries had changed; often photography had come to seem not an alternative idea but merely an alternative medium—another technique, like silkscreen or the airbrush, that was available to broad-minded artists.

It is true that the commercial gallery option existed, in the beginning, only for photographers who were already famous, the fame having been earned in some neighborhood other than the gallery neighborhood. It is

also true that not all photographers of fame and high achievement were equally available to the new opportunity. Walker Evans, for example, was less collectable than André Kertész. A Kertész *clochard*, sleeping on the *quai* on the Seine, is a traditional artistic subject, as abstract as a Roman cherub; but Evans's unfortunates have not yet learned to lose themselves in their role: they are still individuals, and might even be mistaken, on the wall of the study, for someone we know.

All other factors being equal, old photographers or sick ones were naturally collected more energetically than young, healthy ones, partly because one was confronted with a limited opportunity, and partly because old artists are unlikely to surprise and disappoint us. Nevertheless, in the early 1970s even some young photographers of good muscle tone sold substantial numbers of prints.

Few or none of these pictures had been made with the expectation that they might be sold in galleries. Many had been made in service to various other kinds of commerce, and some had been made for love, or for fun, but they had become objects of art, objects of traffic in the art business. In a phrase of the period, a new window of opportunity had opened.

The fact was not lost on the brighter of those students and apprentices who were then finishing their preparation, or on art dealers, many of whom were persuaded to revise their long-standing position that photography—whether or not it was art—could not be sold as art.

Although surprising, photography's early successes in the gallery world were very limited in scope. If those successes were to be significantly broadened it might be done by making photography interesting to the large and prosperous audience that was already committed to the conventional varieties of modern art. Few photographs, however, closely resembled works of the conventional varieties of modern art. They were generally too small, too monochrome, too insistently factual and particularized, and insufficiently personal in aspect to be easily identified as belonging to the same broad enterprise as the one that included the work of van Gogh and Jackson Pollock. The reservations of the modern art lover concerning photography were similar to those of Lady Eastlake a century earlier: photographs were too full of particular fact, and lacking in "the artistic feeling." Soon, however, photographs were being made that seemed more sympathetic to the preferences of the new market. At least they tended to be larger, more colorful, less specific in their information, and more obviously personal in motive than their predecessors.

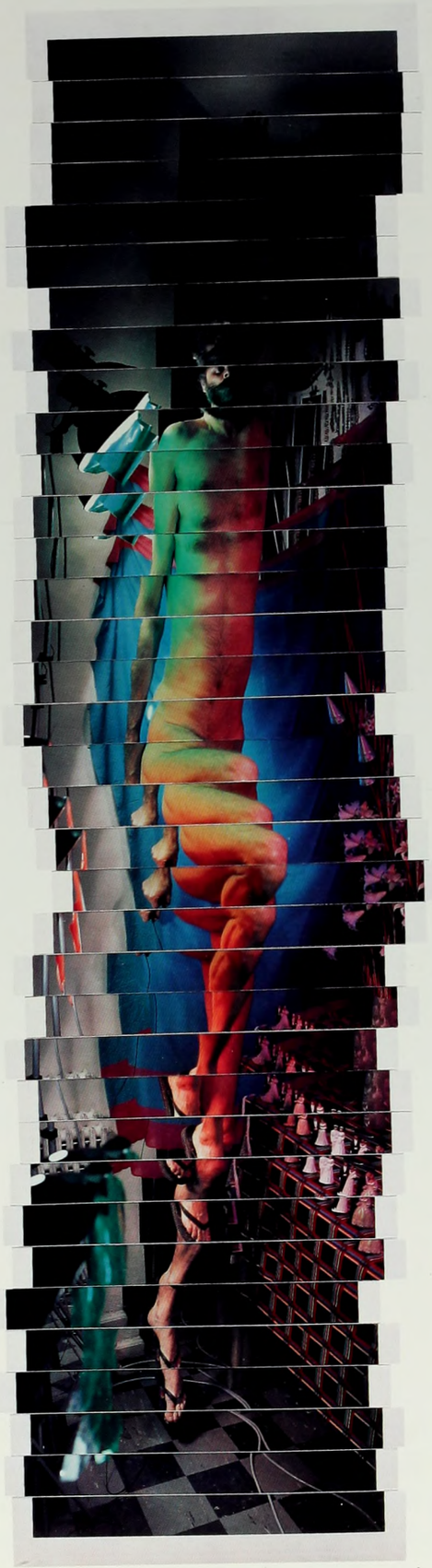
Two of the perceived shortcomings of photography as a modern art had been its excessive factuality and its insufficient self-absorption. These two objections were met with one stroke by the fictionalized self-portrait, which has proven one of the most rewarding single subject-genres for



Cindy Sherman. *Untitled, #123*. 1983



David Hockney. *Stephen Spender, Mas Saint-Jerome.* 1985



Lucas Samaras. *Panorama.* 1983



William Wegman. *Red/Grey—Grey/Red.* 1982

photographers working within the gallery system. Lucas Samaras, Cindy Sherman, Arnulf Rainer, and the team called Gilbert and George (Gilbert Proesch and George Passmore) have devoted their photographic work largely or exclusively to the description of their more or less freely synthesized personas. Another recently popular picture type in the galleries has been what one might call the cultural tableau, in which live models or dolls act out characteristic scenes of everyday life in a constructed environment so insistently common that precision or subtlety of statement would clearly be out of place. A similar tactical advantage has been obtained with subject matter relating to advertising and politics; two-dimensional ideas lend themselves to two-dimensional treatment. As in the comic strip, simplicity of message and simplicity of means justify each other.

At the same moment during which some art collectors and some art merchants began to consider photographs art objects, some artists began to consider the art object an anachronism, an ostentatious expression of unproductive wealth. These artists agreed with Luther—perhaps unwittingly—that only song was pure art, and that faith, an idea, took precedence over good works. Nevertheless, in order that their ephemeral performances and good ideas should not disappear completely without some little souvenir, it became common practice to photograph them. The photographs were not the work of art, but stood in relation to it as the log book stands to the journey. In the beginning these pictures had a humble documentary character that reminded one of the pictures that give step-by-step directions, but before long they acquired color, size, self-conscious design, technical competence, and good frames, and it was discovered that these souvenirs could be collected as though they were themselves the works of art, from which, indeed, they became increasingly hard to distinguish.

The evolution of William Wegman's famous pictures of his weimaraner Man Ray is exemplary. *Ray-O-Vac* (1973) is as dry and serious in manner as an illustration from *Popular Mechanics*. The picture is in fact more interesting to consider than to look at; we are curious about the character and intelligence of the dog and of his collaborator–trainer–visual biographer, but are unlikely to think seriously of the picture as a picture. *Red/Gray Gray/Red*, made nine years later, tells us nothing true or believable about the dog, but the picture is as lushly seductive as a tale from *The Arabian Nights*.



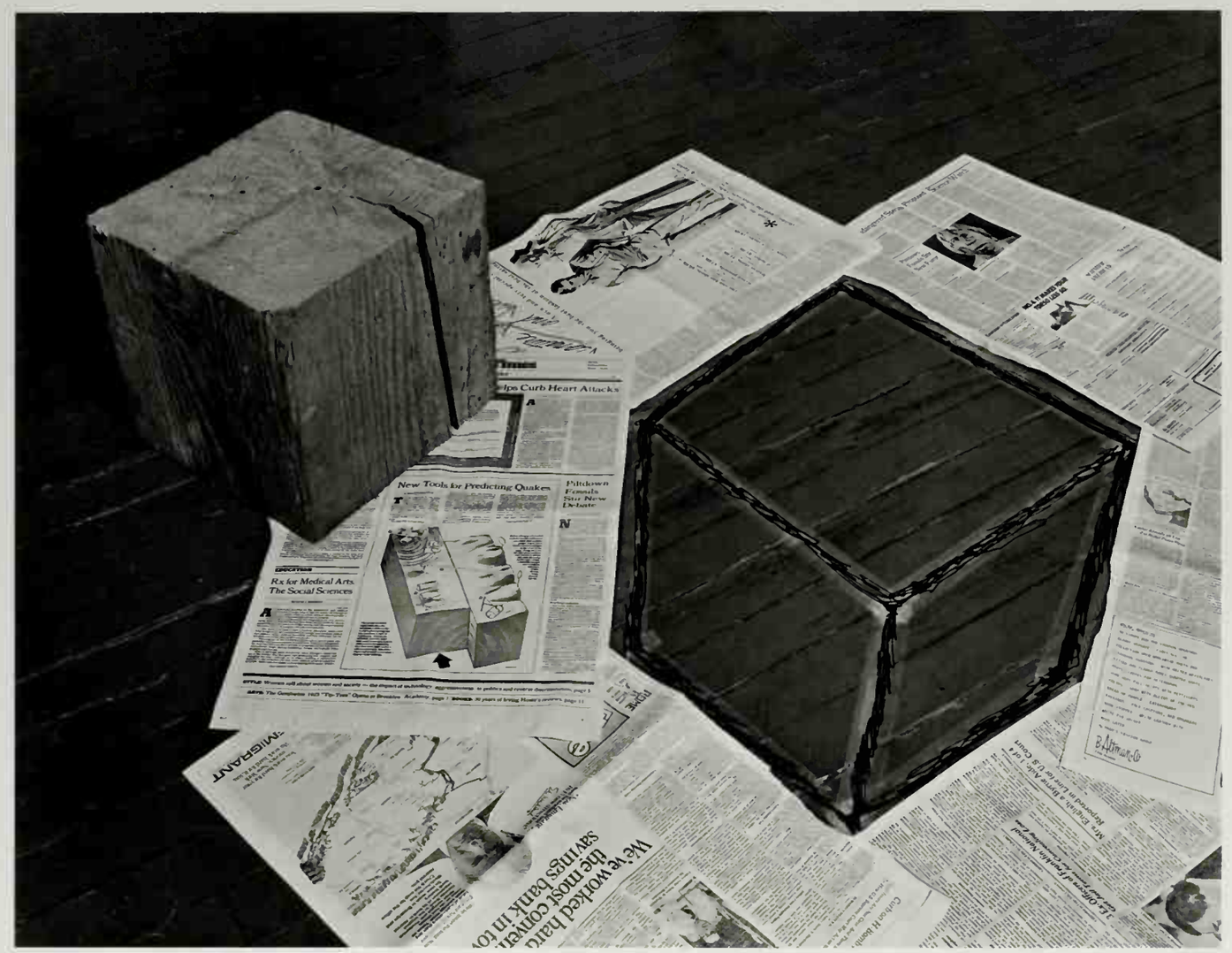
William Wegman. *Ray-O-Vac*. 1973

From a commercial point of view the ideal gallery picture is a wall picture, meaning the kind of picture that can claim a room. Any picture can of course be hung on a wall, but some pictures are at their best only at close range; if they belong on a wall at all it might be the wall of an intimate corridor, or near one's elbow at a writing desk. Many photographs, includ-

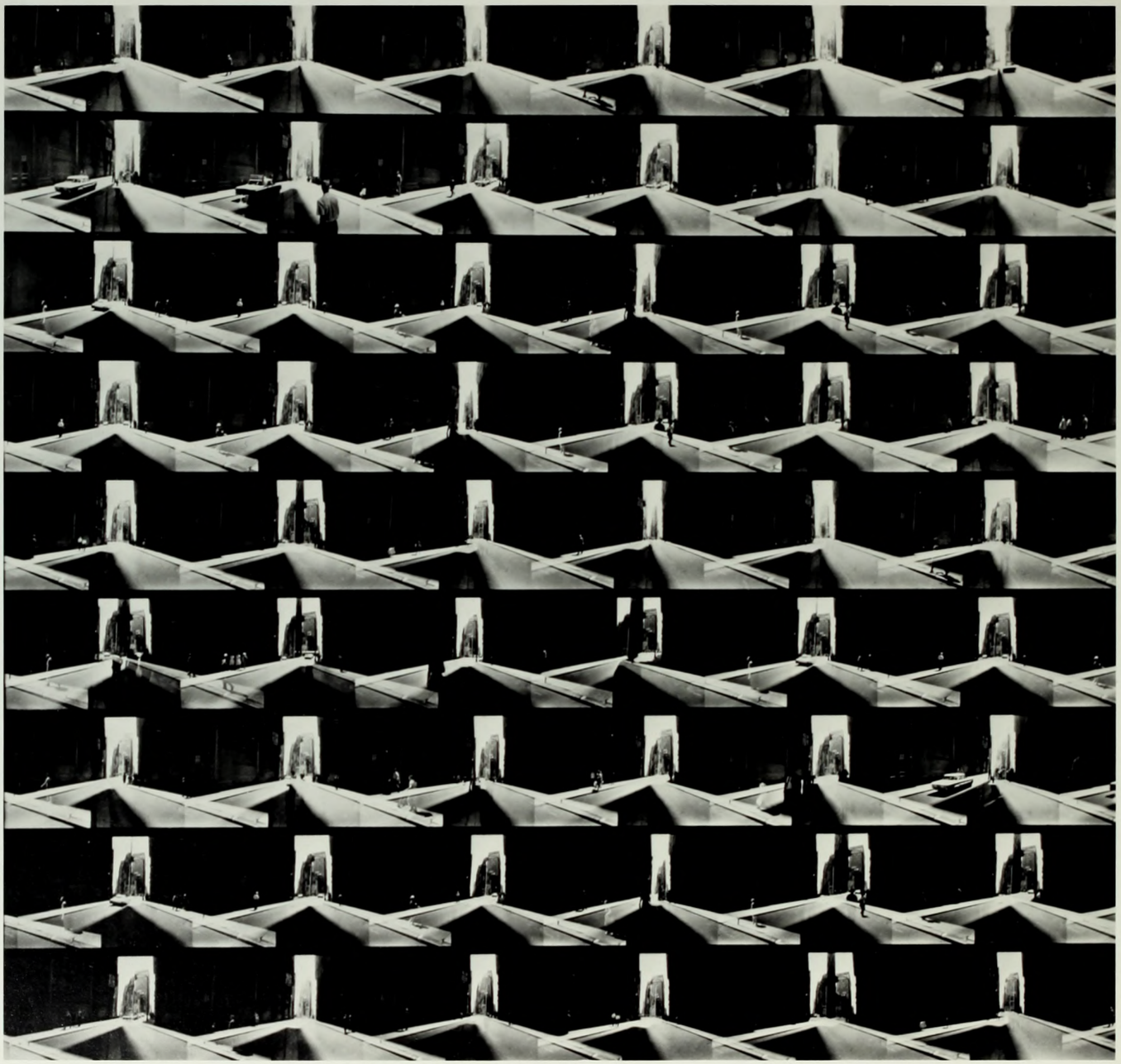




Robert Cumming. *Two Views of One Mishap of Minor Consequence.* 1973



Zeke Berman. *Untitled.* 1979



Ray K. Metzker. Untitled. 1966–67

ing many of the best photographs, are best when held in the hand, and it must be said that pictures bigger than one person can hold with comfort have been a difficult challenge for photography. Part of the problem has been a technical one, and relates to the photographer's traditional insistence that there be detail in the shadows. The trouble with empty black shadows is that if they become bigger than, say, a thumbnail, they stop representing a dark place and begin representing merely a black shape, thus calling attention to the coated surface of the paper, which, especially in its modern manifestations, is not an intrinsically beautiful material, like bronze or marble or rubbed wood or oil pigment on linen, but instead resembles something made in a factory from petroleum derivatives and soy beans.[17]

Ansel Adams, whose technical prowess was legendary, devoted considerable thought and energy to the production of exceptionally large prints. The best of them, seen from far enough away, look as good as his smaller prints, in fact look *like* his smaller prints. From up close, they are not as good.

Perhaps Ray Metzker, in the mid-sixties, was the first photographer to make big pictures that were not simply enlargements of small ones. His photo-collages were designed to lead a fundamentally abstract life when seen from a distance, and a highly particularized one from up close. In spite of their split character, the pictures are good to look at, at both ranges.[18]

But there is perhaps a deeper reason why photographers have had limited success with wall pictures, a reason that touches the issues of privacy and specificity, and perhaps even the matter of secrecy.

Only a small fraction of the world's pictures have been designed to be seen on walls, and those are expected to speak in a more or less public and forceful way, expected even to declaim, unlike a picture that is held in the hand, as in a *Book of Hours*, or a magazine, that speaks to one person (or to one person at a time) and thus can speak in a more confidential, and perhaps in a more dilatory, elliptical, or conversational tone, because the message is not being shared with all those others. Diane Arbus said that a photograph of two people in one bed is shocking because a photograph is private, whereas a movie showing two people in bed is not shocking because a movie is public.[19]

A photograph may also be private in the sense that there is no designated public access to its meaning, no catalog of its constituent parts, its iconographic and formal resources. Each viewer, including the photographer who made it, must devise for the new picture a personal and provisional place among the other pictures and facts that the viewer knows. It is of course true that all good pictures contain unfinished meanings; only



Robert Heinecken. *Costumes of a Woman.* 1966

perfect cliches are perfectly complete. Nevertheless, good photographs are often more richly unfinished than other pictures, are *wilder*, in the sense that they have in them more elements that are not fully understood and domesticated. James Agee, pretending that the photographer was a fisherman and that the truth was a trout, said it was the photographer's task to bring the fish to net without too much subduing it.

Pictures like those that Agee wanted are not easy to make; they are even more difficult to make large and simple, as a poster is simple, or a fresco in city hall. Those who have tried to make the kind of picture that Agee spoke of have tended to think in terms of books—a relatively private, provisional, contingent kind of form—rather than of walls.

A collection of the photographic books that made a significant impact on the evolution of the medium during the generation before 1960 would fit on a very short shelf, although included in their number would be a handful of books of extraordinary originality and influence. *Die Welt ist schön* (The World is Beautiful, 1928), by the German Albert Renger-Patzsch provided an important model for the popular version of photographic modernism that was a staple of the magazines from the 1930s to the 1950s—closeups of natural and industrial forms, patterns, textures, and bird's-eye (or worm's-eye) views. August Sander's *Antlitz der Zeit* (Face of the Time, 1929) was less influential than it would have been had it not been suppressed by the Nazi regime; few photographers outside the Germany of his own generation knew his work until it was published by the Swiss magazine *Du* in 1959, when Sander was eighty-three. Brassaï's *Paris de Nuit* (Paris at Night, 1933) and Bill Brandt's *A Night in London* (1938) established a standard for the popular photographic book that was seldom later met. The publication that many consider the greatest photographic book of the period was *American Photographs* (1938) by Walker Evans, but it is difficult to assess its influence, which was slow and subterranean rather than quick and superficial. The original edition of 5,000 copies lasted for almost a decade, and at the time of publication the book was more often taken note of by the literary than the photographic press. (Almost twenty years later Robert Frank patterned *The Americans* closely on the structure and subject matter of Evans's book, although Frank's style, and the ultimate meaning of *his* masterpiece, is profoundly different.)[20] Wright Morris's *The Inhabitants* (1946), and *Time in New England* (1950) by Paul Strand and Nancy Newhall were both books that contained basic lessons concerning the effective relationship between photographs and text, but neither book was a commercial success, and relatively few photographers knew them. *Fifty Photographs* by Edward Weston (1947) and *The Decisive Moment* by Henri Cartier-Bresson (1952) were essentially bound portfolios, collections of the photographers' work that made no further claim to internal coherence.

Publishers seldom felt confident in their ability to successfully produce serious photographic books, and their lack of confidence generally proved justified. When occasional dramatic successes did occur, it was often outside the normal channels of commercial publishing. One of the most remarkable of these happy triumphs was *"In Wildness is the Preservation of the World,"* a book of color photographs by Eliot Porter accompanied by text edited from the writings of Thoreau. After having been rejected by many commercial publishers the book was published in 1962 by the Sierra Club, a conservation organization that was criticized—perhaps justly—for risking its modest resources on what seemed an art project. The book was first published to sell at the then very high price of $32.50, professional publishing opinion holding that one could not sell a book of photographs of trees and rocks at that price.[21] The book eventually sold 59,000 clothbound copies, and many more in a variety of paperback editions.

The most remarkable fact concerning photographic books during the period from the 1920s to the 1960s might be the rarity of cases in which the photographer could be called the author of the book. The examples mentioned above were exceptional. For the most part the mind set created by the triumph of photomechanical reproduction relieved the photographer of his former functions as author and publisher, and made him a supplier of parts. But as the early promise of the magazines faded, some ambitious photographers turned toward the book as a form over which they might be able to exercise a greater degree of control. The results have been predictably uneven, but it would be easy to compile a considerable list of photographers who during the past quarter-century have produced books for which they would confess responsibility, for better or worse, and this fact in itself seems evidence of ethical (if not automatically artistic) progress. Conspicuous among these would be Lee Friedlander, Shomei Tomatsu, Ralph Gibson, Robert Adams, Paul Caponigro, Chris Killip, and Michael Schmidt. Most remarkable of all is the case of Friedlander, who in the past twenty years has produced at least ten books of widely ranging character under eight imprints, including his own, while maintaining authority over their content and quality. Individually and in sum these books demonstrate the enormous opportunity for independent creative achievement that photography makes available to an individual photographer with no special resources beyond extraordinary talent, high intelligence, technical mastery, deep curiosity, and business acumen.

This perhaps over-simplifies, in emphasizing the virtues of the mind and paying too little attention to those of the heart. For although Friedlander's work does not wear his heart on its sleeve it is surely true that his pictures rekindle in us not only an interest in but an affection for the world, even as it really is. One of his major successes was the book *The American*



Chris Killip. *Untitled*. 1987



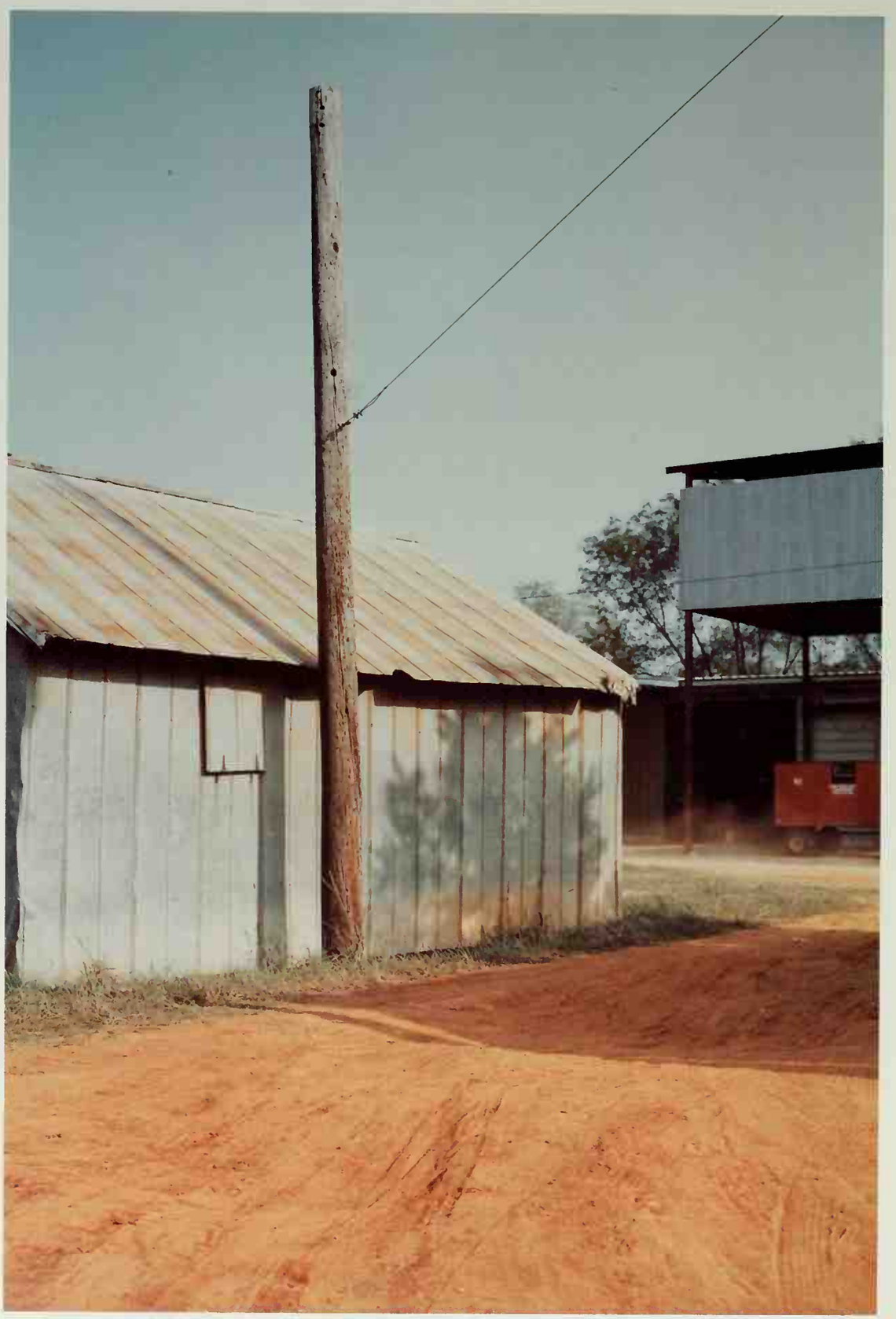
Robert Adams. *East from Flagstaff Mountain, Boulder County, Colorado.* 1976

Monument (1976), Friedlander's contribution to his country's bicentennial celebration. The book is also a record of his own long-standing interest in the homely or elegant memorials that citizens erect to remind themselves of the possibility of virtue or excellence: memorials dedicated to the volunteer fire department, or motherhood, or the pioneers, or the horses of famous cowboys, or dogs of greater than ordinary valor, or (of course) the innumerable dead warriors. Friedlander's thick catalog of these unconsidered, ubiquitous, sometimes ludicrous works of art demonstrates that the least of them, seen clearly in the right light, is capable of eloquence, and that we had again paid insufficient attention.

In the view of this writer a score or more of photographers are now doing work of vitality and original beauty, under conditions that do not seem propitious. But perhaps the conditions were never propitious. One could interpret the historical data to propose that photography has never had a dependable source of support, material or moral, even for a single generation, and that its greatest triumphs have been managed catch-as-catch-can, or within what seemed rational and stable systems that overnight proved as transient as mayflies. To repeat the litany of bankruptcies and broken hearts with which the history of photography is littered would not be useful. We are free to believe that Carleton Watkins and Mathew Brady and Gustave Le Gray and Charles Marville and Timothy O'Sullivan and Eugène Atget and Edward Weston and all the others would not have exchanged the work they did for a softer bed; in any case it is now too late for them to change their minds, and we have the work.

During the past generation photographers have worked without a clear sense of a communal role that they might either serve or revise. As with poets and composers, the relationship between their work and their lives has become casual and improvisatory. This has sometimes seemed to mean a diminished role for photography, even a kind of disenfranchisement, since only a generation earlier photographers still thought they had a privileged access to truth and thus to power. Not many years ago this perception was proven false, but perhaps it was false before it was proven so. Perhaps nothing of consequence was lost—only an illusion.

This is not to say that photography does not still have work of importance to do for the great world, perhaps including even more thrilling pictures of Neptune, and pictures of subatomic events in bubble chambers, and closer to home, pictures of the rain forests and the whales. There is no reason why we should shrink from making such large issues the pretext for picture-making, having already done so even with hell and paradise; but it is not clear that all the best photographers will feel the need to travel so far,



William Eggleston. *Plains, Georgia.* 1976

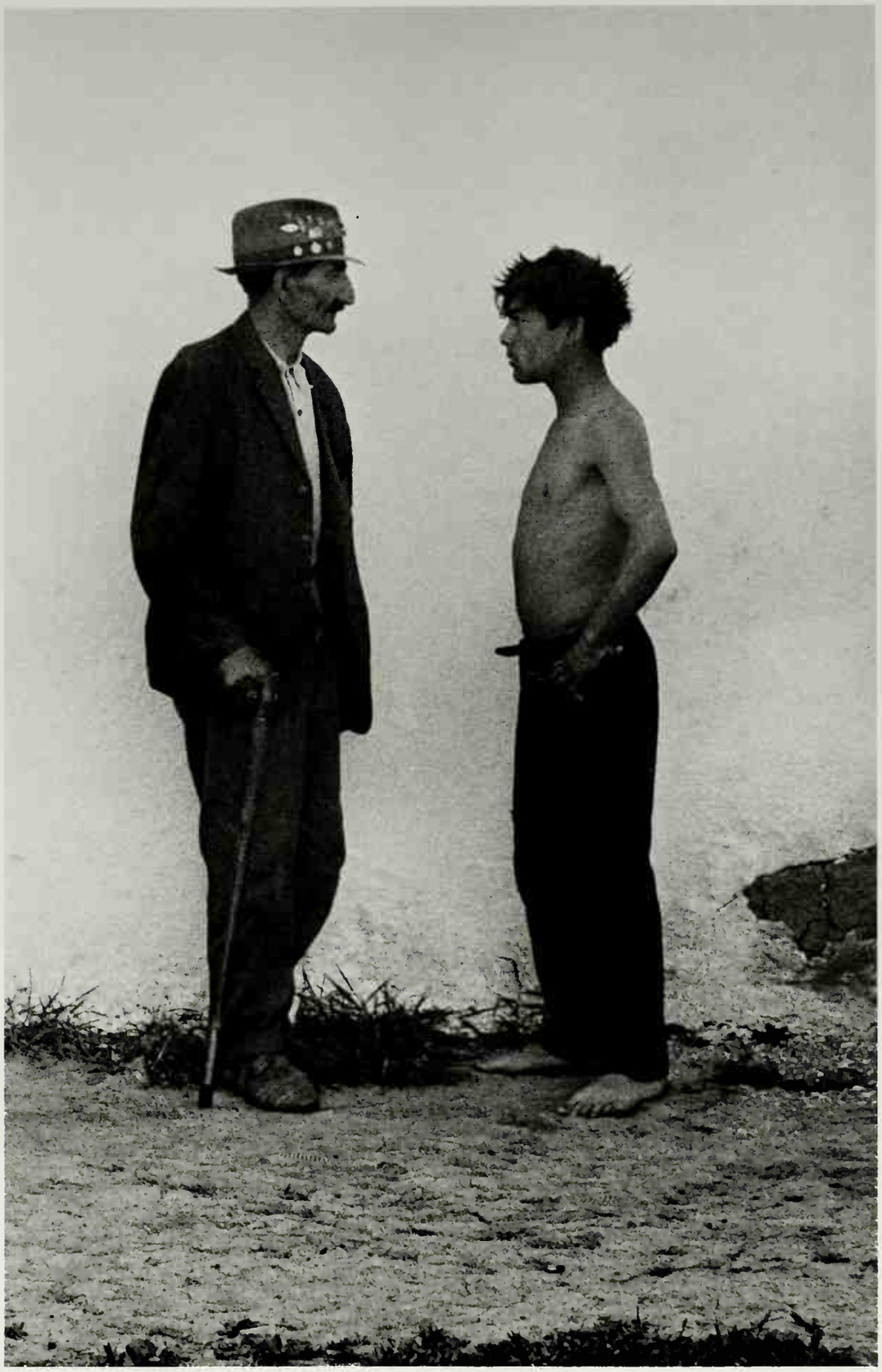
or to choose subjects that carry with them bonus points for good intentions, since their real intentions may be more difficult to explain and not quite so simply honorable. Like Captain Ahab, they might rather know the whale than save him.

To avoid unnecessary misunderstandings, especially their own, most photographers of ambition and high talent would prefer today to serve no instrumental functions—no "useful" goals. They wish simply to make pictures that will—if good enough—confirm their intuition of some part or aspect of quotidian life.

What Eudora Welty wrote of the work of William Eggleston[22] might be taken more broadly, and stand for the deepest of photography's ambitions now, and for our present apprehension of its mysterious powers: "He sets forth what makes up our ordinary world. What is there, however strange, can be accepted without question; familiarity will be what overwhelms us."



Joan Fontcuberta. *Guillumeta Polymorpha.* 1982



Josef Koudelka. *Velka Lomnica, Czechoslovakia.* 1966



296 Frank Gohlke. *Aerial View, Downed Forest Near Elk Rock, Approximately Ten Miles Northwest of Mount St. Helens, Washington.* 1981



Nicholas Nixon. *Tom Moran.* January 1988

Notes

1. Before Photography

1. Abbott Payson Usher, *A History of Mechanical Inventions* (Cambridge, MA: Harvard University Press, 1929), pp. 65–68.
2. John H. Hammond, *The Camera Obscura: A Chronicle* (Briston, England: Adam Hilger Ltd., 1981), p. 1.
3. There is vague evidence to suggest that, in addition to Roger Bacon, Witech the Pole (Witelo the German) and Guillaume de Saint-Cloud, all of the thirteenth century, also understood something about the camera obscura.
4. Georges Potonniée, *The History of the Discovery of Photography*, translated by Edward Epstean (New York: Arno Press, 1973), p. 11. Trans. *Histoire de la découverte de la photographie*. (Paris, 1925). First English edition, New York: Tenant and Ward, 1936.
5. The full title is *Magia Naturalis; sive, de Miraculus Rerum Naturalium*, originally published in Naples, 1588.
6. Hammond, *Camera Obscura*, p. 18.
7. Potonniée, *History*, pp. 7–8.
8. Ibid., p. 19.
9. Ibid., pp. 19–23.
10. Helmut Gernsheim and Alison Gernsheim, *The History of Photography from the Camera Obscura to the Beginning of the Modern Era* (New York: McGraw-Hill Book Co., 1969), pp. 23–24.
11. Ibid., pp. 23–24.
12. Josef Maria Eder, *The History of Photography*, translated by Edward Epstean (New York: Columbia University Press, 1945), pp. 8–9. *Geschichte der Photographie* (Vienna: Wilhelm Knapp, Halle a. S., fourth edition, 1932). Trans. reprinted, New York: Dover Publications, 1978.
13. Eder points out that in Schulze's time it was very difficult to obtain pure nitric acid, and concludes that his light-sensitive mixture consisted of a chloride or carbonate of silver, a nitrate of silver, and an excess of white chalk or magnesia. Ibid., p. 76.
14. Josef Maria Eder, *Geschichte der Photographie* (Vienna: Wilhelm Knapp, Halle a. S., 1905), p. 51. Quoted in Potonniée, *History*, p. 52, n. 4. In Eder's fourth edition (1932) of his *History of Photography* he modifies a little his earlier claim, and says "Because of these facts Schulze must be declared without doubt the inventor of photography with silver salts," an emendation that would not have impressed Potonniée.
15. Potonniée, *History*, p. 48.
16. Samuel Y. Edgerton, Jr., "The Art of Renaissance Picture-making and the

Great Western Age of Discovery," *Essays Presented to Myron P. Gilmore,* Segio Bertelli and Gloria Ramakus, eds. (Florence: La Nuova Italia, 1978).

17. Samuel Y. Edgerton, Jr., "From Mental Matrix to Mappamundi to Christian Empire," *Art and Cartography,* David Woodward, ed. (Chicago: The University of Chicago Press, 1987), pp. 32ff.

18. "He will raise an ensign for the nations/And will assemble the outcasts of Israel/And gather the dispersed of Judah/From the four corners of the earth" (Isaiah, xi:12).

2. The Inventors

1. "An Account of a Method of Copying Paintings upon Glass, of Making Profiles, by the Agency of Light upon the Nitrate of Silver. Invented by T. Wedgwood, Esq. with Observations by H. Davy," *Journals of the Royal Institution of Great Britain,* vol. 1, 1802. Davy's memoir is reprinted in full in Potonniée, *History,* pp. 60–63.

2. "Sir Humphry Davy," *Encyclopaedia Britannica,* eleventh edition (New York: Encyclopaedia Britannica Company, 1910–11), vol. 7, p. 871.

3. Potonniée, *History,* pp. 62–63.

4. Lycopodium powder is made of the inflammable spore of the club mosses and is used in fireworks.

5. Nicéphore to Claude Niépce, May 1816. Quoted in Beaumont Newhall, *Latent Image: The Discovery of Photography* (Garden City, NY: Doubleday, 1967), p. 22.

6. The design that the etcher scratched into the resist allowed the subsequent mordant (acid bath) to eat into the copper below; after removal of the resist these etched lines held the ink that was transferred under pressure to the damp paper.

7. Newhall, *Latent Image,* p. 27.

8. Samuel F. B. Morse was a professional artist, but not one of photography's inventors, although he did claim to have a go at it while he was a professor at New York University (c. 1839–40). He said that he gave up when he discovered that the light values were reversed. See Eder, *History,* pp. 272–73.

9. Conceived in 1810 by Isidore Justin Séverin Taylor (1789–1879), *Voyages pittoresques* consisted of 3,000 lithographs portraying the special flavor of French medieval architecture. Taylor believed that late Roman and medieval architecture were not decadent forms but progressive and original styles in their own right. The work, intended to illustrate French architectural patrimony, was published between 1820 and 1878 in twenty volumes of enormous scale. See André Jammes and Eugenia Parry Janis, *The Art of French Calotype* (Princeton: Princeton University Press, 1983).

10. Ignace Eugène Marie Degotti, an Italian who worked for the Paris Opéra for many years. He died in 1824.

11. C. Wilhelm, "Theatre: Spectacle," *Encyclopaedia Britannica,* eleventh edition (1910–11), vol. 26, p. 735.

12. Potonniée, *History,* p. 112.

13. Newhall, *Latent Image,* pp. 41–42. In this code language, 20 represented

iodine, 56 was the sun, 46 meant light, and 13 the camera.

14. Dominique François Jean Arago (1786–1853) was a physicist celebrated for his work in electromagnetism, light polarization, and the wave theory of light. He served (at different times) both as director of the Paris Observatory and as Minister of War. In 1839 he was permanent secretary of the French Académie des Sciences and a member of the government's Chamber of Deputies.

15. The chronology of events regarding the announcement of Daguerre's process and the securing of an annuity was complex. On January 7, 1839, Arago addressed the Académie des Sciences in Paris. This was the first public announcement of Daguerre's process, and the press reported it with great enthusiasm. (The reports caused Talbot to submit details of his own process to Arago and Jean Baptiste Biot. On January 25 Talbot's process was announced in London by the Royal Institution and the Royal Society.) In May, after Daguerre's Diorama burned, Arago appealed to the French government for a subsidy for Daguerre. Upon receiving Arago's letter, on June 5 Duchâtel formed the three-man committee (Arago, Vitet, and Delaroche) to consider the daguerreotype. In early July, Arago delivered his 5,000-word report to the Chamber of Deputies, and at his urging Duchâtel submitted a bill to award lifelong pensions to Daguerre and Niépce. After approval by the Chamber of Peers on July 30, the daguerreotype process was purchased and a law was passed awarding lifelong pensions to Daguerre and Niépce. The technical details of the process were made public August 19, 1839, at a joint meeting of the Académie des Sciences and the Académie des Beaux-Arts. See Helmut and Alison Gernsheim, *L. J. M. Daguerre* (New York: The World Publishing Co., 1956), pp. 79–95.

16. Potonniée, *History*, p. 159.

17. Ibid., p. 259.

18. The title of Talbot's paper was "Some Account of the Art of Photogenic Drawing, or the Process by Which Natural Objects May Be Made to Delineate Themselves Without the Aid of the Artist's Pencil." See Potonniée, *History*, p. 180.

19. William Henry Fox Talbot, *The Pencil of Nature* (London: Longman, Brown, Green & Longmans, 1844). Facsimiles, New York: Da Capo Press, 1969; and New York: H. P. Kraus, 1989. Unpaginated.

20. Newhall, *Latent Image*, p. 51.

21. Ibid., pp. 111–12.

22. Ibid., pp. 112–13.

23. The patent was for "England, Wales, and the Town of Berwick upon Tweed." Newhall, *Latent Image*, p. 106.

24. Talbot regained possession of Lacock Abbey in 1827. Lady Elizabeth, Talbot's mother, continually reminded her son that his marvellous invention offered an opportunity to restore the family fortune. See Gail Buckland, *Fox Talbot and the Invention of Photography* (Boston: David Godine, 1980).

25. Newhall, *Latent Image*, p. 114.

26. Bayard prepared his paper as Talbot did and then exposed it to the light until it was totally blackened. It was then soaked in a solution of potassium iodide and exposed in the camera.

27. Reported by Lacan in *La Lumière*, September 3, 1854. In Bayard's manuscript notes (now in the Société Française de Photographie), he bitterly complains of it. See Potonniée, *History*, p. 184.

3. The Daguerreotype and the Calotype

1. Attested to by Kurt Vonnegut, in his youth an employee of the Public Information department of the General Electric Corporation, the scion of the Edison Company.
2. Beaumont Newhall, *The History of Photography* (New York: The Museum of Modern Art, 1982), p. 28.
3. Bayard, perhaps characteristically, not only failed to attach his name to his invention, but alone among photography's four principal inventors, gave it no name at all. The Académie des Beaux-Arts declared in 1839 that Bayard's process was artistically superior to that of Daguerre, after which it was forgotten. See Gernsheim, *History*, p. 85.
4. Eder, *History*, p. 272.
5. Newhall, *Latent Image*, p. 84.
6. Gernsheim, *History*, p. 162.
7. Ibid., p. 164.
8. Carolyn Bloore, "The Circle of William Henry Fox Talbot," *The Golden Age of British Photography, 1839–1900*, ed. Mark Haworth-Booth (Millerton, NY: Aperture, 1984), p. 33.
9. Included among the Hill and Adamson portraits are many of the 394 ministers and professors who signed the 1843 Act of Separation, which declared in effect that the Free Church of Scotland was responsible directly to God, rather than to the Church of England. This declaration of independence also constituted a voluntary renunciation of an annual state subsidy of fully £100,000, a sacrifice that would have been impressive even in a country not celebrated for frugality. Hill commemorated the event in a mammoth painting, finally completed in 1866, for which he used his photographs as preliminary sketches of many of the sitters.
10. Newhall, *History*, p. 48.
11. Talbot agreed to release all rights, excepting those to photographic portraits that were for sale. Both the Rosse-Eastlake letter and Talbot's reply were published in the London *Times*, August 13, 1852. Reprinted in Gernsheim, *History*, p. 136.
12. Valerie Lloyd, "Roger Fenton and the Making of a Photographic Establishment," *British Photography*, p. 72.
13. Roger Fenton, "Proposal for the Formation of a Photographic Society," *The Chemist*, March 1852. Reprinted in Haworth-Booth, *British Photography*, p. 71.
14. Newhall, *History*, p. 45.
15. *The Correspondence of Thomas Carlyle and Ralph Waldo Emerson* (Boston, 1883), pp. 269–70.
16. Grace Seiberling with Carolyn Bloore, *Amateurs, Photography, and the Mid-Victorian Imagination* (Chicago: The University of Chicago Press, 1986), pp. 56–57.
17. Mark Haworth-Booth, "The Picturesque Eye: Benjamin Brecknell Turner's Album," The Victoria and Albert Museum Album I, 1982, pp. 135–39.
18. Seiberling and Bloore, *Amateurs, Photography*, p. 53.
19. Jammes and Janis, *French Calotype*, p. 7.
20. Talbot's developing method is known as physical development, in which the image is created from the reduction of the silver compound in the developer; in modern practice, called chemical development, the image is formed by reduction of the silver halides in the emulsion itself.

21. Gernsheim, *History*, p. 170.
22. Ibid., p. 171.
23. Beaumont Newhall says that the print run for the first fascicle of *The Pencil of Nature* was 200 prints (*Latent Image*, p. 121). If this is taken as an average for the 47 pictures included in *The Pencil* and *Sun-Pictures*, the total comes to 9,400 prints. *Annals of the Artists of Spain* and the *Art Union* project would add another 8,675.
24. Gernsheim, *History*, p. 172.
25. An increase in sensitivity seems definitely to have occurred, but it is difficult to make dependable comparisons. Photographers had no instruments with which to compare the actinic effectiveness of the light in Egypt in January with that of Southern England in June, and the surviving records of early photographers' formulae suggest—in Joel Snyder's phrase—not science but cooking.
26. Gustave Le Gray, Henri Le Secq, Charles Nègre, Edouard Baldus, Frédéric Flacheron, Charles Marville, Auguste Salzmann, the brothers Bisson, and Louis Robert had all been active as painters, illustrators, or sculptors before turning to photography.
27. Gernsheim, *History*, p. 188.
28. Jammes and Janis, *French Calotype*, p. 151.
29. Ibid., p. 152.
30. Ibid., p. 94.
31. *Journal of the Photographic Society*, December 22, 1856. Unpaginated.
32. Jammes and Janis, *French Calotype*, p. 94.
33. Ibid., p. 122. For detailed analysis see Isabelle Jammes, *Blanquart-Evrard et les origines de l'édition photographique française: Catalogue raisonné des albums photographiques édités* (Paris: Droz, 1981).

4. Paper versus Glass

1. In fact, negatives on glass had been made earlier, chiefly by a process published in 1848 by Claude Félix Abel Niépce de Saint-Victor, a nephew of Nicéphore Niépce. The problem with glass as a negative support was the difficulty of getting the silver salts to adhere tenaciously to the slick, impervious surface. Niépce de Saint-Victor solved this problem by coating the glass with beaten egg-whites (plus a little potassium iodide) before sensitizing it. The albumen plate, as it was called, was a dry process, and produced negatives of great sharpness, but the plates were extremely slow and apparently unpredictable, sometimes tending toward excessive contrast. The best-known master of the albumen negative, as it was called, was the Scot Robert Macpherson, who worked in Italy and used the albumen plate to photograph in the Vatican and other fastidious places that did not allow dark tents, perhaps because they had learned what the chemicals could do to their beautiful marble floors. Macpherson's exposures are said to have sometimes been measured in days.
2. See Seiberling and Bloore, *Amateurs, Photography*, p. 29, n. 37.
3. Gernsheim, *History*, p. 277.
4. Thomas Sutton, "Paper vs. Collodion," *The Journal of the Photographic Society* [London], no. 23 (October 21, 1854), pp. 53–55.

5. An undated catalog in the library of the George Eastman House, *Catalogue of the Principal Series of Photo-Pictures Printed and Published by F. Frith & Co.* (Reigate, Surrey), thought to be of 1892, appears to list over 26,500 subjects in the main listing and an additional 4,500 in the supplementary catalog.

6. The Fratelli Alinari in Florence, Braun & Cie in Dornach, Delmaet & Durandelle in Paris, and William Henry Jackson in Denver were representative.

7. Seiberling and Bloore, *Amateurs, Photography*, p. 72.

8. Lloyd, *Roger Fenton*, p. 176.

9. *The Photographic News*, August 1861, p. 370. Cited in Gernsheim, *History*, p. 234.

10. John Hannavy, "Roger Fenton and the British Museum," *History of Photography*, vol. 12, no. 3 (July–September 1988), pp. 193–204.

11. Sir David Brewster, *The Stereoscope, Its History, Theory and Construction* (London: John Murray, 1856). Cited in Newhall, *History*, p. 114.

12. Oliver Wendell Holmes, "The Stereoscope and the Stereograph," *The Atlantic Monthly*, June 1859, pp. 738–48. Reprinted in Beaumont Newhall, ed., *Photography: Essays and Images* (New York: The Museum of Modern Art, 1980), pp. 53–61.

13. If a lens draws on a screen located two inches behind it a sharp image of the distant horizon, it is said to have a focal length of two inches. If the distance between the lens and screen is twelve inches, the focal length of the lens is twelve inches. The "shorter" two-inch lens has inherently greater depth of field—that is, the distance between the closest object rendered sharp and the farthest will be much greater than that produced by the long lens, providing each is working at the same relative aperture (the same "speed"). However, the short lens will form an image perhaps only three inches in diameter, large enough only for a plate that will fit within that circle, while the twelve-inch lens forms an image large enough to cover an 8 × 10–inch plate, with image left over. With either lens, the depth of field will increase if the lens's effective diameter is decreased, but this also reduces its light-gathering power.

14. William Welling, *Photography in America: The Formative Years, 1839–1900* (Albuquerque: The University of New Mexico Press, 1978), p. 143.

15. Elizabeth Anne McCauley, *A. A. E. Disdéri and the Carte de Visite Portrait Photograph* (New Haven, CT: Yale University Press, 1985), p. 61.

16. Ibid., p. 82.

17. Robert Taft, *Photography and the American Scene* (New York: Macmillan Company, 1938), p. 194.

18. Welling, *Photography*, p. 143.

19. James Mellon, ed., *The Face of Lincoln* (New York: Viking Press, 1979), p. 12.

20. Elizabeth Anne McCauley, "Of Entrepreneurs, Opportunists, and Fallen Women: Commercial Photography in Paris, 1848–1870, *New Mexico Studies in the Fine Arts*, vol. 9 (1984), pp. 16–27.

21. Ibid., p. 18.

22. Letter from Nadar to his son Paul, August 25, 1892. Bibliothèque Nationale, Paris, Cabinet des manuscrits, N.A.F. 24987. Quoted in McCauley, *Disdéri*, p. 25.

23. "Success," *Anthony's Photographic Bulletin*, vol. 17 (New York: E. & H. T. Anthony & Co., 1886).

24. The tintype and the ambrotype were essentially substitutes for the daguerre-

otype, which was so thoroughly identified with photography in the mind of the general public that the new collodion system—conceived as a way of binding the sensitive emulsion to glass to make multiple prints that were really sharp—was also used to make unique portraits on opaque grounds. The ambrotype was made on glass with a darkened back, the tintype on sheet iron. The principle of both systems can be demonstrated by putting a thin negative, emulsion side up, on a black ground, which will cause the silver deposit to read as a light tone.

25. Henry Mayhew, *London Labour and the London Poor,* vol. 3 (1861), pp. 206ff. Quoted in Gernsheim, *History,* p. 241.

26. "Photographic Dens and 'Doorsmen,'" *The Photographic News,* London, vol. 5, no. 154 (August 16, 1861), p. 389.

27. Alphonse Daudet, *Le Nabob* (Paris: 1906), pp. 20–25. Quoted in E. Anne McCauley, "Of Entrepreneurs, Opportunists, and Fallen Women: Commercial Photography in Paris 1848–1870," *New Mexico Studies in Fine Arts,* vol. 9 (1984), p. 26. Translation by this author.

28. Jammes and Janis, *French Calotype,* p. 40.

29. Elizabeth Eastlake, "Photography," *Quarterly Review* [London], April 1857, pp. 442–68. The essay is reprinted in its entirety in Newhall, *Essays and Images,* pp. 81–95.

30. Charles Baudelaire, "The Salon of 1859," trans. Jonathan Mayne, *The Mirror of Art: Critical Studies by Charles Baudelaire* (London: Phaidon Press, 1955). Reprinted in Newhall, *Essays and Images,* pp. 112–13.

31. Jammes and Janis, *French Calotype,* p. 248.

32. Quoted in Peter Galassi, *Before Photography: Painting and the Invention of Photography* (New York: The Museum of Modern Art, 1981), p. 143. From Salzmann's preface to an album of photographs, *Jérusalem: Etude et réproduction photographique des monuments de la Ville Sainte depuis l'époque judaïque jusqu'à nos jours* (Paris: Gide et Baudry, 1856), p. 4.

33. *Humphrey's Journal,* vol. 4 (June 1852), p. 73. Quoted in Taft, *Photography,* p. 118.

34. Gernsheim, *History,* p. 187.

35. Josephine Cobb, "Photographers of the Civil War," in *Military Affairs* (Fall 1962), pp. 127–35. Cited in Newhall, *History,* p. 302, Ch. 7, n. 8.

36. *The World* [New York], April 12, 1891, p. 26. See Newhall, *Essays and Images,* p. 49. Euphorion was a rich Greek poet of the third century B.C. who in middle age was asked by Antiochus the Great to come to Syria to form and direct the Royal Library, which he did.

37. Gardner had gone into business for himself after a year; Barnard worked for Gardner and later for the Union Army, Division of the Mississippi. O'Sullivan worked for Gardner and claimed also to have served as a Lieutenant in the Division of General Egbert Viele, but no substantiation of this claim has been found. See Joel Snyder, *American Frontiers: The Photographs of Timothy O'Sullivan, 1867–1874* (Millerton, NY: Aperture, in association with the Philadelphia Museum of Art, 1981), pp. 12–14.

38. Lucien Goldschmidt and Weston J. Naef, *The Truthful Lens* (New York: The Grolier Club, 1980), p. 201.

39. Francis R. Gemme, *Maggie and Other Stories* (New York: Airmont Publishing Co., 1968), p. 5.

40. Stephen Crane, *The Red Badge of Courage* (New York: Dell Publishing Co., 1960), p. 149.
41. See Weston J. Naef and James Wood, *Era of Exploration* (Buffalo and New York: Albright-Knox Gallery and The Metropolitan Museum of Art, 1975), pp. 80–81.
42. *The Philadelphia Photographer,* September 1867, pp. 287–89.
43. International Annual, *Anthony's Photographic Bulletin* (New York: E. & H. T. Anthony & Co.).
44. Letter to Francis Sneed, July 26, 1880. Quoted in Ralph W. Andrews, *Picture Gallery Pioneers 1850–75* (New York: Seattle Superior Publishing Co., 1964).
45. Snyder, *American Frontiers,* pp. 177ff.
46. Ibid., p. 31.
47. Ibid., p. 31.

5. George Eastman and Alfred Stieglitz

1. Maddox added silver nitrate to a gelatin suspension with a bromide salt in it, forming silver bromide in a gelatin vehicle. He then coated his plates with the emulsion, dried them, and used them to produce transparencies from existing negatives.
2. "An Experiment with Gelatino Bromide," *The British Journal of Photography,* September 8, 1871, pp. 422–23. Reprinted in Newhall, *Essays and Images,* pp. 144–45.
3. Gernsheim, *History,* pp. 327, 332.
4. Joel Snyder has pointed out that after 1891 the new orthochromatic plates allowed Jackson to describe clouds, which sometimes changed the design of his pictures.
5. Gernsheim, *History,* p. 280.
6. Paul Martin, *Victorian Snapshots* (New York: Scribner's, 1939), p. 22.
7. Alfred Stieglitz, "The Hand-Camera—Its Present Importance," *The American Annual of Photography and Photographic Times Almanac for 1897.* Reprinted in Sarah Greenough and Juan Hamilton, *Alfred Stieglitz: Photographs and Writings* (Washington, DC: National Gallery of Art, 1983), p. 20.
8. Muybridge was tried in 1874 for the murder of his wife's lover, and acquitted on the grounds of "justifiable homicide." After the trial he spent some time out of the country. See *Eadweard Muybridge: The Stanford Years, 1872–1882* (Stanford, CA: Stanford University Press, 1972).
9. *Philadelphia Ledger,* vol. 6 (August 1885), p. 6. Reproduced in Welling, *Photography,* p. 299.
10. C. W. Ceram, *The Archaeology of the Cinema* (New York: Harcourt, Brace & World, Inc., 1965), pp. 114–16.
11. Edward S. Curtis, *The North American Indian,* 40 vols. The work appeared as 20 bound volumes of text with over 1,500 full-page photogravures, and 20 portfolios containing over 700 gravures (vols. 1-5: Cambridge, MA: University Press; vols. 6-20: Norwood, CT: Plimpton Press; vols. 21-40 published privately; 1907-30). See Barbara Davis, *Edward S. Curtis: The Life and Times of a Shadow Catcher* (San Francisco: Chronicle Books, 1985). Intro. by Beaumont Newhall.

12. *Life and Landscape in the Norfolk Broads* (1886), *Pictures from Life in Field and Fen* (1887), *Pictures of East Anglian Life* (1888), *Wild Life on a Tidal Water* (1890). Other books by Emerson include *Naturalistic Photography for Students of the Art* (1889), *On English Lagoons* (1893), and *Marsh Leaves* (1895).

13. Goodwin's patent application described a film obtained by dissolving nitrocellulose "in nitrobenzole or other non-hydrous and non-hygroscopic solvents, . . . and diluted in alcohol or other hydrous and hygroscopic diluent." Quoted in Robert Taft, *Photography and the American Scene: A Social History, 1839–1889.* (New York: Macmillan, 1938), p. 393.

14. E. & H. T. Anthony was an 1852 New York firm that became the principal photographic supply house in the United States. In 1902 it joined with Scovill and Adams Company to become Anthony & Scovill, which in 1907 became Ansco.

15. Taft, *Photography,* pp. 384–90.

16. A. W. Meyers, "Photography as a Royal Hobby," *The Observer,* July 20, 1900, unpaginated.

17. "Local Industries: The Kodak," *The Observer,* July 20, 1900, unpaginated.

18. David Cooper, "Enlarging," *Anthony's Photographic Bulletin,* 1886, p. 467.

19. Bernard E. Jones, ed., *Cassell's Encyclopedia of Photography* (London and New York: Cassell, 1911). Reprinted as *The Encyclopedia of Early Photography* (New York: Arno Press, 1974).

20. Eugene Ostroff, "Photographic Enlarging: A History," *Photographica Journal,* vol. 1, no. 3 (November–December 1984), p. 32.

21. Sue Davidson Lowe, *Stieglitz: A Memoir/Biography* (New York: Farrar, Straus & Giroux, 1983), p. 167.

22. Stieglitz, "Hand-Camera," Greenough and Hamilton, p. 21.

23. Ibid., p. 19.

24. Ibid., p. 24–25.

25. Ernest Beringer, *International Annual 1894 of Anthony's Photographic Bulletin* (New York: E. & H. T. Anthony & Co., 1894), p. 195.

26. David Gray Archibald, "A Few Notes," *The American Annual of Photography and Photographic Times Almanac for 1897* (New York: Scovill & Adams, 1897), p. 66.

27. Charles M. Carter, "Snap Shots Abroad: Snap First, Reflect Afterwards," *American Annual of Photography and Photographic Times Bulletin Almanac for 1904* (New York: Anthony & Scovill Co., 1904), p. 105.

Cartier-Bresson said that a photographer "is never able to wind the scene backward in order to photograph it all over again. . . . We photographers deal in things which are continually vanishing, and when they have vanished, there is no contrivance on earth which can make them come back again. We cannot develop and print a memory." *The Decisive Moment* (New York: Simon & Schuster, in collaboration with the editors of *Verve* of Paris, 1952), unpaginated.

28. W. J. Stillman, "Detective Cameras," *The American Annual of Photography,* 1888, p. 90.

29. [Unsigned], "Street Photography," *The Photo Miniature,* vol. 2, no. 14 (May 1900), pp. 51, 55.

30. Andrew Pringle, *Anthony's Photographic Bulletin,* 1886, p. 583.

31. See Newhall, *History,* pp. 154–55.

32. Van Deren Coke, *The Painter and the Photograph: From Delacroix to Warhol* (Albuquerque: The University of New Mexico Press; revised edition, 1972), p. 81.

33. Thomas Malone recalled that "on one occasion . . . Mr. Collen, an artist, was experimenting with Mr. Talbot, and it was proposed that they should take a ladder and a loft door which was very much above the level of the ground. Mr. Talbot of course pointed the camera up, and produced a very awkward effect, from the peculiar manner in which the lens was placed with reference to the object. Mr. Collen said, 'You are not going to take it so, surely!' Mr. Talbot replied, 'We cannot take it in any other way,' and then Mr. Collen said, 'As an artist, I would not take it at all.'" From a discussion following Mr. Rothwell's talk "On the Apparently Incorrect Perspective of Photographic Pictures," *Photographic Journal*, vol. 7, no. 103 (November 15, 1860), p. 33.

Herschel to Talbot: "In looking at photographic pictures from Nature . . . there are hardly one in fifty perspective representations on a vertical plane. In consequence perpendicular lines all condense upwards or downwards which is a great pity. . . . When a high station can be chosen this is not the case and this is a reason for chusing a station half way up to the height of the principal object to be represented." (Letter from Herschel to Talbot, October 23, 1847. Fox Talbot Collection, The Science Museum, London.)

In his reply Talbot promised to "always endeavor if I can to do what you recommend, place the instrument on a level with the central part of the object, or the first or second story of a building. It is however a pity that artists should object to the convergence of parallel lines, since it is founded in nature and only violates the conventional rules of Art." (Letter from Talbot to Herschel, October 26, 1847. The Royal Society, London.) Cited in Larry J. Schaaf, *H. Fox Talbot's Pencil of Nature Anniversary Facsimile*, intro. vol. (New York: Hans P. Kraus, Jr., Inc., 1989), p. 56.

34. Charles H. Caffin, *Photography as a Fine Art: The Achievement and Possibilities of Photographic Art in America* (New York: Doubleday, Page & Co., 1901), p. 9. Reprinted by The Friends of Photography (Dobbs Ferry, NY: Morgan & Morgan, 1971).

35. Joseph T. Keiley, "The Linked Ring," *Camera Notes*, vol. 5 (October 1901), p. 113. Cited in Newhall, *History*, p. 146.

36. The gallery address was 291 Fifth Avenue, New York.

37. *The American Annual of Photography*, 1899, p. 158.

38. "Alfred Stieglitz and His Latest Work," *The Photographic Times*, no. 27 (April 1896), p. 161. Quoted in Carol Schloss, *In Visible Light* (New York: Oxford University Press, 1987), p. 107.

39. Lowe, *Stieglitz*, p. 326.

6. Photography in Ink

1. Bill Jay, *Victorian Cameraman: Francis Frith's Views of Rural England 1850–1898* (London: David and Charles; Newton Abbot, 1973), p. 26.

2. Bill Jay, "A Taste of Victorian Values," *British Journal of Photography*, vol. 133 (June 1986), p. 722.

3. Charles T. Jacobi, "Printing," *Encyclopaedia Britannica*, eleventh edition (1910–11), vol. 22, p. 352.

4. *Encyclopaedia Britannica*, eleventh edition (1910–11), vol. 8, pp. 961, 973.

5. Hugh Chisolm, "Newspapers," *Encyclopaedia Britannica,* eleventh edition (1910–11), vol. 19, p. 551.

6. F. G. Stephens, "Sir John Gilbert," *Encyclopaedia Britannica,* eleventh edition (1910–11), vol. 12, p. 8.

7. Eugene Ostroff, "Etching, Engraving, and Photography: History of Photomechanical Reproduction," *Journal of Photographic Science,* no. 27 (May–June 1969), p. 72.

8. Eugene Ostroff, "Photography and Photogravure: History of Photomechanical Reproduction," *Journal of Photographic Science,* no. 27 (May–June 1969), pp. 101–15.

9. Conspicuous among these would be Henri Le Secq's album *Fragments d'architecture et sculpture de Chartres,* printed in the late 1870s by Thiel Ainé et Cie using Poitevin's photolithographic process. Charles Nègre made good prints by photogravure as early as the late 1850s, but little is known about the distribution achieved by these prints. In the 1880s Peter Henry Emerson produced several books, including *Pictures of East Anglian Life* (1888), illustrated by gravures that fully achieved the potentials of that medium.

10. Gernsheim, *History,* p. 297.

11. In 1879 Karl V. Klíc invented the photogravure process. In 1886 Frederic E. Ives improved on his halftone process using a single-line screen by introducing a cross-line screen for reproduction.

12. Welling, *Photography,* p. 237. Also, Snyder, *American Frontiers,* p. 31.

13. Beaumont Newhall and Diana Edkins, *William H. Jackson* (Dobbs Ferry, NY: Morgan & Morgan, 1974), p. 148.

14. The authorship of individual pictures of the series will probably never be settled beyond dispute. Judy Giuriceo has called my attention to the fact that the archives of the New York Historical Society contain photographs credited to Richard Hoe Lawrence (copies of photographs given to the Society many years ago by Mrs. Lawrence) that include pictures from the same negatives that the Museum of the City of New York credits to Riis.

15. Riis later said, "A drawing would not have been evidence of the kind I wanted." See Jacob Riis, *The Making of an American* (New York: Macmillan, 1901). Reprinted.

16. The woodburytype was a screenless ink print in which tonal variation depended on the thickness of the ink layer. The ink was deposited from a lead plate that carried a shallow negative relief impression.

17. Estelle Jussim, *Visual Communication and the Graphic Arts: Photographic Technologies in the Nineteenth Century* (New York: R. R. Bowker Co., 1974), pp. 186–87.

18. Welling, *Photography,* p. 31.

19. Heartfield wrote, "A photograph can, by the addition of an unimportant spot of color, become a photomontage, a work of art of a special kind." Sergei Tretyakov, *John Heartfield: A Monograph* (Moscow: Ogis Stage Publishing House, 1936). Reprinted, *Photomontages of the Nazi Period: John Heartfield* (New York: Universe, 1977). Cited in Sally A. Stein, "The Composite Photographic Image and the Composition of Consumer Ideology," *Art Journal,* spring 1981, pp. 39–45.

20. Ossip Brik, "Photography Versus Painting," *Sovetskoe Foto,* no. 2, 1926. Reprinted in David Elliott, *Rodchenko and Arts of Revolutionary Russia* (New York: Pantheon Books, 1979), p. 91.

21. Elliott, *Rodchenko,* p. 130.
22. In addition to Stefan Lorant, Martin Munkacsi and André Kertész were conspicuous among the Austro-Hungarian expatriates. Although Kertész lived in Paris, his work was used extensively in Germany.
23. Newhall, *Essays,* pp. 271–75.
24. Ibid., p. 272.
25. In conversation with the author.
26. The same story was published three times: in the *Münchner Illustrierte Presse* (Munich Illustrated Press), March 1, 1931; in *Pesti Napolo* (Hungarian Diary, Budapest), December 1933; and in the *Weekly Illustrated* (London) August 4, 1934.
27. In 1943 the photography unit was organized as a historical resource by Paul Vanderbilt. In 1946 he accompanied the collection to the Library of Congress, where he became head of the Prints and Photographs Division. See Carl Fleischauer and Beverly W. Brannan, eds., *Documenting America* (Los Angeles: University of California Press, 1988), pp. 330ff.
28. The radio program first appeared in 1949. The hero, Sergeant Joe Friday, became famous for his line, "Just the facts, ma'am. Just the facts."
29. From "A Prospectus for a New Magazine," 1934, courtesy Time Inc. Archives.
30. John Szarkowski, Introduction, *Walker Evans* (New York: The Museum of Modern Art, 1971), p. 18.
31. The Smith essays are "Country Doctor," 1948; "Spanish Village," 1951; and "Nurse Midwife," 1951.
32. Newhall, *Essays,* p. 299.
33. Ibid., p. 318.
34. Wright Morris, "Photographs, Images, and Words," *The American Scholar,* autumn 1979. Reprinted in *Time Pieces: Photographs, Writing, and Memory* (New York: Aperture, 1989), p. 61.
35. Nancy Newhall, ed., *The Daybooks of Edward Weston,* vol. 2 (Millerton, NY: Aperture, 1961), p. 8.
36. Ibid., p. 47.
37. Ibid., p. 277.
38. Greenough and Hamilton, *Alfred Stieglitz,* p. 18.
39. Letter from Stieglitz to R. C. Bayley, April 17, 1919; Alfred Stieglitz Archives, Yale University. Quoted in Weston J. Naef, *The Collection of Alfred Stieglitz: Fifty Years of Modern Photography* (New York: The Metropolitan Museum of Art and Viking Press, 1978), p. 471.
40. Greenough and Hamilton, *Alfred Stieglitz,* p. 210.
41. Ibid., p. 205.

7. After the Magazines

1. Lewis Hine, "Social Photography, How the Camera May Help in the Social Uplift," *Proceedings, National Conference of Charities and Corrections,* June 1909. Reprinted in Alan Trachtenberg, ed., *Classic Essays on Photography* (New Haven, CT: Leet's Island Books, 1980), p. 110.
2. Edward Steichen, "Minutes of Representatives Meetings," January 31, 1928,

pp. 2–3. Quoted in Patricia Johnston, "Romance, Class, Strategy, and Style: Edward Steichen's Photographs for Jergens Lotion," *Exposure*, vol. 26, no. 4 (winter 1988).

3. Irving Penn, from a transcript of the symposium "What is Modern Photography?" held at The Museum of Modern Art, New York, October 20, 1950.

4. W. Eugene Smith, "Photographic Journalism," *Photo Notes*, June, 1948, pp. 4–5. Reprinted in Nathan Lyons, ed., *Photographers on Photography: A Critical Anthology* (Englewood Cliffs, NJ: Prentice-Hall, 1966), p. 103.

5. From an undated transcript of an undated session (probably late 1964–early 1965) of the Alexey Brodovitch Workshop. Bound transcripts, collection The Museum of Modern Art Department of Photography library, pp. 25–26.

6. Jacob Deschin, "Panoramic Show at The Museum of Modern Art," The New York *Times*, January 30, 1955.

7. Quoted by Willy Rotzler, "Robert Frank," *Du* [Zurich], January 1962, pp. 11–12.

8. Written by the English poet Adelaide Proctor (pseudonym Mary Berwick) about ten years after Hill lost the secret of color daguerreotypy. One day while daydreaming at the organ she "struck one chord of music/Like the sound of a great Amen," but was unable to repeat it. Sir Arthur Sullivan set the poem to music, and the song was an all-time hit. Two arrangements are still published by Carl Fischer, Inc.

9. Color separation was not really practical until black-and-white emulsions were developed that were sensitive to all colors, rather than blue only, as was the case with the wet-plate process. The basis for the solution was Hermann W. Vogel's discovery, first published in 1873, that the color sensitivity of photographic emulsions could be extended by the addition of suitable dyes. Panchromatic plates, which are almost equally sensitive to all the colors of the visible spectrum, were perfected in the early twentieth century.

10. The extraordinarily complex Kodachrome process was invented by two professional musicians and amateur scientists, Leopold Mannes (piano) and Leopold Godowsky, Jr. (violin), who worked for almost twenty years, beginning in their teens, to develop a satisfactory color film. Kodachrome was first released as a 16mm movie film, in 1935.

11. C. William Horrell, *A Survey of Photographic Instruction*, 3rd ed. (Rochester, NY: Eastman Kodak Co., 1968), p. 3. Art Sinsabaugh stated in an unpublished 1970 report to the University of Illinois ("Photography and Cinematography within the University") that the number of students studying photography or cinematography at the University had increased between 1966 and 1970 from 132 to 4,175—an increase of over 3,000 percent in four years.

12. The New Bauhaus was founded in 1937; by April 1938 it was closed. Moholy-Nagy reopened it in February 1939 with his own funds, as the New Bauhaus School of Design in Chicago. In 1944 its name was changed to The Institute of Design to underscore college-level standing. In 1949 it became part of The Illinois Institute of Technology. See Charles Traub, ed., *The New Vision: Forty Years of Photography at the Institute of Design* (Millerton, NY: Aperture, 1982), p. 19.

13. The list includes: Thomas Barrow, Barbara Blondeau, Linda Connor, Barbara Crane, Len Gittleman, Joseph Jachna, Kenneth Josephson, William Larson, Lyle Mayer, Ray K. Metzker, George Nan, Richard Nickel, Keith Smith, Joseph

Sterling, Charles Swedlund, and Geoff Winningham.

14. Minor White, "Equivalence: The Perennial Trend," *PSA Journal*, vol. 27, no. 7. Reprinted in Lyons, *Photographers on Photography*, p. 175.

15. "Julien Levy: The Eyes," excerpts from an interview for *Photograph* by Gretchen Berg. *The Julien Levy Collection at The Witkin Gallery Inc.*, October 12–November 12, 1977.

16. The Gallery opened in March 1969 with an exhibition of five American photographers of very different perspectives: Scott Hyde, George Krause, Duane Michals, George Tice, and Burke Uzzle. During its first year the gallery's schedule also included exhibitions of the work of the Photo-Secession, Eugène Atget, Edward Weston, and Frederick Evans.

17. This is not a problem for those working within the normal (classical) photographic vocabulary, since it is their strategy to make the print invisible, to persuade the viewer that he is looking not at it but through it, into a real space behind it, as though the print were Alberti's imaginary window. The larger the print, however, the more difficult it is to maintain this illusion. As the chemical and optical structure of the photograph becomes visible the picture ceases to be a disembodied image and is likely to become a rather unprepossessing physical object.

18. From a commercial point of view, Metzker's timing was unfortunate. In 1965 the idea of photographs as wall hangings was premature; before the market was ready for his big pictures Metzker had gone on to other problems.

19. In conversation with the author.

20. Tod Papageorge has made a superb analysis of the relationship between the two books in *Walker Evans and Robert Frank: An Essay in Influence* (New Haven, CT: Yale University Art Gallery, 1981).

21. The fictional photographer played by Fred Astaire in the movie *Funny Face* (1956), said to be loosely patterned after Richard Avedon, formulated the rule. When asked why he photographed fashion he said, "You would be amazed at how small the demand is for pictures of trees."

22. Eudora Welty, Introduction to William Eggleston, *The Democratic Forest* (New York: Doubleday & Co., 1989), p. 10.



Judith Joy Ross. *Untitled, from "Easton Portraits".* 1988

List of Illustrations and Checklist of the Exhibition

*An asterisk indicates works not included in the exhibition.

Berenice Abbott
American, born 1898
Zito's Bakery, Bleecker Street, New York. c. 1937

Gelatin-silver print. 9½ × 7½ in. (24.2 × 19.1 cm). The Museum of Modern Art, New York. Anonymous gift
PAGE 225

Ansel Adams
American, 1902–1984
Rocks and Grass, Moraine Lake, Sequoia National Park, California. c. 1932, printed 1978

Gelatin-silver print. 9⅛ × 11¼ in. (23.2 × 28.6 cm). The Museum of Modern Art, New York. Gift of the photographer
PAGE 223

Robert Adams
American, born 1937
East from Flagstaff Mountain, Boulder County, Colorado. 1976

Gelatin-silver print. 8 15/16 × 11 3/16 in. (22.7 × 28.4 cm). The Museum of Modern Art, New York. Purchase
PAGE 290

Josef Albers
German, 1888–1976
Paul Klee, Dessau. 1929

3 gelatin-silver prints. 6¾ × 15⅞ in. (17.1 × 40.4 cm) overall. The Museum of Modern Art, New York. Gift of the Josef Albers Foundation, Inc.
PAGE 245

Leopoldo Alinari. Italian, 1832–1865
Giuseppe Alinari. Italian, 1836–1891
Romualdo Alinari. Italian, 1830–1891
Palazzo delle Cascine, Florence. c. 1855

Albumen-silver print from a wet-collodion glass negative. 9½ × 12¾ in. (24.1 × 32.4 cm). Collection Centre Canadien d'Architecture/ Canadian Centre for Architecture, Montreal
PAGE 122

Manuel Alvarez-Bravo
Mexican, born 1902
Daydream. 1931

Gelatin-silver print. 9⅛ × 5¾ in. (23.2 × 14.6 cm). The Museum of Modern Art, New York. Anonymous gift
PAGE 230

Paul L. Anderson
American, 1880–1956
Sunday Morning. 1939

Palladium print. 9⅛ × 6½ in. (23.1 × 16.4 cm). The Museum of Modern Art, New York. Gift of Mrs. Raymond Collins
PAGE 172

Ottomar Anschütz
German, 1846–1907
Storks. 1884

9 albumen-silver prints from glass negatives. 3¾ × 5½ in. (9.5 × 13.9 cm) each. Agfa Foto-Historama im Wallraf-Richartz Museum, Museum Ludwig, Cologne
PAGE 133

Diane Arbus
American, 1923–1971
Untitled. 1970–71

Gelatin-silver print. 14¾ × 14⅝ in. (37.5 × 37 cm). The Museum of Modern Art, New York. Mrs. Armand P. Bartos Fund
PAGE 260

Charles Dudley Arnold
American, 1844–1917 [?]
Ferris Wheel: World Columbian Exposition. 1893

Platinum print. 17¼ × 16 1/16 in. (43.8 × 40.7 cm). Gernsheim Collection, Harry Ransom Humanities Research Center, University of Texas at Austin
PAGE 154

Eugène Atget
French, 1856–1927
Saint-Cloud. 1915–19

Gelatin-silver printing-out paper print. 7 1/16 × 9 7/16 in. (18 × 24 cm). The Museum of Modern Art, New York. Abbott-Levy Collection, partial gift of Shirley C. Burden
PAGE 235

Eugène Atget
Saint-Cloud, juin 1926

Gelatin-silver printing-out paper print. 7 1/16 × 9 7/16 in. (18 × 24 cm). The Museum of Modern Art, New York. Abbott-Levy Collection, partial gift of Shirley C. Burden
PAGE 234

Charles Hippolyte Aubry
French, 1811–1877
Leaf arrangement. 1860s

Albumen-silver print from a wet-collodion glass negative. 13 9/16 × 10 11/16 in. (34.4 × 27.1 cm). J. Paul Getty Museum, Malibu
PAGE 100

Richard Avedon
American, born 1923
Brigitte Bardot. 1959

Gelatin-silver print. 23 × 20 in. (58.4 × 51.3 cm). The Museum of Modern Art, New York. Gift of the photographer
PAGE 273

Liberty Hyde Bailey
American, 1858–1954
Cucumber Pollination Experiments. 1891

4 cyanotypes. 6 × 7¾ in. (15.2 × 19.7 cm) each. Department of Manuscripts and University Archives, Cornell University Library, Ithaca, NY
PAGE 135



Edouard-Denis BALDUS
French, 1815–1882
Pavillon Richelieu, Nouveau Louvre, Paris. c. 1855

Salt print from a wet-collodion glass negative. 13½ × 17⅜ in. (34.3 × 44.1 cm). Collection Centre Canadien d'Architecture/Canadian Centre for Architecture, Montreal

Edouard-Denis BALDUS
Pont du Gard. c. 1855

From the album *Railways from Paris to Lyon and the Mediterranean* (Chemins de fer de Paris à Lyon et à la Méditerranée), 1859. 13½ × 17⅜ in. (29.2 × 42.7 cm). International Museum of Photography at George Eastman House, Rochester, NY
PAGE 75



George N. BARNARD
American, 1819–1902
Ruins of the Railroad Depot, Charleston, South Carolina. 1864–65

From *Photographic Views of Sherman's Campaign* (New York: George N. Barnard, 1866). Albumen-silver print from a wet-collodion glass negative. 10⅛ × 14⅛ in. (23.1 × 35.8 cm). The Museum of Modern Art, New York. Acquired by exchange with the Library of Congress



Tina BARNEY
American, born 1945
The Skier. 1987

Chromogenic color print (Ektacolor). 48 × 60 in. (122 × 152.4 cm). The Museum of Modern Art, New York. Polaroid Foundation Fund

*Hippolyte BAYARD
French, 1801–1887
Arrangement of specimens. c. 1842–43

From the album "Photography: Collection of Positive Drawings Obtained from Negatives on Paper" (Photographie: Recueil de dessin positifs obtenus a l'aide de negatifs sur papier), 1839–67. Cyanotype (above) and salt prints from paper negatives (below). 7 7/16 × 5 3/16 in. (18.9 × 13.7 cm). J. Paul Getty Museum, Malibu
PAGE 20

*Hippolyte BAYARD
Self-Portrait. 1842–50

Gelatin-silver print by Pierre Gassman from the original paper negative, 1965. 8⅞ × 6⅜ in. (22.5 × 16.1 cm). The Museum of Modern Art, New York. Purchase
PAGE 33

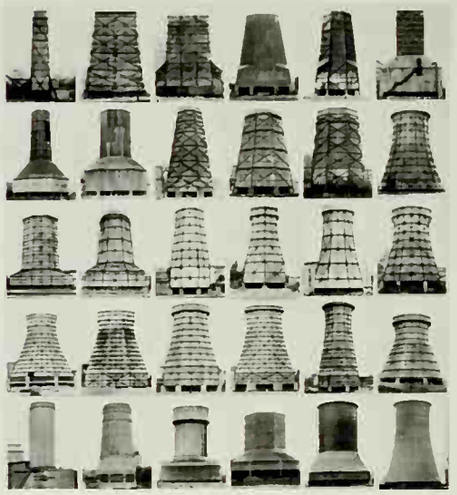
Herbert BAYER
American, born Austria, 1900–1986
Lonely Metropolitan (Einsamer Grossstädter). 1932

Gelatin-silver print. 13½ × 10 in. (34.3 × 25.4 cm). Fotografische Sammlung, Museum Folkwang, Essen, West Germany
PAGE 203



Felice BEATO
British, died 1903
Interior of Pehtang Fort Showing the Magazine and Wooden Gun. 1860

Albumen-silver print from a wet-collodion glass negative. 9¾ × 11¼ in. (25 × 28.8 cm). The Museum of Modern Art, New York. Gift of Jon Hendricks



Bernhard BECHER
German, born 1931
Hilla BECHER
German, born 1934
Anonymous Sculpture. 1970

30 gelatin-silver prints. 15 7/8 × 11¾ in. (40.3 × 29.8 cm) each; 85 × 78 in. (215.9 × 198.1 cm) overall. The Museum of Modern Art, New York. Gertrud A. Mellon Fund

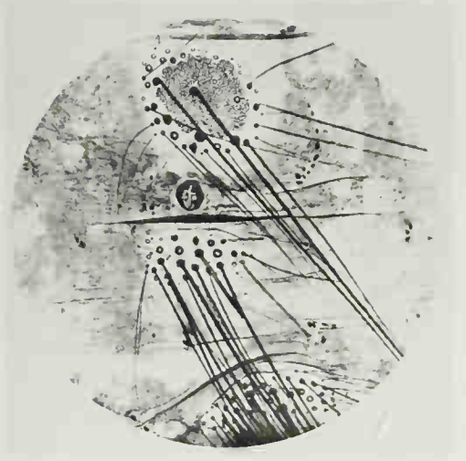


Richard Benson
American, born 1943
Cannon, Vicksburg. 1986

Photograph in paint (acrylic on aluminum). 14½ × 18¼ in. (36.8 × 46.4 cm). Washburn Gallery, New York

Zeke Berman
American, born 1951
Untitled. 1979

Gelatin-silver print. 10½ × 13⅝ in. (26.7 × 34.7 cm). The Museum of Modern Art, New York. The Family of Man Fund
PAGE 283



Auguste-Adolphe Bertsch
French, died 1871
Epidermis and Stigmata of a Larva (Epiderme et stigmata d'une larvae). c. 1853

Photomicrograph; albumen-silver print. 6⅝ × 6 3/16 in. (16 × 15.8 cm). National Museum of Photography, Film and Television, Bradford, England



Auguste-Adolphe Bertsch
Head of a Coudin Larva (Tête d'une larvae de Coudin). c. 1853

Photomicrograph; albumen-silver print. 6 11/16 × 6½ in. (17 × 16.5 cm). National Museum of Photography, Film and Television, Bradford, England



Auguste-Adolphe Bertsch
Mouth of a Wasp (Bouche de guépe). c. 1853

Photomicrograph; albumen-silver print. 6 3/16 × 6⅛ in. (15.8 × 15.5 cm). National Museum of Photography, Film and Television, Bradford, England

Margaret Bourke-White
American, 1904–1971
At the Time of the Louisville Flood. 1937

Gelatin-silver print. 9¾ × 13⅛ in. (24.7 × 33.4 cm). The Museum of Modern Art, New York. Gift of the photographer
PAGE 224



Margaret Bourke-White
Decoy Tanks of Tin and Wooden Guns. 1939 or earlier

Published in *Life*, September 11, 1939. Gelatin-silver print. 7 11/16 × 13¼ in. (19.5 × 33.7 cm). Collection Stephen White



Mathew Brady
American, 1823–1896
Portrait. c. 1860

Ambrotype. 7¼ × 6 in. (18.4 × 15.2 cm). The Museum of Modern Art, New York. Purchase

Bill Brandt
British, 1904–1983
At "Charlie Brown's," London. c. 1936

Gelatin-silver print. 12¾ × 10 11/16 in. (32.4 × 27.2 cm). The Museum of Modern Art, New York. Gift of the photographer
PAGE 218

Bill Brandt
Untitled. 1953

From the series "Perspective of Nudes." Gelatin-silver print. 24 1/4 × 20 1/2 in. (61.4 × 52.5 cm). The Museum of Modern Art, New York. Purchase
PAGE 255

Brassaï (Gyula Halász)
French, born Transylvania, 1899–1984
Three Masked Women. 1935

Gelatin-silver print. 9 1/16 × 11 7/16 in. (23 × 29 cm). The Museum of Modern Art, New York. David H. McAlpin Fund
PAGE 221

Francis Joseph Bruguière
American, 1879–1945
Cut paper. c. 1928

Gelatin-silver print. 14 × 11 in. (35.6 × 27.9 cm). J. Paul Getty Museum, Malibu
PAGE 179

Harry Callahan
American, born 1912
Aix-en-Provence. 1958

Gelatin-silver print. 7 3/4 × 6 1/8 in. (19.7 × 15.2 cm). The Museum of Modern Art, New York. Stephen R. Currier Memorial Fund
PAGE 271

Julia Margaret Cameron
British, 1815–1879
Iago. 1867

Albumen-silver print from a wet-collodion glass negative. 13 × 9 3/4 in. (33 × 24.8 cm). National Museum of Photography, Film and Television, Bradford, England
PAGE 91



Julia Margaret Cameron
Pre-Raphaelite Study. 1870

Albumen-silver print from a wet-collodion glass negative. 13 7/8 × 11 in. (35.4 × 28 cm). Collection Paul F. Walter

Alfred Capel-Cure
British, 1826–1896
Bat and insects. 1850s

Paper negative. 7 × 8 1/2 in. (17.8 × 21.5 cm). The Museum of Modern Art, New York. Gift of Paul F. Walter
PAGE 51

Paul Caponigro
American, born 1932
Untitled. 1964

Gelatin-silver print. 6 9/16 × 8 1/4 in. (16.7 × 20.9 cm). The Museum of Modern Art, New York. Purchase
PAGE 274

Etienne Carjat et Cie
French, active 1861–1876
Gustave Courbet. c. 1867–75

Albumen-silver print (carte-de-visite). 3 1/2 × 2 1/4 in. (8.9 × 5.7 cm). The Museum of Modern Art, New York. Purchased as the gift of Shirley C. Burden
PAGE 83

Lewis Carroll (Charles Lutwidge Dodgson)
British, 1832–1898
The Reverend C. Barker and His Daughter May. 1864

Albumen-silver print. 8 1/16 × 6 1/16 in. (20.5 × 15.3 cm) [curved top]. Gernsheim Collection, Harry Ransom Humanities Research Center, University of Texas at Austin
PAGE 96

Lewis Carroll
Irene MacDonald. 1863

Albumen-silver print. 5 5/8 × 7 1/2 in. (14.3 × 19 cm) [oval]. Gernsheim Collection, Harry Ransom Humanities Research Center, University of Texas at Austin
PAGE 92

Henri Cartier-Bresson
French, born 1908
Santa Clara, Mexico. 1934

Gelatin-silver print. 6 5/8 × 9 7/8 in. (16.8 × 25.1 cm). The Museum of Modern Art, New York. Gift of Willard Van Dyke
PAGE 220

Charles Clifford
British, 1800–1863
Martorell, Spain: Devil's Bridge. 1850s [?]

Albumen-silver print from a wet-collodion glass negative. 11 7/8 × 16 7/16 in. (30.1 × 41.8 cm). Victoria and Albert Museum, London
PAGE 76, TOP

Jane Clifford
British, active 1860s
Shield. c. 1863–66

Albumen-silver print from a wet-collodion glass negative. 12 5/8 × 9 5/8 in. (31.3 × 24.4 cm). Victoria and Albert Museum, London
PAGE 104

Alvin Langdon Coburn
American, 1882–1966
Flatiron Building. 1912

Platinum print. 15 15/16 × 12 3/8 in. (40.5 × 31.4 cm). International Museum of Photography at George Eastman House, Rochester, NY
PAGE 165

Albert Collard
French, before 1838–after 1887
Bridge. 1860s [?]

Albumen-silver print from a paper negative. 11½ × 19⅝ in. (29.2 × 49.9 cm). Musée Carnavalet, Paris
PAGE 99

William Collie
British, n.d.
Still life. c. 1850

Salt print from a paper negative. 4 13/16 × 3 11/16 in. (12.3 × 9.4 cm). Royal Photographic Society, Bath, England
PAGE 65

William Collie
Dr. Wolfe. 1852

Salt print from a paper negative. 6 11/16 × 5⅝ in. (17 × 14.2 cm). Royal Photographic Society, Bath, England
PAGE 50



Dmitri Constantin
Greek, active 1858–1870
Philoappos Monument, Athens. c. 1865

Albumen-silver print from a wet-collodion glass negative. 13 1/16 × 10⅜ in. (33.2 × 26.3 cm). J. Paul Getty Museum, Malibu



John G. Crace
British, 1809–1889
Irish Peasants. 1855

Albumen-silver print from a wet-collodion glass negative [?]. 5 11/16 × 4⅞ in. (14.4 × 12.3 cm). Victoria and Albert Museum, London

Robert Cumming
American, born 1943
Two Views of One Mishap of Minor Consequence. 1973

2 gelatin-silver prints. 7⅝ × 9⅝ in. (19.4 × 24.4 cm) each. The Museum of Modern Art, New York. Purchased as the gift of Mrs. Armand P. Bartos
PAGE 282

Francis Edmund Currey
British, 1814–1896
Heron. 1863

Albumen-silver print from a glass negative. 8 1/4 × 5 13/16 in. (21 × 14.8 cm) [irregular]. The Museum of Modern Art, New York. Anonymous Purchase Fund
PAGE 79



Edward S. Curtis
American, 1868–1952
Cutting Rushes, Mandan. 1908

From *The North America Indian.* Photogravure. 5⅛ × 7⅜ in. (13.6 × 18.7 cm). The Museum of Modern Art, New York. Purchase

*Louis-Jacques-Mandé Daguerre
French, 1787–1851
Collection of shells and miscellany. 1839

Daguerreotype. Conservatoire Nationale des Arts et Métiers, Paris
PAGE 27

Roy De Carava
American, born 1925
Untitled. 1959

Gelatin-silver print. 9 × 13 1/16 in. (22.8 × 33.2 cm). The Museum of Modern Art, New York. Purchase
PAGE 250

Louis-Constantin-Henri-François De Clercq
French, 1836–1901
Southern Side, Krak of the Knights (Kalaat-et-Hosn), Syria. 1859

From *Voyage in the Orient: Crusader Castles in Syria* (Voyage en orient: châteaux du temps des croisades en Syrie), vol. 2, Paris, 1859–60. Albumen-silver print from a paper negative. 8 9/16 × 10 13/16 in. (21.7 × 27.5 cm). Collection Centre Canadien d'Architecture/Canadian Centre for Architecture, Montreal
PAGE 107

Adolf de Meyer
French, born Germany, 1868–1946
Helen Lee Worthing. 1920

Gelatin-silver print. 9½ × 7½ in. (24.2 × 19.1 cm). The Museum of Modern Art, New York. Gift of Richard Avedon
PAGE 191



Hilaire-Germain-Edgar DEGAS
French, 1834–1917
Pierre Auguste Renoir and Stéphane Mallarmé. 1895

Gelatin-silver print. 15⅜ × 11 13/16 in. (39.1 × 28.4 cm). The Museum of Modern Art, New York. Gift of Paul F. Walter

Philip Henry DELAMOTTE
British, 1820–1889
View Through Circular Truss, Crystal Palace. 1853–54

16 × 22 in. (40.7 × 55.9 cm). Metropolitan Museum of Art, New York. David Hunter McAlpin Fund, 1952
PAGE 74



Louis Jules DUBOSCQ-SOLEIL
French, 1817–1886
Still life with skull. c. 1850

Sixth-plate daguerreotype. 3 5/16 × 2¾ in. (8.3 × 6.9 cm). International Museum of Photography at George Eastman House, Rochester, NY



Maxime DU CAMP
French, 1822–1894
Temple of Kertassi, Kerdasah, Egypt. 1849–51

From *Egypte, Nubie, Palestine, et Syrie* (Paris: Gide et J. Baudry, 1852). Salt print from a paper negative. 6½ × 8 9/16 in. (16.5 × 21.8 cm). The Museum of Modern Art, New York. Gift of Warner Communications Inc.

Guillaume-Benjamin-Amand DUCHENNE DE BOULOGNE
French, 1806–1875
Fright (Effroi). 1862

From *Mechanisms of Human Physiognomy* (Méchanisme de la physiognomie humaine) (Paris: J. B. Baillière et Fils, 1862). Albumen-silver print from a wet-collodion glass negative. 4 13/16 × 3 11/16 in. (12.2 × 9.4 cm). The Museum of Modern Art, New York. Gift of Paul F. Walter
PAGE 97, BOTTOM

Louis-Emile DURANDELLE
French, 1839–1917
Ornamental Sculpture, New Paris Opera. 1865–72

Plate 31 from *The New Paris Opera* (Le Nouvel Opera de Paris) (Paris: Ducher et Cie, 1872). Albumen-silver print from a glass negative. 10 15/16 × 14 13/16 in. (27.9 × 37.6 cm). The Museum of Modern Art, New York. Gift of Paul F. Walter
PAGE 101

*George EASTMAN
American, 1854–1932
Portrait of (Félix) Nadar taken with a No. 2 Kodak Camera. After 1888

Gelatin-silver print. 3⅝ in. (9.1 cm) diameter. International Museum of Photography at George Eastman House, Rochester, NY
PAGE 144, TOP

Josef Maria EDER
Austrian, 1855–1944
Eduard VALENTA
Austrian, 1857–1937
Newborn Rabbit (Neugeborenes kaninchen). c. 1896

X-ray; photogravure. 2 11/16 × 5 7/16 in. (6.9 × 13.8 cm). National Museum of Photography, Film and Television, Bradford, England
PAGE 137



Harold EDGERTON
American, born 1903
Bouncing Golf Ball. c. 1940

Gelatin-silver print. 8⅜ × 7⅛ in. (21.2 × 18 cm). Collection Stephen White

EDWARDS and Son
American, active 1860–1885
Landscape with Portrait of Alfred R. Waud. c. 1883

Albumen-silver print from a dry-plate negative [?]. 17¼ × 19⅜ in. (43.8 × 49.2 cm). J. Paul Getty Museum, Malibu
PAGE 127

William EGGLESTON
American, born 1939
Plains, Georgia. 1976

Plate 34 from *Election Eve* (Caldecott Chubb and William Eggleston, 1977). Chromogenic color print (Ektacolor). 14⅞ × 10⅛ in. (38 × 25.9 cm). The Museum of Modern Art, New York. Partial gift of Shirley C. Burden, by exchange
PAGE 292

Harry C. ELLIS
American, 1857–1928
Untitled. c. 1912

Gelatin-silver print. 7 1/16 × 9⅜ in. (17.9 × 23.7 cm). Collection Stephen White
PAGE 150

Peter Henry EMERSON
British, born Cuba, 1856–1936
The Clay Mill. Before 1888

From *Pictures of East Anglian Life* (London: Sampson, Low, Marston, Searle and Rivington, 1888). Photogravure. 7 15/16 × 11 7/16 in. (20 × 29 cm). The Museum of Modern Art, New York
PAGE 140

Hugo ERFURTH
German, 1874–1948
Renée Sintenis. c. 1925

Gelatin-silver print. 11 13/16 × 9 1/16 in. (29.9 × 23.1 cm). Agfa Foto-Historama im Wallraf-Richartz Museum, Museum Ludwig, Cologne
PAGE 175

Hugo ERFURTH
Mies van der Rohe. c. 1930

Oil pigment print. 11¾ × 9 1/16 in. (29.8 × 23.1 cm). Agfa Foto-Historama im Wallraf-Richartz Museum, Museum Ludwig, Cologne
PAGE 174



Hugo ERFURTH
Portrait. c. 1929

Oil-pigment print. 22¼ × 16 15/16 in. (56.5 × 43 cm). Agfa Foto-Historama im Wallraf-Richartz Museum, Museum Ludwig, Cologne

Max ERNST
French, 1891–1976
Loplop Introduces Members of the Surrealist Group. 1931

Cut-and-pasted gelatin-silver prints, pencil, and pencil frottage. 19¾ × 13¼ in. (50.1 × 33.6 cm) [sheet]. The Museum of Modern Art, New York. Purchase
PAGE 207

Eliott ERWITT
American, born 1928
Fontainebleau Hotel, Miami Beach. 1962

Gelatin-silver print. 9½ × 13½ in. (24.1 × 34.3 cm). The Museum of Modern Art, New York. Gift of the photographer
PAGE 248



Frederick H. EVANS
British, 1853–1943
Château Meillant, Chapel Door. 1906–07

Platinum print. 10½ × 8⅛ in. (26.8 × 20.6 cm). Collection John Parkinson III

Walker EVANS
American, 1903–1975
Church Organ, Alabama. 1936

Gelatin-silver print. 7½ × 9 3/16 in. (19 × 23.3 cm). The Museum of Modern Art, New York. Mr. and Mrs. John Spencer Fund
PAGE 214

Roger FENTON
British, 1819–1869
Sebastopol from Cathcart's Hill. 1855

Salt print from a paper negative. 8¾ × 13 13/16 in. (22.2 × 35 cm). Gernsheim Collection, Harry Ransom Humanities Research Center, University of Texas at Austin
PAGE 106

Roger FENTON
Dinornis Elephantopus. c. 1858

Salt print from a wet-collodion glass negative. 15 × 12 1/16 in. (38.1 × 30.6 cm). The Museum of Modern Art, New York. Gift of Paul F. Walter
PAGE 78

Roger Fenton
Salisbury Cathedral: The Spire. c. 1860

Albumen-silver print from a wet-collodion glass negative. 16 5/16 × 14 3/8 in. (41.4 × 36.5 cm). The Museum of Modern Art, New York. Gift of Paul F. Walter
PAGE 114

Grancel Fitz
American, 1894–1963
Advertisement for Isotta-Fraschini automobile. 1931

Gelatin-silver print. 8 1/16 × 10 1/16 in. (20.5 × 25.5 cm). G. H. Dahlsheimer Gallery Ltd., Baltimore
PAGE 188

Joan Fontcuberta
Spanish, born 1955
Guillumeta Polymorpha. 1982

Gelatin-silver print. 10 1/2 × 8 9/16 in. (26.6 × 21.8 cm). The Museum of Modern Art, New York. Robert and Joyce Menschel Fund
PAGE 294

E. Fox
British, n.d.
Spanish Chestnut in Winter. Early 1860s

Albumen-silver print from a wet-collodion glass negative. 9 9/16 × 11 1/4 in. (24.2 × 28.6 cm). Victoria and Albert Museum, London
PAGE 81

E. Fox
Spanish Chestnut in Summer. Early 1860s

Albumen-silver print from a wet-collodion glass negative. 11 1/4 × 9 7/16 in. (28.6 × 24 cm). Victoria and Albert Museum, London
PAGE 80

Robert Frank
American, born Switzerland, 1924
Parade, Hoboken, New Jersey. 1955

Gelatin-silver print. 8 7/16 × 12 13/16 in. (21.4 × 32.5 cm). The Museum of Modern Art, New York. Purchase
PAGE 258

Lee Friedlander
American, born 1934
Colorado. 1967

Gelatin-silver print. 6 3/4 × 9 3/4 in. (17.2 × 24.8 cm). The Museum of Modern Art, New York. Purchase
PAGE 251

Lee Friedlander
The American Monument

(New York: The Eakins Press Foundation, 1976). [Not illustrated]

Lee Friedlander
Canyon de Chelly, Arizona. 1983

Gelatin-silver print. 22 9/16 × 15 in. (57.4 × 38.1 cm). Courtesy the photographer.
FRONTISPIECE

Francis Frith
British, 1822–1898
The Pyramids of Dahshoor, from the East. 1857

Plate 5 from *Egypt, Sinai, Jerusalem: A Series of Twenty Photographic Views* (London: William Mackensie, c. 1862). Albumen-silver print from a wet-collodion glass negative. 14 13/16 × 19 1/16 in. (37.6 × 48.4 cm). J. Paul Getty Museum, Malibu
PAGE 77

Francis Frith
The Pyramids of El-Geezeh, from the South West. 1857

Plate 12 from *Egypt, Sinai, Jerusalem: A Series of Twenty Photographic Views* (London: William Mackensie, c. 1862). Wet-collodion glass plate. 16 × 20 in. (40.6 × 50.8 cm). Collection Janet Lehr, New York [Not illustrated]

*Francis Galton
British, 1822–1911
Twenty-seven Members of the National Academy of Sciences. c. 1885

Illustration from "Composite Photography" in *The Century Illustrated Monthly Magazine*, vol. 33, no. 96 (1886–87), p. 754
PAGE 151



Frank Gilbreth
American, 1868–1924
Sewing machine, motion study. c. 1910

Gelatin-silver print, printed by Mike Mandel, 1988. Courtesy Mike Mandel and Purdue University Library, West Lafayette, IN



L. S. Glover
American, n.d.
The Heart of the Copper Country, Calumet, Michigan (detail). 1905

Published by Detroit Publishing Co., 1906. Gelatin-silver print. 7 × 56 9/16 in. (17.8 × 143.7 cm). The Museum of Modern Art, New York. Lois and Bruce Zenkel Fund

Frank Gohlke
American, born 1942
Aerial View, Downed Forest Near Elk Rock, Approximately Ten Miles Northwest of Mount St. Helens, Washington. 1981

Gelatin-silver print. 17 7/8 × 21 7/8 in. (45.7 × 55.8 cm). The Museum of Modern Art, New York. Purchased as the gift of Shirley C. Burden
PAGE 296

John B. Greene
American, c. 1832–1856
Ancient ruin, North Africa. 1855–56

Salt print from a paper negative. 9 1/8 × 11 7/8 in. (23.3 × 30.1 cm). The Museum of Modern Art, New York. Gift of Daniel K. Mayers
PAGE 45

Jan Groover
American, born 1943
Untitled. 1975

3 chromogenic color prints (Ektacolor). 9 × 13 1/2 in. (22.7 × 34.2 cm) each; 9 × 40 3/4 in. (22.7 × 102.5 cm) overall. Collection Robert and Joyce Menschel
PAGE 268

Yakov Guminer
Russian, 1896–1942
1917. 1927

Offset lithograph. 41 7/8 × 26 5/8 in. (106.4 × 65.1 cm). The Museum of Modern Art, New York. Gift of Alfred H. Barr, Jr.
PAGE 206

Clementina Hawarden
British, 1822–1865
Clementina Maude. c. 1863–64

Albumen-silver print from a wet-collodion glass negative. 9 × 10 11/16 in. (22.9 × 27.2 cm). Victoria and Albert Museum, London
PAGE 90

John Heartfield
German, 1891–1968
Before the War Defeats You (Bevor der Krieg euch fällt)

Back cover from *AIZ (Arbeiter Illustrierte Zeitung)*, no. 22, 1936. 14 15/16 × 10 1/2 in. (38 × 26.7 cm). International Museum of Photography at George Eastman House, Rochester, NY
PAGE 204

Robert Heinecken
American, born 1931
Costumes of a Woman. 1966

Film and paper collage. 15 × 19 in. (38.1 × 48.3 cm). The Museum of Modern Art, New York. Purchase
PAGE 286

David Octavius Hill
British, 1802–1870
Robert Adamson
British, 1821–1848
Sir David Brewster. c. 1843

Salt print from a paper negative. 7 5/8 × 5 7/16 in. (19.4 × 13.9 cm). J. Paul Getty Museum, Malibu
PAGE 31

David Octavius Hill
Robert Adamson
William Gillespie. c. 1844

Salt print from a paper negative. 6 3/8 × 4 13/16 in. (15.7 × 12.2 cm). J. Paul Getty Museum, Malibu
PAGE 42

David Octavius Hill
Robert Adamson
East Gable of the Cathedral and St. Rule's Tower, St. Andrews, Scotland. c. 1844

Salt print from a paper negative. 5 15/16 × 7 7/8 in. (14.8 × 20 cm). Collection Centre Canadien d'Architecture/Canadian Centre for Architecture, Montreal
PAGE 41

John K. Hillers
American, born Germany, 1843–1925
Santo Domingo, New Mexico. c. 1875

Albumen-silver print from a glass negative. 9 5/8 × 12 7/16 in. (19 × 24.2 cm). J. Paul Getty Museum, Malibu
PAGE 123

Lewis Hine
American, 1874–1940
Bowery Mission Bread Line. 1906

Gelatin-silver print. 7 1/2 × 9 1/2 in. (19 × 24.2 cm). The Museum of Modern Art, New York. Purchase
PAGE 170

David Hockney
British, born 1937
Stephen Spender, Mas Saint-Jerome. 1985

Collage of chromogenic color prints (Ektacolor). 21 1/2 × 17 1/2 in. (54.6 × 44.4 cm). The Museum of Modern Art, New York. The Fellows of Photography Fund
PAGE 278

Fallon Horne
British, n.d.
Youth and Age. 1855

Salt print [?] from a wet-collodion glass negative. 6 7/8 × 5 3/8 in. (17.5 × 13.6 cm) [arched top]. Royal Photographic Society, Bath, England
PAGE 94

Robert Howlett
British, 1831–1858
Stern of the "Great Eastern." 1857

Albumen-silver print from a wet-collodion glass negative. 11 1/4 × 14 3/16 in. (28.6 × 36.1 cm). Victoria and Albert Museum, London
PAGE 71, BOTTOM

Frank Hurley
Australian, 1885–1962
Shackleton Expedition, Antarctica. 1916

Gelatin-silver print. 23 15/16 × 18 3/4 in. (60.9 × 47.9 cm). The Museum of Modern Art, New York. The Fellows of Photography Fund
PAGE 148

Frances Benjamin Johnston
American, 1864–1952
Geography: Studying the Cathedral Towns. 1899–1900

From an album of 159 photographs documenting The Hampton Institute, Hampton, VA. Platinum print. 7 9/16 × 9 1/2 in. (19.2 × 24.2 cm). The Museum of Modern Art, New York. Gift of Lincoln Kirstein
PAGE 169

Gertrude Kasebier
American, 1852–1934
Baron Adolf de Meyer. 1903

Gum-bichromate print. 13 3/8 × 10 in. (34 × 25.5 cm). The Museum of Modern Art, New York. Gift of Miss Mina Turner
PAGE 173

André Kertész
American, born Austria-Hungary, 1894–1985
Montmartre. 1926

Gelatin-silver print. 6 1/8 × 8 1/16 in. (15.5 × 20.4 cm). The Museum of Modern Art, New York. Purchase
PAGE 222

Chris Killip
British, born 1946
Untitled. 1987

Gelatin-silver print. 15 7/8 × 19 7/8 in. (40.4 × 50.5 cm). Courtesy the photographer
PAGE 289

William Klein
American, born 1928
Moscow. 1959

Gelatin-silver print. 15 × 19 in. (38.1 × 48.3 cm). The Museum of Modern Art, New York. Purchase
PAGE 256

Josef Koudelka
Stateless, born Czechoslovakia, 1938
Velka Lomnica, Czechoslovakia. 1966

Gelatin-silver print. 13 × 8 3/8 in. (33 × 21.3 cm). The Museum of Modern Art, New York. Stephen R. Currier Memorial Fund
PAGE 295

Heinrich Kuhn
German, 1866–1944
The Artist's Umbrella. 1910

Gum-bichromate print. 9 1/16 × 11 5/16 in. (23 × 28.8 cm). International Museum of Photography at George Eastman House, Rochester, NY
PAGE 153

Dorothea Lange
American, 1895–1965
Migratory Cotton Picker, Eloy, Arizona. 1940

Gelatin-silver print. 10 1/2 × 13 1/2 in. (26.8 × 34.3 cm). The Museum of Modern Art, New York. Gift of the photographer
PAGE 217

Jacques Henri Lartigue
French, 1894–1986
Paris, Avenue des Acacias. 1912

Gelatin-silver print, 1962. 11 3/4 × 15 1/2 in. (29.8 × 39.4 cm). The Museum of Modern Art, New York. Gift of the photographer
PAGE 130

Gustave Le Gray
French, 1820–1862
View on the Sea: The Cloudy Sky. c. 1856

Albumen-silver print from a wet-collodion glass negative. 11 13/16 × 16 in. (30 × 40.6 cm). Trustees of The British Museum, London
PAGE 110

Gustave Le Gray
Forest of Fontainebleau. 1849 or 1852

Albumen-silver print from a wet-collodion glass negative. 10 1/8 × 14 11/16 in. (25.7 × 37.3 cm). J. Paul Getty Museum, Malibu
PAGE 59



Gustave Le Gray
The Camp at Châlons, Maneuvers of October 3, 1857.

From the album "Souvenirs du camp de Châlons." Albumen-silver print from a wet-collodion glass negative. 10 3/4 × 14 1/4 in. (27.3 × 36.2 cm). Collection Paul F. Walter

Jean-Louis Henri Le Secq
French, 1818–1882
The Violin Player, Maison des Musiciens, Rheims. c. 1851

Salt print from a paper negative. 10 11/16 × 7 9/16 in. (27.2 × 19.2 cm). J. Paul Getty Museum, Malibu
PAGE 56

Helen Levitt
American, born 1913
New York. c. 1942

Gelatin-silver print. 6 7/8 × 9 9/16 in. (17.4 × 23.3 cm). The Museum of Modern Art, New York. Gift of William H. Levitt
PAGE 229

El Lissitzky
Russian, 1890–1941
The Constructor (Self-Portrait). 1924

Gelatin-silver print. 9 5/8 × 10 1/8 in. (24.4 × 25.7 cm). Collection Steinitz Family
PAGE 176

Robert Macpherson
British, 1811–1872
Temple of Vesta and Fountain, Rome. c. 1857

Albumen-silver print from a glass negative. 10 7/16 × 15 3/16 in. (26.5 × 38.6 cm). Gernsheim Collection, Harry Ransom Humanities Research Center, University of Texas at Austin
PAGE 76, BOTTOM

Robert Macpherson
Palazzo dei Consoli, Gubbio. c. 1864

Albumen-silver print from a wet-collodion glass negative. 10 9/16 × 16 in. (26.7 × 40.6 cm). Collection Centre Canadien d'Architecture/Canadian Centre for Architecture, Montreal
PAGE 76, CENTER

Felix H. Man
German, 1893–1985
"Mussolini: What Is He Planning?"

Published in *Weekly Illustrated*, August 4, 1934, pp. 14–15; photographs originally published in *Münchner Illustrierte Presse*, March 1, 1931. The Museum of Modern Art, New York
PAGE 213

Man Ray
American, 1890–1976
Rayogram. 1923

Gelatin-silver print. 11 5/8 × 9 5/16 in. (29.5 × 23.7 cm). The Museum of Modern Art, New York. Gift of Mr. and Mrs. Alfred H. Barr, Jr.
PAGE 209

Man Ray
Sleeping Woman. 1929

Gelatin-silver print. 6 1/2 × 8 1/2 in. (16.5 × 21.6 cm). The Museum of Modern Art, New York. Gift of James Thrall Soby
PAGE 238



Etienne-Jules MAREY
French, 1830–1904
Acceleration of falling ball. 1880s[?]

Negative. 3 5/16 × 3 15/16 in. (8.4 × 10 cm). Private collection

Etienne-Jules MAREY
Horseman Riding the Mare Odette (Cavalier avec la jument Odette). c. 1887

Gelatin-silver printing-out paper print. 31 11/16 × 3 15/16 in. (80.5 × 10 cm). Private collection
PAGE 132, LEFT

Paul MARTIN
Woman raking. 1893

Platinum print. 3 × 4 1/16 in. (7.6 × 10.3 cm). Victoria and Albert Museum, London
PAGE 129, CENTER

Paul MARTIN
Woman raking. 1893

Platinum print. 3 × 4 1/16 in. (7.6 × 10.3 cm). Victoria and Albert Museum, London
PAGE 129, BOTTOM

Paul MARTIN
British, 1864–1942
Entrance to Boulogne Harbor. 1897

Platinum print. 3 7/8 × 2 11/16 in. (9.9 × 6.9 cm). Victoria and Albert Museum, London
PAGE 131, TOP

Paul MARTIN
Entrance to Boulogne Harbor. 1897

Platinum print. 2 7/8 × 3 13/16 in. (7.3 × 9.7 cm). Victoria and Albert Museum, London
PAGE 131, CENTER

Paul MARTIN
Entrance to Boulogne Harbor. 1897

Platinum print. 3 13/16 × 2 13/16 in. (9.6 × 7.1 cm). Victoria and Albert Museum, London
PAGE 131, BOTTOM

Charles MARVILLE
French, 1816–c. 1879
Rue de Choiseul, Paris. c. 1865

Albumen-silver print from a wet-collodion glass negative. 10 1/16 × 14 3/8 in. (25.5 × 36.5 cm). Musée Carnavalet, Paris
PAGE 108

Charles MARVILLE
Street Lamp (Réverbère). c. 1870

Albumen-silver print from a wet-collodion glass negative. 13 13/16 × 9 1/4 in. (35 × 23.5 cm). Bibliothèque Historique de la Ville de Paris
PAGE 70



Charles MARVILLE
Street Lamp, Parc Monceau, Paris (Réverbère, Parc Monceau). c. 1870

Albumen-silver print from a wet-collodion glass negative. 13 13/16 × 9 1/16 in. (35 × 23 cm). Bibliothèque Historique de la Ville de Paris



Charles MARVILLE
Rue Croulebarbe, Paris. c. 1865

Albumen-silver print from a wet-collodion glass negative. 9 3/4 × 14 9/16 in. (24.8 × 37 cm). Musée Carnavalet, Paris

Charles MARVILLE
Landscape: Trees along a Highway, Coblentz (Paysage: arbres bordant une route à Coblentz). 1853–54 or earlier

From *Etudes et paysages* (Lille: Blanquart-Evrard, 1853–54). Salt print from a paper negative. 9 15/16 × 13 9/16 in. (25.3 × 34.1 cm). Private collection
PAGE 60



MAUL and POLYBLANK
British, active mid-19th century
Professor Michael Faraday. 1859

From *Photographic Portraits of Living Celebrities*, vol. 1 (London: W. Kent and Co., 1859) Albumen-silver print from a glass negative. 7 3/4 × 5 3/4 in. (19.7 × 14.6 cm). The Museum of Modern Art, New York. Purchase

William Mayfield
American, n.d.
Orville and His Older Brother Rauchlin Wright at Simines Station. 1911

Gelatin-silver print. 4 11/16 × 6¾ in. (11.9 × 17.1 cm). Private collection
PAGE 155

Ray K. Metzker
American, born 1931
Untitled. 1966–67

Gelatin-silver prints. 32¼ × 34¾ in. (82 × 89.3 cm) overall. The Museum of Modern Art, New York. Purchase
PAGE 284

Edward H. Mitchell
American, n.d.
A Carload of Red Apples. 1910

Chromolithograph. 3 7/16 × 5 7/16 in. (8.7 × 13.8 cm). Private collection
PAGE 202



Tina Modotti
Italian, 1896–1942
Mother and Child. c. 1929

Gelatin-silver print. 8 15/16 × 6 1/16 in. (22.7 × 15.4 cm). The Museum of Modern Art, New York. Anonymous gift

László Moholy-Nagy
American, born Hungary, 1895–1947
The Law of Series. 1925

Gelatin-silver print from a photo collage. 8½ × 6⅜ in. (21.6 × 16.2 cm). The Museum of Modern Art, New York. Anonymous gift
PAGE 197

László Moholy-Nagy
Repose. 1924–31

Gelatin-silver print. 14½ × 10 11/16 in. (36.8 × 27.1 cm). The Museum of Modern Art, New York. Anonymous gift
PAGE 231

Daidoh Moriyama
Japanese, born 1938
Stray Dog, Misawa. 1971

Gelatin-silver print. 18⅞ × 28 in. (48 × 71.2 cm). The Museum of Modern Art, New York. Gift of the photographer
PAGE 261

James Mudd
British, 1821–1906
Clouds. 1850s [?]

Paper negative. 8 9/16 × 10 7/8 in. (21.8 × 27.7 cm). National Museum of Photography, Film and Television, Bradford, England
PAGE 52

Martin Munkacsi
American, born Hungary, 1896–1963
Vacation Fun. 1929

Gelatin-silver print. 13¼ × 10⅝ in. (33.8 × 27.1 cm). The Museum of Modern Art, New York. Purchased as the gift of Lois and Bruce Zenkel
PAGE 211

Eadweard Muybridge
British, 1830–1904
Valley of the Yosemite from Mosquito Camp. 1872

Albumen-silver print from a wet-collodion glass negative. 16 15/16 × 21 9/16 in. (43.1 × 54.8 cm). The Museum of Modern Art, New York. Gift of Paul F. Walter
PAGE 116

Eadweard Muybridge
Nude men, motion study. 1877

Plate 522 from *Animal Locomotion* (Philadelphia: University of Pennsylvania, 1877). Collotype. 19 × 24 in. (48.2 × 61 cm). The Museum of Modern Art, New York. Gift of Philadelphia Commercial Museum

Nadar (Gaspard Félix Tournachon)
French, 1820–1910
Portrait of a West Indian. 1854–59

Salt print from a wet-collodion glass negative. 9 7/8 × 7½ in. (25 × 19 cm). Musée d'Orsay, Paris
PAGE 87

Nadar
Théodore Rousseau. c. 1857

Salt print from a wet-collodion glass negative. 10¼ × 8 in. (26 × 20.3 cm). J. Paul Getty Museum, Malibu
PAGE 88



Nadar
Jean Guillaume Viennet. c. 1859

Salt print from a wet-collodion glass negative. 9 13/16 × 7½ in. (24.9 × 19 cm). J. Paul Getty Museum, Malibu

Charles Negre
French, 1820–1880
The Angel of the Resurrection on the Roof of Notre Dame, Paris. 1853

Salt print from a paper negative. 12 15/16 × 9 3/16 in. (32.9 × 23.3 cm). J. Paul Getty Museum, Malibu
PAGE 55

Charles NÈGRE
South Porch, Chartres Cathedral. c. 1856

Photogravure. 20 11/16 × 28 13/16 in. (52.5 × 73.1 cm). Private collection
PAGE 72

Charles NÈGRE
South Porch, Chartres Cathedral. c. 1856

Steel gravure plate. 23 7/16 × 31 1/2 in. (59.5 × 80 cm). Private collection.
[NOT ILLUSTRATED]

Charles NÈGRE
Fame Riding Pegasus, Sculpture by Coysevox, Tuileries Gardens, Paris. 1859

Albumen-silver print from an albumen glass negative. 17 1/2 × 13 15/16 in. (44.5 × 35.4 cm). Musée d'Orsay, Paris
PAGE 73

William NEWTON
British, 1785–1869
Birnham Beeches. 1855

From the album *Pictures of the Photographic Exchange Club,* published 1855. Salt print from a paper negative. 6 5/8 × 8 3/4 in. (16.9 × 22.2 cm). International Museum of Photography at George Eastman House, Rochester, NY
PAGE 46

Horace NICHOLLS
British, 1867–1941
For Queen and Country (Funeral of soldier, Boer War). 1899–1902

Carbon print [?]. 11 5/16 × 17 15/16 in. (28.7 × 45.5 cm). National Museum of Photography, Film and Television, Bradford, England
PAGE 149

*Nicéphore NIÉPCE
French, 1765–1833
View from His Window at La Gras. 1827

Heliograph. Gernsheim Collection, Harry Ransom Humanities Research Center, University of Texas at Austin
PAGE 24

Nicholas NIXON
American, born 1947
Tom Moran. January 1988

From a series of portraits of people with AIDS. Gelatin-silver print. 7 11/16 × 9 11/16 in. (19.5 × 24.6 cm). The Museum of Modern Art, New York. Gift of the photographer
PAGE 297

William McFarlane NOTMAN
Scottish, 1826–1891
Spruce Tree, Forty-four Feet in Circumference, Stanley Park, Vancouver. 1890–92

Albumen-silver print from a glass negative. 16 1/8 × 21 1/8 in. (41 × 53.6 cm). Musée d'Orsay, Paris. Gift of Robert Gerard
PAGE 111

Timothy H. O'SULLIVAN
American, 1840–1882
Slaughter Pen, Foot of Round Top, Gettysburg, July 1863

Plate 44 from *Gardner's Photographic Sketch Book of the War,* 2 vols. (Washington, DC: Philip and Solomons, 1866). Albumen-silver print from a glass negative. 6 3/4 × 9 in. (17.2 × 22.8 cm). The Museum of Modern Art, New York. Purchase
PAGE 113

Timothy H. O'SULLIVAN
Vermillion Creek Canyon. 1872

Plate 57 from *Photographs: Geological Explorations of the 40th Parallel, Clarence King, Geologist in Charge* (Washington, DC: Government Printing Office, 1873). Albumen-silver print from a wet-collodion glass negative. 10 5/8 × 8 in. (27 × 20.3 cm). Library of Congress, Washington, DC
PAGE 121

H. PEARSON and E. W. WADE
British, n.d.
Sandpiper's Nest. 1903

From an album of photographs of birds' nests in Norway. Gelatin-silver print. 3 3/4 × 5 3/4 in. (9.5 × 14.6 cm). The Museum of Modern Art, New York. Purchase
PAGE 141, TOP

Irving PENN
American, born 1917
Large Sleeve (Sunny Harnett), New York. 1951

Gelatin-silver print. 13 1/2 × 12 1/2 in. (34.3 × 31.8 cm). Courtesy the photographer
PAGE 193

Irving PENN
Cigarette No. 37. 1972

Platinum-palladium print. 23 7/16 × 17 15/16 in. (59.5 × 45.6 cm). The Museum of Modern Art, New York. Gilman Foundation Fund
PAGE 252

Albert PFEIFFER
German, n.d.
Musketeer Podolski. 1913–15

Collage; gelatin-silver prints mounted on collotype. 14 3/16 × 11 7/16 in. (36 × 29 cm). Fotografische Sammlung, Museum Folkwang, Essen, West Germany
PAGE 198

Eliot PORTER
American, born 1901
Trees and Pond, Near Sherborn, Massachusetts, April 1957

Dye-transfer print. 10 7/8 × 8 5/16 in. (27.6 × 21.2 cm). The Museum of Modern Art, New York. Gift of David H. McAlpin
PAGE 264

William PUMPHREY
British, 1817–1905
Norman Porch of St. Margaret's Church, Walmgate, York. 1852 or 1853

Plate 47 from *Photographic Views of York and its Environs* (York: William Pumphrey, Coney Street, 1853). Albumen-silver print from a paper negative. 6 1/2 × 8 1/2 in. (16.4 × 21.6 cm). Collection Centre Canadien d'Architecture/Canadian Centre for Architecture, Montreal
PAGE 49



Robert RAUSCHENBERG
American, born 1925
Rush 16 Cloister. 1980

Mixed media. 97 1/2 × 74 1/8 in. (247.6 × 188.2 cm). The Museum of Modern Art, New York. Fractional gift of Sheldon H. Solow

Henri-Victor Regnault
French, 1810–1878
Woods at Sèvres or Meudon. c. 1851

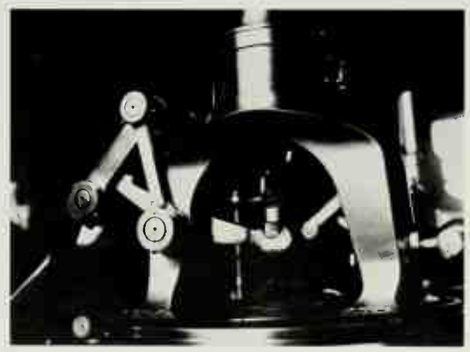
Salt print from a paper negative. 10 3/8 × 8 1/2 in. (25.8 × 21.5 cm). National Museum of Photography, Film and Television, Bradford, England
PAGE 43

Henri-Victor Regnault
The Ladder, Sèvres Porcelain Manufactory. c. 1852

Salt print from a paper negative. 11 3/16 × 8 1/8 in. (28.3 × 20.6 cm). National Museum of Photography, Film and Television, Bradford, England
PAGE 58

Oscar G. Rejlander
Swedish, 1813–1875
Untitled. c. 1857

Albumen-silver print. 6 1/4 × 8 1/16 in. (15.8 × 20.4 cm) [curved top]. Gernsheim Collection, Harry Ransom Humanities Research Center, University of Texas at Austin
PAGE 93



Albert Renger-Patzsch
German, 1897–1966
Machine detail. c. 1930

Gelatin-silver print. 6 3/4 × 9 1/16 in. (17.2 × 23 cm). The Museum of Modern Art, New York. Partial gift of David H. McAlpin by exchange

Jacob Riis
American, born Denmark, 1849–1914
In the Home of an Italian Rag-Picker, New Jersey. c. 1889

Gelatin-silver print, printed 1957. 5 × 7 in. (12.7 × 17.7 cm). The Museum of Modern Art, New York. Courtesy of the Museum of the City of New York
PAGE 186

After Jacob Riis (1849–1914)
In the Home of an Italian Rag-Picker, New Jersey. 1889–90

Photoengraving (line cut) of drawing by Kenyon Cox. Published in Jacob Riis, *How the Other Half Lives* (New York: Charles Scribner's Sons, 1890)
PAGE 187

Louis-Rémy Robert
French, 1811–1882
The Park at Saint-Cloud. c. 1853

Albumen-silver print from a paper negative. 12 5/8 × 10 1/8 in. (32.2 × 25.9 cm). Collection Paul F. Walter
PAGE 61

Henry Peach Robinson
British, 1830–1901
Sleep. 1867

Albumen-silver print from four glass negatives. 15 × 21 3/4 in. (38.1 × 55.2 cm). Royal Photographic Society, Bath, England
PAGE 95

Alexander Rodchenko
Russian, 1891–1956
Assembling for a Demonstration. 1928

Gelatin-silver print. 19 1/2 × 13 7/8 in. (29 × 23.7 cm). The Museum of Modern Art, New York. Mr. and Mrs. John Spencer Fund
PAGE 210

Judith Joy Ross
American, born 1946
Untitled, from "Easton Portraits." 1988

Gelatin-silver print. 9 5/8 × 7 3/4 in. (24.5 × 19.6 cm). The Museum of Modern Art, New York. Robert and Joyce Menschel Fund
PAGE 312

Auguste Salzmann
French, 1842–1872
Jerusalem—Helmet found in Jordan (Jerusalem, casque trouvé dans le Jourdain). 1854

Plate 77 from *Jerusalem—Photographic Study and Reproduction of the Monuments of the Holy City from the Judaic period until the Present Time* (Jérusalem—Étude et reproduction photographiques des monuments de la Ville Sainte judaïque jusqu'à nos jours. Paris: Gide et Baudry, 1856). Salt print from a paper negative. 9 × 12 3/16 in. (22.8 × 32.6 cm). Musée d'Orsay, Paris. Robien-de Bry gift
PAGE 67

Lucas Samaras
Greek, born 1936
Panorama. 1983

Collage of color instant prints (Polaroid). 33 1/16 × 9 1/16 in. (84 × 23 cm). The artist, courtesy Pace/MacGill Gallery, New York
PAGE 279

August Sander
German, 1876–1964
The Earthbound Farmer (Der erdgebundene Bauer). 1910

From the series "People of the Twentieth Century, Archetypes" (Menschen des 20. Jahrhunderts, Stammappe). Gelatin-silver print. 9 1/2 × 7 in. (24.1 × 17.7 cm). The Museum of Modern Art, New York. Gift of the photographer
PAGE 240

August Sander
Young Girl in Circus Caravan (Mädchen im Kirmeswagen). 1932

From the series "People of the Twentieth Century, Itinerants" (Menschen des 20. Jahrhunderts, Fahrendes Volk). Gelatin-silver print. 11 × 8 in. (27.9 × 20.3 cm). The Museum of Modern Art, New York. Gift of the photographer
PAGE 241



Michael Schmidt
German, born 1945
Untitled. 1985–87

From the series "Ceasefire" (Waffenruhe). 2 gelatin-silver prints. 19 7/16 × 15 7/16 in. (49.4 × 39.3 cm) each. The Museum of Modern Art, New York. Purchased as the gift of Jo Carole Lauder

Charles Sheeler
American, 1883–1965
Stairwell. 1914

Gelatin-silver print. 9 1/2 × 6 5/8 in. (24.2 × 16.8 cm). The Museum of Modern Art, New York. Gift of the photographer
PAGE 233

Cindy SHERMAN
American, born 1954
Untitled, #123. 1983

Chromogenic color print (Ektacolor). 35 3/16 × 24 3/8 in. (89.4 × 62 cm). The Museum of Modern Art, New York. Gift of Barbara and Eugene Schwartz
PAGE 277

Pierre-Charles SIMART [?]
French, 1806–1857
Untitled. c. 1856

Salt print enlarged from a wet-collodion glass negative. 12 11/16 × 17 1/16 in. (32.2 × 43.3 cm). Private collection
PAGE 63

Aaron SISKIND
American, born 1903
Uruapan, Mexico 4. 1955

Gelatin-silver print. 13 1/8 × 16 1/4 in. (33.3 × 41.3 cm). The Museum of Modern Art, New York. John Parkinson III Fund
PAGE 267

Charles Norman SLADEN
British, 1858–1949
Untitled. 1913

Page from a personal album titled "July 1913," made at Great Chebeague Island, Maine. Gelatin-silver prints with ink drawing. 12 1/2 × 21 3/8 in. (30.7 × 54.2 cm). Collection Mark Emerson
PAGE 199

W. Eugene SMITH
American, 1918–1978
"Country Doctor."

Published in *Life*, September 20, 1948, pp. 118–19. Letterpress on newsprint
PAGES 226, 227

Albert Sands SOUTHWORTH
American, 1811–1894
Josiah Johnson HAWES
American, 1808–1908
Portrait. c. 1850

Full-plate daguerreotype. 8 1/2 × 6 1/2 in. (21.6 × 16.5 cm). Metropolitan Museum of Art, New York. Gift of I. N. Phelps Stokes, Edward S. Hawes, Alice Mary Hawes, and Marian Augusta Hawes, 1937
PAGE 36



Albert Sands SOUTHWORTH
Josiah Johnson HAWES
Man in Sheraton Chair. c. 1850

Full-plate daguerreotype. 8 1/2 × 6 1/2 in. (21.6 × 16.5 cm). Metropolitan Museum of Art. Gift of Edward S. Hawes and Marian Augusta Hawes, 1939

Albert Sands SOUTHWORTH
Josiah Johnson HAWES
Rufus Choate. c. 1851

Full-plate daguerreotype. 8 1/2 × 6 1/2 in. (16.5 × 21.6 cm). Metropolitan Museum of Art, New York. Gift of I. N. Phelps Stokes, Edward S. Hawes, Alice Mary Hawes, and Marian Augusta Hawes, 1937
PAGE 38

Edward STEICHEN
American, 1879–1973
Flatiron Building. 1904, printed 1905

Gum-bichromate over platinum print. 18 3/4 × 15 1/8 in. (47.8 × 38.4 cm). Metropolitan Museum of Art, New York. Alfred Stieglitz Collection, 1933
PAGE 167

Edward STEICHEN
Flatiron Building. 1904, printed 1909

Gum-bichromate over platinum print. 18 3/4 × 15 1/8 in. (47.8 × 38.4 cm). Metropolitan Museum of Art, New York. Alfred Stieglitz Collection, 1933
PAGE 166

Edward STEICHEN
Portrait of Miss Sawyer. c. 1914

Autochrome. 6 5/8 × 4 3/4 in. (16.8 × 12 cm). The Museum of Modern Art, New York. Gift of Miss Eleanor Conway Sawyer
PAGE 162

Edward STEICHEN
The Maypole. 1932

Gelatin-silver print. 13 1/4 × 10 7/16 in. (33.7 × 26.5 cm). The Museum of Modern Art, New York. Gift of the photographer
PAGE 192

Ralph STEINER
American, 1899–1986
Ford Car. 1929

Gelatin-silver print. 7 1/2 × 9 1/2 in. (19 × 24.1 cm). The Museum of Modern Art, New York. Gift of the photographer
PAGE 180

Alfred STIEGLITZ
Flatiron Building. 1903

Photogravure on vellum. 12 7/8 × 6 5/8 in. (32.7 × 16.8 cm). The Museum of Modern Art, New York. Purchase
PAGE 164

Alfred STIEGLITZ
American, 1864–1946
Georgia O'Keeffe. 1920

Platinum print. 9 1/4 × 7 11/16 in. (23.5 × 19.4 cm). The Museum of Modern Art, New York. Gift of David H. McAlpin
PAGE 242

Alfred STIEGLITZ
Georgia O'Keeffe. 1933

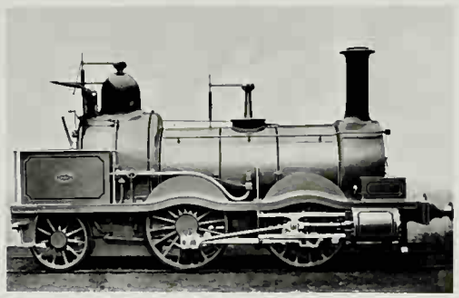
Gelatin-silver print. 9 1/2 × 7 1/2 in. (24.2 × 19.1 cm). The Museum of Modern Art, New York. Alfred Stieglitz Collection, gift of Georgia O'Keeffe
PAGE 243

William James Stillman
American, 1828–1901
Figure of Victory, Athens. 1869

From *The Acropolis of Athens* (London: F. S. Ellis, 1870). Carbon print from a wet-collodion glass negative. 9 7/16 × 7 3/16 in. (24 × 18.2 cm). The Museum of Modern Art, New York. Gift of Miss Frances Stillman
PAGE 103, BOTTOM

Paul Strand
American, 1890–1976
Akeley Motion Picture Camera. 1923

Gelatin-silver print. 9 1/2 × 7 9/16 in. (24.1 × 19.2 cm). The Museum of Modern Art, New York. Gift of the photographer
PAGE 185



John Stuart
American, n.d.
Locomotive. c. 1866

Albumen-silver print from a wet-collodion glass negative. 8 1/2 × 13 1/2 in. (21.5 × 34.2 cm). Collection Stephen White

Oskar Suck
German, 1845–1904
The Marketplace in Karlsruhe (Der Marktplatz in Karlsruhe). 1886

Albumen-silver print from a glass negative. 15 3/4 × 18 1/2 in. (40 × 47 cm). Agfa Foto-Historama im Wallraf-Richartz Museum, Museum Ludwig, Cologne
PAGE 129

Oskar Suck
The Marketplace in Karlsruhe (Der Marktplatz in Karlsruhe). 1886

Albumen-silver print from a glass negative. 6 5/8 × 8 7/16 in. (16.8 × 21.4 cm). Collection Robert Lebeck
PAGE 128

Hugo Summerville
American, 1885–1948
Gaines Fig Farm. 1926, printed 1988

Gelatin-silver print. 9 3/8 × 57 in. (23.8 × 144.8 cm). The Museum of Modern Art, New York. Purchase
PAGE 146

Thomas Sutton
British, 1819–1875
Ruined Tower, Isle of Jersey (Tour en ruine). 1854 or earlier

From *Souvenir de Jersey* (Lille: Blanquart-Evrard, 1854). Salt print from a paper negative. 11 1/2 × 7 15/16 in. (29.2 × 20.1 cm). Private collection
PAGE 48

William Henry Fox Talbot
British, 1800–1877
Leaf. 1839

Photogenic drawing (salt print from a paper negative). 3 1/4 × 6 3/8 in. (8.3 × 16.2 cm). International Museum of Photography at George Eastman House, Rochester, New York
PAGE 34

*William Henry Fox Talbot
Botanical Specimen. c. 1840

Leucotype. 6 15/16 × 4 3/8 in. (17.7 × 11 cm). J. Paul Getty Museum, Malibu
PAGE 29

William Henry Fox Talbot
Lace. 1840s

Salt print from a paper negative. 9 1/16 × 7 7/16 in. (22.9 × 18.9 cm). The Museum of Modern Art, New York. Lois and Bruce Zenkel Fund
PAGE 30, TOP

*William Henry Fox Talbot
Garden Scene at Lacock Abbey, May 2, 1840

Photogenic drawing negative. 6 13/16 × 8 3/8 in. (17.2 × 21.2 cm). J. Paul Getty Museum, Malibu
PAGE 47

William Henry Fox Talbot
Reverend Calvert Jones at Lacock Abbey. c. 1845

Salt print from a paper negative. 6 1/2 × 8 1/8 in. (16.5 × 20.6 cm). The Museum of Modern Art, New York. The Fellows of Photography Fund
PAGE 32



William Henry Fox Talbot
Wheat. Before 1852

Photoglyphic engraving (photogravure). 2 3/4 × 4 1/16 in. (7 × 10.3 cm). The Museum of Modern Art, New York. Gift of Miss M. T. Talbot

Félix Teynard
French, 1817–1892
General View of the Pylon, Temple of Sebou'ah, Nubia. 1851–52

Plate 132 from *Egypte et Nubie,* 2 vols. (Paris: Goupil et Cie, 1853–54). Salt print from a paper negative. 9 3/8 × 11 15/16 in. (23.8 × 30.4 cm). The Museum of Modern Art, New York. Gift of Paul F. Walter
PAGE 64

Shomei Tomatsu
Japanese, born 1930
Okinawan Victim of the Atomic Bomb Explosion in Hiroshima. 1969

Gelatin-silver print. 19 7/8 × 29 3/8 in. (50.5 × 74.7 cm). The Museum of Modern Art, New York. Gift of the photographer
PAGE 257

Linneaus Tripe
British, 1822–1902
Aisle on the Southside of the Puthu Mundapum, from the Western Portico, Madura, India. 1856–58

Plate 11 from *Photographic Views in Madura,* Part 2, published under the auspices of the Madras Presidency, Madras, India, 1858. Albumen-silver print from a paper negative. 13 5/16 × 11 3/8 in. (34 × 29 cm). Collection Paul F. Walter
PAGE 66

Benjamin Brecknell Turner
British, 1815–1894
Windmill at Kempsey. 1852–54

Albumen-silver print from a paper negative. 10 9/16 × 15 5/16 in. (26.7 × 38.9 cm). Victoria and Albert Museum, London
PAGE 53

Hugo VAN WERDEN
German, n.d.
Panorama of the Fried. Krupp Cast-Steel Factory, Essen (Kruppsche Gussstahlfabrik in Essen, Panorama). October 1864

8 albumen-silver prints. 19 11/16 × 127 7/8 in. (50 × 325 cm). Historical Archives Fried. Krupp, Essen, West Germany
PAGES 102, 103, TOP



Pierre-Amédée VARIN
French, 1818–1883
Eugène-Napoléon VARIN
French, b. 1831
Rheims Cathedral. 1854

Plate 21 from "Rheims and its Environs, photographs by Varin frères, 1854–55" (Rheims et ses environs, photographies par Varin frères, 1854–55). Salt print from a paper negative. 6 11/16 × 5 1/16 in. (17 × 12.8 cm). Musée d'Orsay, Paris

Adam Clark VROMAN
American, 1856–1916
Interior of (Mr.) Hooker's House, Sichimovi. 1902

Platinum print. 8 1/8 × 6 1/8 in. (20.7 × 15.6 cm). J. Paul Getty Museum, Malibu
PAGE 124



Andy WARHOL
American, 1928–1987
Marilyn Monroe. 1967

Serigraph. 36 × 36 in. (91.5 × 91.5 cm). Collection Nelson Blitz, Jr., and Catherine Woodard

*Andy WARHOL
Black and White Marilyn. 1964

Silkscreen ink on synthetic polymer paint on canvas. 10 × 16 in. (50.8 × 40.6 cm). Courtesy Douglas S. Cramer
PAGE 272

Carleton WATKINS
American, 1829–1916
Grizzly Giant, Mariposa Grove. 1861

Albumen-silver print from a wet-collodion glass negative. 20 9/16 × 15 11/16 in. (52.2 × 39.9 cm). The Museum of Modern Art, New York. The Fellows of Photography Fund
PAGE 115

Hans Johann Josef WATZEK
German, 1848–1903
Portrait. 1898

Gum-bichromate print. 13 1/2 × 8 in. (34.3 × 20.3 cm). Collection Noel and Harriette Levine
PAGE 163

Charles Leander WEED
American, 1824–1903
Mirror View of El Capitan, Yosemite Valley. c. 1864

Albumen-silver print from a wet-collodion glass negative. 20 3/8 × 15 5/8 in. (51.7 × 39.7 cm). J. Paul Getty Museum, Malibu
PAGE 119

WEEGEE (Arthur Fellig)
American, born Austria, 1899–1968
Tenement Fire, December 14, 1939

Gelatin-silver print. 10 3/4 × 13 1/4 in. (27.3 × 33.6 cm). The Museum of Modern Art, New York. Purchase
PAGE 194

*William WEGMAN
American, born 1943
Ray-O-Vac. 1973

6 gelatin-silver prints. 12 × 11 in. (30.5 × 28 cm) each; 25 × 44 in. (63.5 × 111.7 cm) overall. The Museum of Modern Art, New York. Anonymous gift
PAGE 281

*William WEGMAN
Red/Grey–Grey/Red. 1982

2 color instant prints (Polaroid). 24 × 20 in. (61 × 50.8 cm) each; 24 × 42 1/2 in. (61 × 107.9 cm) overall. Courtesy The Smorgen Family Collection of Contemporary American Art, Melbourne, Australia
PAGE 280





William WEGMAN
Fay/Ruscha. 1987

2 color instant prints (Polaroid). 24 1/4 × 21 in. (61.6 × 53.3 cm). The Museum of Modern Art, New York. Gift of the Contemporary Arts Council in honor of Mrs. Ronald S. Lauder

Edward WESTON
American, 1886–1953
Nude on Sand. 1936, printed by Cole Weston before 1975

Gelatin-silver print. 7 5/8 × 9 9/16 in. (19.4 × 24.3 cm). The Museum of Modern Art, New York. Purchased as the gift of Mrs. John D. Rockefeller 3rd
PAGE 237

Edward WESTON
Nude on Sand. 1936

Gelatin-silver print. 7 9/16 × 9 7/16 in. (19.3 × 24 cm). The Museum of Modern Art, New York. Gift of David H. McAlpin
PAGE 236

Clarence WHITE
American, 1871–1925
Spring, a Triptych. 1898

Platinum print. Center panel: 16 1/8 × 8 1/8 in. (41 × 20.7 cm); side panels: 15 × 2 3/8 in. (38.2 × 6 cm) each. The Museum of Modern Art, New York. Lily Auchincloss Fund
PAGE 158

Minor WHITE
American, 1903–1976
Rochester. 1954

Gelatin-silver print. 7 9/16 × 9 1/4 in. (18.5 × 23.6 cm). The Museum of Modern Art, New York. Gift of David H. McAlpin
PAGE 270

Garry WINOGRAND
American, 1928–1984
Circle Line Ferry, New York. 1971

Gelatin-silver print. 8 9/16 × 12 7/8 in. (21.7 × 32.7 cm). The Museum of Modern Art, New York. Gift of N. Carol Lipis
PAGE 263



Photographer unknown
French
View in the Place St. Sulpice, Paris. 1840s

Ink print from etched daguerreotype (Fizeau process). 5 1/8 × 6 7/16 in. (12.9 × 16.3 cm). The Museum of Modern Art, New York. Purchase

Photographer unknown
Portrait. c. 1850

Sixth-plate daguerreotype. 2 13/16 × 2 3/8 in. (7.2 × 5.9 cm). The Museum of Modern Art, New York. Gift of Mrs. Armand P. Bartos
PAGE 37



Photographer unknown
Portrait. c. 1850

Quarter-plate daguerreotype. 3 1/2 × 2 5/8 in. (9 × 6.6 cm). The Museum of Modern Art, New York. Benjamin Zeller Memorial Fund

Photographer unknown
French
Cow (Vache couchée). 1853

No. 38 from *Etudes photographiques*, first series (Lille: Blanquart-Evrard, 1853). Salt print from a paper negative. 5 15/16 × 7 3/8 in. (15 × 18.7 cm). Private collection
PAGE 62

*Photographer unknown
British
William Henry Fox Talbot. c. 1855

Albumen-silver print from a wet-collodion glass negative. Science Museum, London
PAGE 28

Photographer unknown
Untitled. c. 1855

Salt print from a wet-collodion glass negative [?]. 6 3/16 × 8 9/16 in. (15.7 × 21.7 cm). Private collection
PAGE 10



Photographer unknown
Portrait of a Mother and Child. 1859

Full-plate daguerreotype. 8 1/16 × 5 13/16 in. (20.5 × 14.8 cm). The Museum of Modern Art, New York. Purchase



Photographer unknown
American
Untitled. 1850s

Hand-painted salt print. 11 5/8 × 13 3/8 in. (29.5 × 34 cm). Collection Addison Thompson and Lisa Westerman



Photographer unknown
Still life. 1850s [?]

Salt print from a paper negative. 7½ × 8 3/16 in. (19 × 20.8 cm). The Museum of Modern Art, New York. The Family of Man Fund

Photographer unknown
Untitled. 1850s

Albumen-silver print from a glass negative. 4¼ × 3⅞ in. (10.7 × 9.8 cm). Collection Jan Groover and Bruce Boice
PAGE 97, TOP

Photographer unknown
American
Portraits of workers. 1862–67

2 pages of an album containing 282 carte-de-visite portraits of workers at Lyon, Shorb and Company, Pittsburgh. 12 albumen-silver prints from wet-collodion glass negatives. 4⅛ × 2½ in. (10.5 × 6.3 cm) each. Historical Society of Western Pennsylvania, Pittsburgh
PAGES 84, 85

Photographer unknown
American
Hoyer and Kuschke, No. 421 Washington Avenue, St. Louis, Mo. 1866–67

Albumen-silver print from a wet-collodion glass negative (carte-de-visite). 4 × 2½ in. (10.2 × 6.4 cm). Private collection, courtesy William L. Schaeffer
PAGE 89

Photographer unknown
American
Daguerreotype camera. 1866–67

Albumen-silver print from a wet-collodion glass negative. 3½ × 2½ in. (8.9 × 6.4 cm). Private collection, courtesy William L. Schaeffer
PAGE 39

Photographer unknown
British
Two plows. c. 1870

2 albumen-silver prints from wet-collodion glass negatives. 4½ × 7½ in. (11.4 × 19 cm) each. Institute of Agricultural History and Museum of English Rural Life, University of Reading, England
PAGE 68

Photographer unknown
American
Paper Boxes. c. 1870

From *Gallery of Arts and Manufacturers of Philadelphia* (Philadelphia: Wendroth, Taylor, and Brown, n.d.). Albumen-silver print from a wet-collodion glass negative on a letterpress mount. 7 15/16 × 6 5/16 in. (20.1 × 16 cm). Private collection, courtesy William L. Schaeffer
PAGE 105

Photographer unknown
British
Portraits of prisoners. c. 1880

12 albumen-silver prints. 2½ × 3⅜ in. (6.4 × 8.5 cm) each. National Museum of Photography, Film and Television, Bradford, England
PAGE 98



Photographer unknown
View Across the Desert from the Hypostyle of the Temple at Kôm Ombo. c. 1890

Plate 76 from Auguste Mariette, *Voyage dans la haute Egypte* vol. 2, (Paris and Leipzig: H. Welter, 1893). Photogravure. 9¾ × 7¾ in. (24.7 × 19.7 cm). Collection Centre Canadien d'Architecture/Canadian Centre for Architecture, Montreal

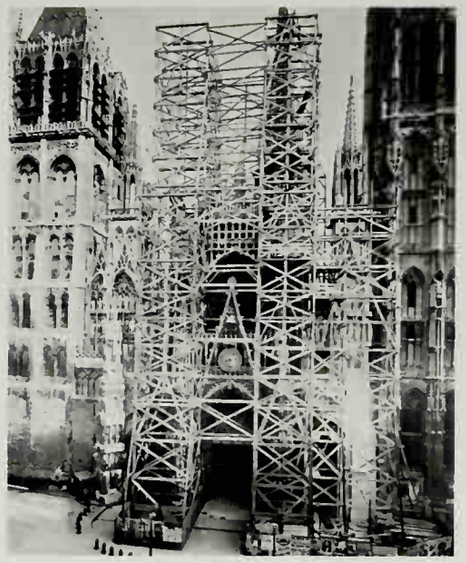
Photographer unknown
Group of Funeral Statues Associated with Osiris, Taken from the Serapeum of Apis, at Memphis-Saqqara. c. 1890

Plate 13 from Auguste Mariette, *Voyage dans la haute Egypte*, vol. 1, (Paris and Leipzig: H. Welter, 1893). Photogravure. 9¾ × 7¾ in. (24.7 × 19.7 cm). Collection Centre Canadien d'Architecture/Canadian Centre for Architecture, Montreal
PAGE 138



Photographer unknown
U.S.S. Adams in Tow by the Yorktown. 1894

Albumen-silver print. 10½ × 8¼ in. (26.7 × 21 cm). Collection Stephen White



Photographer unknown
French
Rouen Cathedral. 1890s [?]

Gelatin-silver print. 18⅝ × 15⅛ in. (47.3 × 38.5 cm). The Museum of Modern Art, New York. Purchased as the gift of David H. McAlpin

Photographer unknown
German
Worker with Locomotive Wheel Tire, Fried. Krupp Cast-Steel Factory (Arbeiter der Gussstahlfabrik Fried. Krupp mit Eisenbahnradreifen). c. 1900

Gelatin-silver print. 9⅛ × 6¹¹⁄₁₆ in. (23 × 17 cm). Historical Archives Fried. Krupp, Essen, West Germany
PAGE 143

Photographer unknown
American
Population chart
Published in *The World* [New York], September 9, 1900, p. 2

Letterpress on newsprint. 20¾ × 17¾ in. (52.8 × 45 cm). The Museum of Modern Art, New York. Purchase
PAGE 201

Photographer unknown
American
President Roosevelt's Choicest Recreation, Amid Nature's Rugged Grandeur, on Glacier Point, Yosemite. 1903 or earlier

Published by Underwood & Underwood, 1903. One-half stereograph; gelatin-silver printing-out paper print. 3⅛ × 3½ in. (8 × 9.9 cm). The Museum of Modern Art, New York
PAGE 82

Photographer unknown
German
Safety Device on a Milling Machine, Fried. Krupp Cast-Steel Factory, Essen (Schutzvorrichtung an einer Stossmaschine, Gussstahlfabrik, Essen). c. 1905

Gelatin-silver print. 9⅛ × 7⅛ in. (23 × 18 cm). Historical Archives, Fried. Krupp, Essen, West Germany
PAGE 145



Photographer unknown
German
Protective Clothing for Workers in the Furnace Room, Fried. Krupp Cast-Steel Factory, Essen (Schutzkleidung für Tiegelträger im Schmelzbau der Gussstahlfabrik, Essen). c. 1905

Gelatin-silver print. 6⅝ × 9⅞ in. (17.5 × 24 cm). Historical Archives, Fried. Krupp, Essen, West Germany

Photographer unknown
German
Last Shift of the Steam Hammer "Fritz," Fried. Krupp Cast-Steel Factory, Essen, March 4, 1911 (Letzte Schicht des Dampfhammers "Fritz"). 1911

Gelatin-silver print. 9⅛ × 11⅝ in. (23 × 29.5 cm). Historical Archives, Fried. Krupp, Essen, West Germany
PAGE 141, BOTTOM

Photographer unknown
German
Inside of the Turbine Tube, Fried. Krupp Cast-Steel Factory, Essen (Werkstück, Turbinentrommel, im Pressbau der Gussstahlfabrik). 1911

Gelatin-silver print. 8¹¹⁄₁₆ × 11 in. (22 × 28 cm). Historical Archives, Fried. Krupp, Essen, West Germany
PAGE 161

*Photographer unknown
American
"Durable Dane" and His New Manager. c. 1912

News-photo collage; gelatin-silver print. 10 × 13⅝ in. (25.4 × 34.5 cm). Courtesy Fotofolio, New York
PAGE 200



Photographer unknown
American
"Lighter than Air Machine" in Flight over Pasadena, California. 1912

Gelatin-silver print. 12¾ × 7⁹⁄₁₆ in. (32.4 × 19.2 cm). Private collection

Photographer unknown
Radiology Unit, Military Hospital, Grand Palais, Paris. 1914–16

From the album "Le Grand Palais pendant la guerre, 1914, 1915, 1916." Gelatin-silver print. 6 11/16 × 10 15/16 in. (16.9 × 27.8 cm). Collection Centre Canadien d'Architecture/Canadian Centre for Architecture, Montreal
PAGE 136

Photographer unknown
The Great Nave: Wounded Soldiers Performing Arms Drill at the End of Their Medical Treatment, Military Hospital, Grand Palais, Paris. 1914–16

From the album "Le Grand Palais pendant la guerre, 1914, 1915, 1916." Gelatin-silver print. 6 11/16 × 10 15/16 in. (21.8 × 27.9 cm). Collection Centre Canadien d'Architecture/Canadian Centre for Architecture, Montreal
PAGE 171

Photographer unknown
Laboratory of the Kryz and Lakey Metal Works, Letchworth, England. 1914–18

Gelatin-silver print. 11 3/4 × 14 11/16 in. (29.8 × 37.3 cm). Collection Centre Canadien d'Architecture/Canadian Centre for Architecture, Montreal
PAGE 144, BOTTOM

Photographer unknown
British
Aeroplane Packed for Transport. c. 1915–16

Gelatin-silver print. 8 × 11 in. (20.3 × 27.9 cm). Institute of Agricultural History and Museum of English Rural Life, University of Reading, England
PAGE 142

Photographer unknown
American
Advertisement for Westinghouse

Published in *Collier's*, July 1, 1916, p. 35. Letterpress on newsprint. The Museum of Modern Art, New York. Purchase
PAGE 196







Photographer unknown
Untitled. c. 1917

3 gelatin-silver prints. 1 1/2 × 2 3/8 in. (3.8 × 6 cm) each. Private collection

Photographer unknown
American
Coronado Beach, California. c. 1930

Gelatin-silver print. 4 1/4 × 2 3/8 in. (10.7 × 6 cm). Collection Jan Groover and Bruce Boice
PAGE 159

Photographer unknown
American
Houses at Nos. 332 and 336 Franklin Street, Elizabethport, New Jersey, May 19, 1931

From an album of 66 photographs compiled by the Real Estate Division, Central Railroad of New Jersey, 1931. Gelatin-silver print. 7 7/16 × 9 5/8 in. (18.9 × 24.4 cm). Collection Centre Canadien d'Architecture/Canadian Centre for Architecture, Montreal
PAGE 139

Photographer unknown
American
Aerial View of Lower Manhattan. c. 1934

Gelatin-silver print. 10 5/8 × 13 3/8 in. (27 × 34 cm). Private collection
PAGE 156

Photographer unknown
American
Evidence: The sash cord which was used to strangle Paula Magagna, and her shoes and socks, the only clothing found on her body.

Published in the New York *Daily News*, August 2, 1937. Gelatin-silver print. 6 3/4 × 8 1/2 in. (17.1 × 21.6 cm) [cropped]. The Museum of Modern Art, New York
PAGE 195

Photographer unknown [automatic camera]
Accident, B-17 raid over Berlin. 1944–45

5 gelatin-silver prints. 18 × 22 5/8 in. (45.7 × 55 cm) each. The Museum of Modern Art, New York
PAGES 246, 247



Photographer unknown
X-Ray with Bullet. 1917

X-ray; gelatin-silver print. 15 3/4 × 11 3/4 in. (40 × 29.8 cm). The Museum of Modern Art, New York. Gift of Paul F. Walter

Lenders to the Exhibition

Agfa Foto-Historama im Wallraf-Richartz Museum, Museum Ludwig, Cologne, West Germany

Bibliothèque Historique de la Ville de Paris

Nelson Blitz, Jr., and Catherine Woodard

The British Museum, London

Musée Carnavalet, Paris

Centre Canadien d'Architecture/Canadian Centre for Architecture, Montreal

Cornell University, Ithaca, New York

G. H. Dalsheimer Gallery, Ltd., Baltimore, Maryland

Mark Emerson

Museum Folkwang, Essen, West Germany

Lee Friedlander

Gernsheim Collection, Harry Ransom Humanities Research Center, The University of Texas at Austin

The J. Paul Getty Museum, Malibu

Jan Groover and Bruce Boice

Historical Society of Western Pennsylvania, Pittsburgh

Institute of Agricultural History and Museum of English Rural Life, University of Reading, England

International Museum of Photography at George Eastman House, Rochester, New York

Chris Killip

Fried. Krupp Archives, Essen, West Germany

Robert Lebeck

Janet Lehr, New York

Noel and Harriette Levine

The Library of Congress, Washington, D.C.

Mike Mandel

Robert and Joyce Menschel

The Metropolitan Museum of Art, New York

National Museum of Photography, Film and Television, Bradford, England

Musée d'Orsay, Paris

Pace/MacGill Gallery, New York

John Parkinson III

Irving Penn

The Royal Photographic Society, Bath, England

William Schaeffer

Steinetz Collection

Addison Thompson and Lisa Westerman

Victoria and Albert Museum, London

Paul F. Walter

Washburn Gallery, New York

Stephen White

Private lenders

Acknowledgments

All those who concern themselves with the history of photography are in debt to Beaumont Newhall. One might say that he built the shop we work in. Those of us who are also his friends are doubly fortunate, for we have had his unfailing encouragement and support.

I acknowledge also the importance to me of the ideas and the perspective of André Jammes, whose independence and wit serve so strict a conscience.

The next-to-best pleasure of this project, after that of seeing so many splendid pictures that I had not seen before, was sharing thoughts about photography with a hundred friends and colleagues, as though we were philosophers discussing the weight of angels. Joel Snyder, who *is* a philosopher, not only shared his thoughts but read much, not all, of the first draft of this book; errors that remain are surely from the parts that he did not read. I also thank him for allowing me to read his unpublished *Notes on Nineteenth Century Photographic Techniques,* which was very helpful. Peter Galassi also read much of the text; his suggestions were cogent, and, like Snyder, he cannot be held accountable for the book's failings. I am additionally grateful to Galassi for his generosity in allowing me to name my first chapter after his wonderful book *Before Photography.*

The ideas—verbal and visual—of Pierre Apraxine, James Enyeart, Ute Eskildsen, Roy Flukinger, Colin Ford, Maria Hambourg, Mark Haworth-Booth, Françoise Heilbrun, Eugenia Parry Janis, Weston Naef, Philippe Néagu, Richard Pare, Françoise Reynaud, Pam Roberts, Robert Sobieszek, and David Travis have affected this book. I am grateful for our conversations, and for both the confirmation and the challenge they have offered.

For their gracious generosity in arranging the loan of works from the collections of the institutions that they serve, I am grateful to John S. Creasey, Institute of Agricultural History and Museum of English Rural Life, University of Reading; Bodo von Dewitz, Agfa Foto-Historama im Wallraf-Richartz Museum, Museum Ludwig, Cologne; A. V. Griffiths, The British Museum, London; Donald L. Haggerty, The Historical Society of Western Pennsylvania, Pittsburgh; David Harris, Canadian Centre for Architecture, Montreal; H. Thomas Hickerson, Cornell University, Ithaca, NY; Carol Johnson, The Library of Congress, Washington, DC; Renate

Köhne-Lindenlaub, Historical Archives Fried. Krupp, Essen; and Marie de Thézy, Bibliothèque Historique de la Ville de Paris. I would not have been able to tell the story that I wanted to tell without their help.

Literally scores of people have helped with difficult research problems. I must give particular thanks to Walter Clark, Rudolph Kingslake, Hans P. Kraus, Jr., Harry H. Lunn, Jr., Eugene Ostroff, Roger Taylor, and Hellmut Wohl. At the Museum, Joan Marshall, Lisa Kurzner, and Leah Dickerman have been of indispensable help with a wide range of research problems. Susan Weiley, the editor of this book, has greatly improved its text in spite of the irrational resistance of the author, who is slow to abandon his own syntactical infelicities. Michael Hentges, the book's designer, has produced a structure that accommodates with grace a remarkably divergent set of elements and requirements. I am extraordinarily fortunate that the production of the book has been planned and supervised by Tim McDonough, assisted by Pamela Smith. I am sure that McDonough in his turn would wish to join me in thanking Robert Hennessey, who with extraordinary skill and understanding made the negatives for the two- and three-color reproductions, and Richard Benson, who collaborated in designing the complex reproduction strategy that this book embodies. In a sense the entire staff of the Department of Photography for the past half-century has contributed to this book. If one works in an institution one's thoughts are formed in part by what has been saved there, and what lost, and by the marginal notations written in an unknown hand on yellowing index cards. I hope that the sense of photography expressed here would be of some interest to those unknown collaborators.

Most of the difficult parts of this project, and some of the easy parts, have been managed by Catherine Evans. In addition to relying on her formidable organizing and diplomatic skills, I have given heavy weight to her advice on every variety of substantive question.

If this project had not been sponsored by Springs Industries another sponsor would have been sought, and might have been found. But no other would have been so satisfying to me, and I want to express my own thanks to Springs and to its chairman, Walter Y. Elisha. Springs' support of the art of photography has been a great service to all who love the medium, and this Museum is proud to have played a central role in that contribution.

J. S.

The Department of Photography

John Szarkowski, *Director*
Peter Galassi, *Curator*
Susan Kismaric, *Curator*
Catherine Evans, *Assistant Curator*
Lisa Kurzner, *Newhall Fellow*
Anthony Troncale, *Study Center Supervisor*
Marie Creste, *Executive Secretary*
Nicole Friedler, *Administrative Assistant*
Grace M. Mayer, *Steichen Archive*

Trustees of The Museum of Modern Art

William S. Paley
Chairman Emeritus

Mrs. John D. Rockefeller 3rd
President Emeritus

David Rockefeller
Chairman of the Board

Mrs. Henry Ives Cobb
Gifford Phillips
Vice Chairmen

Donald B. Marron
President

Mrs. Frank Y. Larkin
Executive Vice President

Agnes Gund
Ronald S. Lauder
Vice Presidents

John Parkinson III
Vice President and Treasurer

Frederick M. Alger III
Lily Auchincloss
Edward Larrabee Barnes
Celeste G. Bartos
Sid R. Bass
H.R.H. Prinz Franz von Bayern**
Gordon Bunshaft
Thomas S. Carroll*
Marshall S. Cogan
Robert R. Douglass
Gianluigi Gabetti
Lillian Gish**
Paul Gottlieb
Mrs. Melville Wakeman Hall
George Heard Hamilton*
Barbara Jakobson
Philip Johnson
John L. Loeb*
Mrs. John L. Marion
Robert B. Menschel
Dorothy C. Miller**
J. Irwin Miller*
S. I. Newhouse, Jr.
Philip S. Niarchos
James G. Niven
Richard E. Oldenburg
Peter G. Peterson
John Rewald**
David Rockefeller, Jr.
Rodman C. Rockefeller
Richard E. Salomon
Mrs. Wolfgang Schoenborn*
Mrs. Bertram Smith
Jerry I. Speyer
Mrs. Alfred R. Stern
Mrs. Donald B. Straus
Robert L. B. Tobin
E. Thomas Williams, Jr.
Richard S. Zeisler

**Trustee Emeritus*
***Honorary Trustee*

Ex Officio

Edward I. Koch
Mayor of the City of New York

Harrison J. Goldin
Comptroller of the City of New York

Joann K. Phillips
President of The International Council

Committee on Photography

John Parkinson III
Chairman

Robert B. Menschel
Paul F. Walter
Vice Chairmen

Arthur M. Bullowa
Mrs. Henry Ives Cobb
Anne B. Ehrenkranz
Wendy Larsen
Mrs. Ronald S. Lauder
Pierre N. Leval
Harriette Levine
Mark Levine
Beaumont Newhall*
John C. Waddell
Clark B. Winter, Jr.
Mrs. Bruce Zenkel

**Honorary Member*

Ex Officio

William S. Paley
Mrs. John D. Rockefeller 3rd
David Rockefeller
Donald B. Marron
Richard E. Oldenburg

Index of Names

Page numbers in *italics* refer to illustrations.

Abbott, Berenice (b. 1898), 219, *225*
Adams, Ansel (1902–1984), *223*, 285
Adams, Robert (b. 1937), 288, *290*
Adamson, Robert, see Hill and Adamson
Agee, James (1909–1955), 228, 287
Agnew, Thomas (1794–1891), 79, 102
Albers, Josef (1888–1976), *245*
Alberti, Leone Battista (1404–1472), 16, 18
Albright Art Gallery, 163
Alhazen (Ibn Al-Haitham) (965–c. 1040), 12
Alinari, fratelli, *122*, 187
  Leopoldo (1832–1865)
  Giuseppe (1836–1891)
  Romualdo (1830–1891),
Alvarez-Bravo, Manuel (b. 1902), *230*
Anderson, Paul L. (1880–1956), *172*
Anschütz, Ottomar (1846–1907), *133*
Anthony, E. & H. T., 125–26, 129, 144
  Anthony's Photographic Bulletin, 129, 151, 152
Arago, François Jean Dominque (1786–1853), 27, 28, 32, 33, 39, 40
Arbus, Diane (1923–1971), *260*, 285
Archer, Frederick Scott (1813–1857), 69, 71, 76
Aristotle (384–322 B.C.), 11
Arnold, Charles Dudley (1844–c. 1917), *154*
The Art Union, 51, 54
Atget, Jean-Eugène-Auguste (1856–1927), 134, 168, *234*, *235*, 262, 291
Aubry, Charles Hippolyte (1811–1877), *100*
Avedon, Richard (b. 1923), *273*

Bacon, Francis (1561–1626), 12, 13
Bacon, Roger (c. 1214–1294), 12
Bailey, Liberty Hyde (1858–1954) *135*, 141
Baldus, Edouard-Denis (1815–1882), 57, *75*, 92, *314*
Barnard, George N. (1819–1902), 112, *314*
Barney, Tina (b. 1945), *314*
Baudelaire, Charles (1821–1867), 97
Bauer, Francis (1758–1840), 32
Bauhaus (Germany), 205
Bauhaus (Chicago), 269
Bayard, Hippolyte (1801–1887), *20*, 32, 33, *33*, 37, 39, 40, 48, 57, 92, 265
Bayer, Herbert (1900–1986), *203*, 208
Bayley, R. C., 244
Beato, Felice (d. 1903),
Beaton, Cecil (1904–1980), 190
Becher, Bernhard (b. 1931), *314*
Becher, Hilla (b. 1934), *314*
Bedford, Francis (1816–1894), 76, 187
Bennett, Charles Harper (1840–1927), 125
Benson, Richard (b. 1943), *315*
Berman, Zeke (b. 1951), *283*
Bertsch, Auguste-Adolphe (d. 1871), *315*
Biot, Jean Baptiste (1774–1862), 31
Blanquart-Evrard, Louis Désiré (1802–1872), 54, 60, 64, 69, 71, 148, 177
Bourke-White, Margaret (1904–1971), 224, *224*, *315*
Brady, Mathew (1823–1896), 86, 112, 118, 291, *315*
Brandt, Bill (1904–1983), *218*, 219, 253, 254, *255*, 287
  A Night in London (1938), 287
Braque, Georges (1882–1963), 244
Brassaï (Gyula Halász) (1899–1984), 219, *221*, 287
  Paris de Nuit (Paris at Night) (1933), 287
Brewster, David (1781–1868), 31, 79
Brodovitch, Alexey (1895–1971), 253
Bruguière, Francis Joseph (1879–1945), *179*
Burgess, N. G., 83

Caffin, Charles (n.d.), 159, 160
Caillebotte, Gustave (1848–1894), 152
Callahan, Harry (b. 1912), 269, *271*, 272
Calotype Society, 44
Camera Club of New York, 159
Cameron, Julia Margaret (1815–1879), 89, *91*, 102, *316*
Canale, Antonio (Canaletto) (1697–1768), 13
Capel-Cure, Alfred (1826–1896), *51*
Caponigro, Paul (b. 1932), *274*, 288
Caravaggio, Michelangelo da (1571–1610), 18
Carjat, Etienne (1828–1906), *83*, 190
Carlyle, Thomas (1795–1881), 47, 60
Carroll, Lewis (Charles Lutwidge Dodgson) (1832–1898), 89, *92*, *96*

Cartier-Bresson, Henri (b.1908), 219, *220*, 224, 259, 287
The Decisive Moment (1952), 287
Cathcart, George (1794–1854), 103
Cézanne, Paul (1839–1906), 163, 244
Claudet, Antoine François Jean (1797–1867), 40
Clifford, Charles (1800–1863), *76*
Clifford, Jane (active 1860s), *104*
Club der Amateur-Photographen, Vienna, 159
Coburn, Alvin Langdon (1882–1966), 157, *165*, 244
Coke, Van Deren, 157
Collard, Albert (before 1838–after 1887), *99*
Collie, William (n.d.), *50*, *65*
Columbus, Christopher (1451–1506), 16
Commission des Monuments Historiques, 57
Constable, John (1776–1837), 18
Constantin, Dmitri (active 1858–1870), *317*
Copley, John Singleton (1738–1815), 109
Cornell, Joseph (1903–1972), 141
Crace, John G. (1809–1889), *317*
Crane, Stephen (1871–1900), 112
The Red Badge of Courage (1895), 112
Cumming, Robert (b. 1943), *282*
Currey, Francis Edmund (1814–1896), *79*
Curtis, Edward S. (1868–1952), 141, *317*

Da Vinci, Leonardo (1452–1519), 12
Daguerre, Louis-Jacques-Mandé (1787–1851), 24–27, *27*, 28, 30, 31–33, 35, 37, 39, 40, 48, 60, 109, 181, 182, 183
Dali, Salvador (1904–1989), 208
Dallmeyer, Thomas Ross (1859–1906), 160
Daudet, Alphonse (1840–1897), 89
Daumier, Honoré (1808–1879), 23
Davy, Sir Humphry (1778–1829), 21, 22
De Carava, Roy (b. 1925), 250
De Clercq, Louis-Constantin-Henri-François (1836–1901), *107*
De Saulcy, Louis F. Caignart (n.d.), 107
de Meyer, Adolf (1868–1946), *191*
Degas, Hilaire-Germain-Edgar (1834–1917), 132, 152, 157, *318*
Degotti, Ignace Eugène Marie (d. 1824), 25
Delacroix, Ferdinand Victor Eugène (1798–1863), 23, 54
Delamotte, Philip Henry (1820–1889), *74*, 76
Delaroche, Hippolyte Paul (1797–1856), 27, 54
della Porta, Giovanni Battista (c. 1538–1615), 12
Demachy, Robert (1859–1937), 160, 163, 168
Demeny, George (1850–1917),
Deutsche Werkbund, 205
Disdéri, André Adolphe-Eugène (1819–1889), 83
Duboscq-Soleil, Louis Jules (1817–1886), *318*
Du Camp, Maxime (1822–1894), *318*
Duchâtel, Tannegui (1803–1867), 27
Duchenne de Boulogne, Guillaume-Benjamin-Amand (1806–1875), *97*
Dumas père, Alexandre (1802–1870), 83
Durandelle, Louis-Emile (1839–1917), *101*
Dürer, Albrecht (1471–1528), 178, 181

Eastlake, Charles Lock (1793–1865), 43, 97
Eastlake, Elizabeth (1809–1893),97, 102, 107, 109, 276
Eastman Kodak Company, 148, 266
Eastman, George (1854–1932), 125, 126, 141, *144*, 151
Eder, Josef Maria (1855–1944), 14, 15, *137*
Edgerton, Harold (b. 1903), *318*
Edinburgh Photographic Society, 126
Edison, Thomas Alva (1847–1931), 35
Edwards and Son (active 1860–1885), *127*
Eggleston, William (b. 1939), *292*, 293
Eisenstadt, Alfred (b. 1898), 224
Ellis, Harry C. (1857–1928), *150*
Emerson, Peter Henry (1856–1936), *140*, 141
Emerson, Ralph Waldo (1803–1882), 47
Erfurth, Hugo (1874–1948), *174*, *175*, *319*
Ernst, Max (1891–1976), *207*, 208
Erwitt, Eliott (b. 1928), *248*
Frederick H. Evans (1853–1943), *319*
Evans, Walker (1903–1975), *214*, 215, 216, 219, 224, 228, 276, 287
American Photographs (1938), 287

Fenton, Roger (1819–1869), 43, 44, 47, 54, 76, *78*, 79, 89, 102, 103, *106*, *114*
Finsler, Hans (1891–1972), 269
Fitz, Grancel (1894–1963), *188*
Fizeau, Hippolyte L. (1819–1896), 183
Florence, Hercules (1804–1879), 33
Folkwangschule (Essen), 269
Fontcuberta, Joan (b. 1955), *294*
Fox, E. (n.d.), *80*, *81*
Fox Talbot, William Henry, see Talbot
Frank, Robert (b. 1924), 254, *258*, 259, 262, 287
The Americans (1955), 259, 262, 287
Friedlander, Lee (b. 1934), *frontis.*, *251*, 288, 291
The American Monument (1976), 288, 291
Frith, Francis (1822–1898), 71, 76, *77*, 89, 177, 187
FSA (Farm Security Administration), 212, 215, 216, 219

Galton, Francis (1822–1911), *151*
Gardner, Alexander (1821–1882), 112
Gardner's Photographic Sketch Book of the War (1866), 112

Géricault, Jean Louis A. T. (1791–1824), 23
Gernsheim, Helmut and Alison, 51, 126
Gibson, Ralph (b. 1939), 288
Gibson, William Hamilton (1850–1896), 197
Gilbert and George, 281
  Gilbert Proesch (b. 1943)
  George Passmore (b. 1942)
Gilbert, Sir John (1817–1897), 182
Gillot, Charles (n.d.), 182
Giotto (c. 1276–c. 1337), 15
Glover, L. S. (n.d.), *320*
Gohlke, Frank (b. 1942), *296*
Goodwin, Hannibal (1822–1900), 144
Goya y Lucientes, Francisco José de (1746–1828), 23
Gozzoli, Benozzo (1420–1498), 103
Gray, R. D., 129, 131
Greene, John B. (c. 1832–1856), *45*
Groover, Jan (b. 1943), *267*
Guminer, Yakov (1896–1942), *206*

Haas, Ernst (b. 1921), 266
Hardwich, T. F., 76
Hawarden, Clementina Elphinstone (1822–1865), 89, *90*
Hawthorne, Nathaniel (1804–1864), 86
Heartfield, John (Helmut Herzfelde) (1891–1968), *204*, 205
Heinecken, Robert (b. 1931), *286*
Herschel, John F. W. (1792–1871), 31, 32, 33, 39, 48
Hesler, Alexander (1823–1895), 86
Hill and Adamson, *31*, *40*, 41, *42*, 43, 48, 64, 265
  Hill, David Octavius (1802–1870), 40
  Adamson, Robert (1821–1848), 40
Hill, Reverend Levi L. (1816–1865), 265
Hillers, John K. (1843–1925), *123*
Hine, Lewis (1874–1940), 168, *170*, 172, 249
Hockney, David (b. 1937), *278*
Holmes, Oliver Wendell (1809–1894), 82
Horne, Fallon (n.d.), *94*
Horst, Horst P. (b. 1906), 190
Howlett, Robert (1831–1858), *71*, 76
Hoyningen-Huene, George (1900–1968), 190
Humphrey, S. D., 109
  Humphrey's Journal of Photography, 109
Hurley, Frank (1885–1962), *148*

Imprimerie Photographique Blanquart-Evrard à Lille, 60, 64, 148
Ingres, Jean Auguste Dominique (1780–1867), 23
The Institute of Design (Chicago), 269

Jackson, William Henry (1843–1942), 109, 118, 126, 187
Jammes, André, 48, 64, 107
Jannis, Eugenia, 48, 64, 107
Johnston, Frances Benjamin (1864–1952), 168, *169*
Julien Levy Gallery, 275

Karsh, Yousuf (b. 1908), 190
Käsebier, Gertrude (1852–1934), *173*
Kepler, Johannes (1571–1630), 13
Kertész, André (1894–1985), 211, 219, 222, 224, 276
Killip, Chris (b. 1946), 288, *289*
King, Clarence (1842–1901), 118, 120
Klein, William (b. 1928), 254, *256*, 259
Klusis, Gustav (b. 1928),
Kodak camera, 144, 151
Koudelka, Josef (b. 1938), *295*
Kühn, Heinrich (1866–1944), *153*
Kunstgewerbeschule (Zurich), 269

Lange, Dorothea (1895–1965), 216, *217*, 219
Langenheim, Frederick and William (n.d.), 109
Lartigue, Jacques Henri (1894–1986), *130*
Lawrence, Richard Hoe (1850–1936), 187
Le Gray, Gustave (1820–1862), 54. 57, *59*, 64, 69, 92, 102, 109, *110*, 141, 291, *322*
Le Secq, Jean-Louis Henri (1818–1882), 54, *56*, 57, 92
Levitt, Helen (b. 1913), *229*
Life magazine, 190, 219, 224, 228
The Linked Ring, 159
El Lissitzky (Eliezer Markovich Lissitzky) (1890–1941), *176*
The Little Galleries of the Photo-Secession, see 291 Gallery
Liverpool Photograpic Society, 76
Lorant, Stefan (b. 1901), 211, 212
Lynes, George Platt (1907–1955), 190

Macpherson, Robert (1811–1872), *76*
Maddox, Richard Leach (1816–1902), 125
Magnum Photos, 250
Man, Felix H. (Hans Baumann) (1893–1985), 212, *213*
Man Ray (Emmanuel Rudnitsky) (1890–1976), 15, 208, *209*, *238*
Manet, Edouard (1832–1883), 152
Marey, Etienne-Jules (1830–1904), 132, *132*, 134, *323*
Martin, Paul (1864–1942), 129, *129*, *131*
Marville, Charles (1816–c. 1879), *60*, *70*, 92, 102, 107-09, *108*, 134, 262, 291, *323*
Matisse, Henri (1869–1954), 244
Matter, Herbert (b. 1907), 208
Maul and Polyblank (active mid-19th century), *323*
Mayfield, William (n.d.), *155*

Mayhew, Henry (1812–1887), 89
London Labour and the London Poor (1851–64), 89
McCauley, Elizabeth Anne, 86
Mestral, O. (n.d.), 57, 92
Metzker, Ray K. (b. 1931), *284*, 285
Missions Héliographiques, 57, 64, 92
Mitchell, Edward H. (n.d.), *202*
Mo Ti (fl. 5th and 4th cent. B.C.), 11
Model, Lisette (1906–1983), 219
Modotti, Tina (1896–1942), *324*
Moholy-Nagy, László (1895–1947), 15, *197*, 208, 219, *231*, 269, 272
Malerei, Fotographie, Film (*Painting, Photography, Film*), (1925), 269
Vision in Motion (1947), 269
Moriyama, Daidoh (b. 1938), *261*
Morris, Wright (b. 1910), 228, 287
The Inhabitants (1946), 228, 287
Morse, Samuel F. B. (1791–1872), 39
Mudd, James (1821–1906), 47, *52*
Munkacsi, Martin (1896–1963), *211*
Muybridge, Eadweard (1830–1904), 109, *116*, 117, 131, 132, *132*, 134, 141,
Animal Locomotion (1887), 132

Nadar (Gaspard Félix Tournachon) (1820–1910), 86, *87*, *88*, 190, *324*
Nègre, Charles (1820–1880), 54, *55*, *72*, *73*, 92
Newhall, Beaumont (b. 1908), 82
Newhall, Nancy (1908–1974), 228, 287
Newton, William (1785–1869), *46*
Nicholls, Horace (1867–1941), *149*
Niépce, Claude (d. 1828), 22, 23, 24, 25
Niépce, Isidore (1805–1868), 26, 27
Niépce, [Joseph] Nicéphore (1765–1833), 22, 23, 24, *24*, 25, 26, 27, 28, 32, 37, 39, 182, 183
Niépce de Saint-Victor, Claude Félix Abel (1805–1870), 24
Nixon, Nicholas (b. 1947), *297*
Notman, William McFarlane (1826–1891), *111*

O'Sullivan, Timothy (1840–1882), 109, 112, *113*, 118, 120, *121*, 291

Pearson, H. and E. W. Wade, (n.d.), 141, *141*
Penn, Irving (b. 1917), *193*, 250, *252*, 253, 254
Pfeiffer, Albert (n.d.), *198*
Photo-Club de Paris, 159
Photo-Secession, 160, 168, 190
Photographic Society
Photographic Society of London (1853), 43, 44, 76, 79
Photographic Society of Great Britain (1874), 126, 159
Royal Photographic Society (1894), 43
Picasso, Pablo (1881–1973), 163, 244
Piffard, Henry G. (n.d.), 187
Poitevin, Alphonse-Louis (1819–1882), 160, 183
Porter, Eliot (b. 1901), *264*, 266, 288
"In Wildness is the Preservation of the World" (1962), 288
Potonniée, Georges, 14, 15, 25
Price, William Lake (1810–1896), 76
Ptolemy (fl. 2nd century A.D.), 16
Pumphrey, William (1817–1905), *49*

Rau, William (1855–1920), 168
Rauschenberg, Robert (b. 1925), 272, *325*
Rainer, Arnulf (b. 1929), 281
Ray, Man, see Man Ray
Reade, Joseph Bancroft (n.d.), 33
Regnault, Henri-Victor (1810–1878), *43*, *58*, 97
Rejlander, Oscar G. (1813–1875), 89, *93*
Rembrandt Harmensz van Rijn (1606–1669), 109
Remington, Frederic (1861–1909), 126
Renger-Patzsch, Albert (1897–1966), 287, *326*
Riis, Jacob (1849–1914), 168, *186*, 187, *187*, 189, 198
How the Other Half Lives (1890), 187, 189
Robert, Louis-Rémy (1811–1882), *61*, 97
Robinson, Henry Peach (1830–1901), 76, 86, 89, *95*
Rodchenko, Alexander (1891–1956), 205, *210*
Rodin, Auguste (1840–1917), 163
Ross, Judith Joy (b. 1946), *312*
Rosse, 3rd Earl of, William Parsons (1800–1867), 43
Rubens, Peter Paul (1577–1640), 18
Ruskin, John (1819–1900), 60, 118
Russell, Andrew Joseph (1830–1902), 109, 112

Salzmann, Auguste (1842–1872), *67*, 102, 103, 107
Samaras, Lucas (b. 1936), *279*, 281
Sander, August (1876–1964), 232, 239, *240*, *241*, 244, 262, 287
Schmid, William, 128
Schmidt, Michael (b. 1945), 288, *326*
Schuh, Gotthard (1897–1969), 259
Schulze, Johann (1687–1744), 14, 15
Seeberger brothers (n.d.), 168
Seiberling, Grace, 47
Senefelder, Aloys (1771–1834), 178
Sheeler, Charles (1883–1965), *233*
Sherman, Cindy (b. 1954), *277*, 281
Shew, William (1820–1903), 37
Simart, Pierre-Charles (1806–1857), *63*
Siskind, Aaron (b. 1903), *268*, 269, 272
Sladen, Charles Norman (1858–1949), 198, *199*

Smith, W. Eugene (1918–1978), 224, *226*, *227*, 228, 250
Snelling, H. H., 187
Snyder, Joel, 118
Société Héliographique, 92
Southworth and Hawes, *36*, *38*, 265, *327*
  Albert Sands Southworth (1811–1894)
  Josiah Johnson Hawes (1808–1908)
Stanford, Leland (1824–1893), 131
Steichen, Edward (1879–1973), *162*, 163, *166*, *167*, 172, 190, *192*, 244, 249, 254
Steiner, Ralph (1899–1986), *180*
Steinert, Otto (1915–1978), 269
Stieglitz, Alfred (1864–1946), 129, 151, 152, 159, 160, 163, *164*, 168, 172, 189, 215, 232, *242*, *243*, 244, 245, 272
  Camera Work, 163, 215
Stillman, William James (1828–1901), *103*, 151
Strand, Paul (1890–1976), 172, *185*, 215, 228, 244, 245, 287
  Time in New England (1950), 228, 287
Stryker, Roy E. (1893–1976), 216
Stuart, John (n.d.), *328*
Suck, Oscar (1845–1904), *128*, *129*
Summerville, Hugo (1885–1948), *146*
Sutton, Thomas (1819–1875), *48*, 71

Tabard, Maurice (1897–1984), 208
Talbot, William Henry Fox (1800–1877), 28, *29*, 30, *30*, 31, 32, *32*, 33, *34*, 35, 37, 39, 40, 43, 44, 47, *47*, 48, 51, 54, 60, 71, 109, 177, 182, 183, 184, *328*
  The Pencil of Nature (1844–46), 35, 48, 51
  Sun Pictures in Scotland (1845), 51
  Annals of the Artists of Spain (1847), 51
Taylor, Baron Isidore Justin Séverin (1789–1879), 25, 57, 215
  Voyages pittoresques et romantiques de l'ancienne France (1820–63), 25, 57, 215
Teynard, Félix (1817–1892), *64*
Tintoretto (1518–1594), 18
Titzenthaler, Waldemar (1869–1937), 168
Tomatsu, Shomei (b. 1930), *257*, 288
Toscanelli, Paolo dal Pozzo (1397–1482), 16
Tripe, Linneaus (1822–1902), *66*
Tugwell, Rexford Guy (b. 1891), 212
Turner, Benjamin Brecknell (1815–1894), *53*
291 Gallery (New York), 163, 168, 244

Ubac, Raoul (b. 1909–1985), 208

Valenta, Eduard (1857–1937), 137
van Werden, Hugo (n.d.), *102*, *103*
Varin frères, *329*
  Pierre Amédée Varin (1818–1883)
  Eugène-Napoléon Varin (b. 1831)
Velázquez, Diego Rodríguez de Silva y (1599–1660), 103
Vermeer, Jan (1632–1675), 13, 14
Vignoles, Charles (1793–1875), 76
Vitel, Louis, 27
Vkhutemas (Higher State Art-Technical Studios), 205
Vogel, Lucien, 211
Vroman, Adam Clark (1856–1916), *124*
Vu magazine, 211
Vuillard, Edouard (1868–1940), 152

Walton, Izaak (1593–1683), 13
Warhol, Andy (1928–1987), 272, *272*, *329*
Watkins, Carleton Eugene (1829–1916), 109, *115*, 117, 118, 152, 168, 262, 291
Watzek, Hans Johann Josef (1848–1903), *163*
Wedgwood, Thomas (1771–1805), 21, 23, 30
Weed, Charles Leander (1824–1903), 117, *119*
Weegee (Arthur Fellig) (1899–1968), *194*, 197
Wegman, William (b. 1943), *280*, 281, *281*, *329*
West, Benjamin (1730–1813), 103
Weston, Edward (1886–1953), 141, 232, *236*, 237, *239*, 262, 287, 291
  Fifty Photographs (1947), 287
White, Clarence (1871–1925), 157, *158*, 160, 244
White, Minor (1903–1976), *270*, 272
  Aperture, 272
Winogrand, Garry (1928–1984), 262, *263*
Winther, Hans Thøger (1786–1851), 33
Witkin Gallery (New York), 275
Wollasten, William Hyde (1766–1828), 30
Wotten, Henry (1568–1639), 13

Photograph credits

In many cases, the tritone negatives for the plates were made directly from the original prints. Transparencies and copy photographs used for the remainder of the plates and for illustrations in the text and in the checklist have been provided by the owners or the custodians of the works with the following exceptions: Gamma One Conversions, pages 66, 162, 264, 268, 277, 279; and Roberto Barrero, page 176.

Page 12, top: Rosenwald Collection, The Library of Congress, Washington, DC; page 13: Gernsheim Collection, Harry Ransom Humanities Research Center, University of Texas at Austin; page 14: The Metropolitan Museum of Art, New York; page 15: Collection Royal Society of Antiquities, Rijksprentenkabinet, Amsterdam; page 16, center: Biblioteca Ambrosiana, Milan; page 16, bottom: The British Museum, London; page 17: American Geographical Society Collection, University of Wisconsin–Milwaukee Library; page 18, top: Alinari/Art Resource; page 18, bottom: Seattle Art Museum, Samuel H. Kress Collection; page 21: The Science Museum, London; page 22, bottom: Institut National de la Propriété Industrielle, Paris; page 25, top: Musée de Bry-sur-Marne, France; page 25, bottom: Walker Art Gallery, Liverpool; page 30, bottom: The Science Museum, London; page 71, top: Gernsheim Collection, Harry Ransom Humanities Research Center, University of Texas at Austin.

continued from front flap

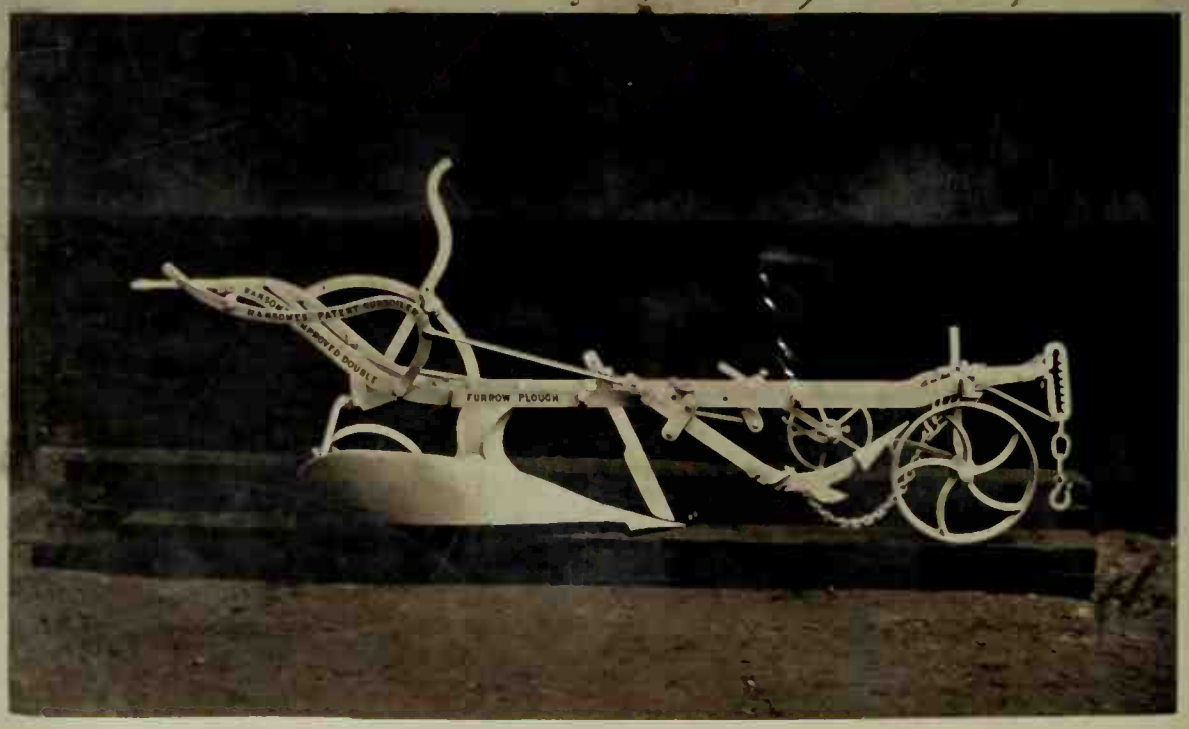
John Szarkowski has for twenty-five years been director of the Department of Photography at The Museum of Modern Art and is the author of such classic works as *The Photographer's Eye, Looking at Photographs, Irving Penn,* the four-volume *The Work of Atget* (with Maria Morris Hambourg), and *Winogrand: Figments from the Real World.* In his Foreword, Richard Oldenburg writes, "The originality of thinking that characterizes all of John Szarkowski's work makes *Photography Until Now* not a summation but a fresh departure."

The Museum of Modern Art
11 West 53 Street
New York, New York 10019

Distributed by Bulfinch Press
Little, Brown and Company · Boston · Toronto

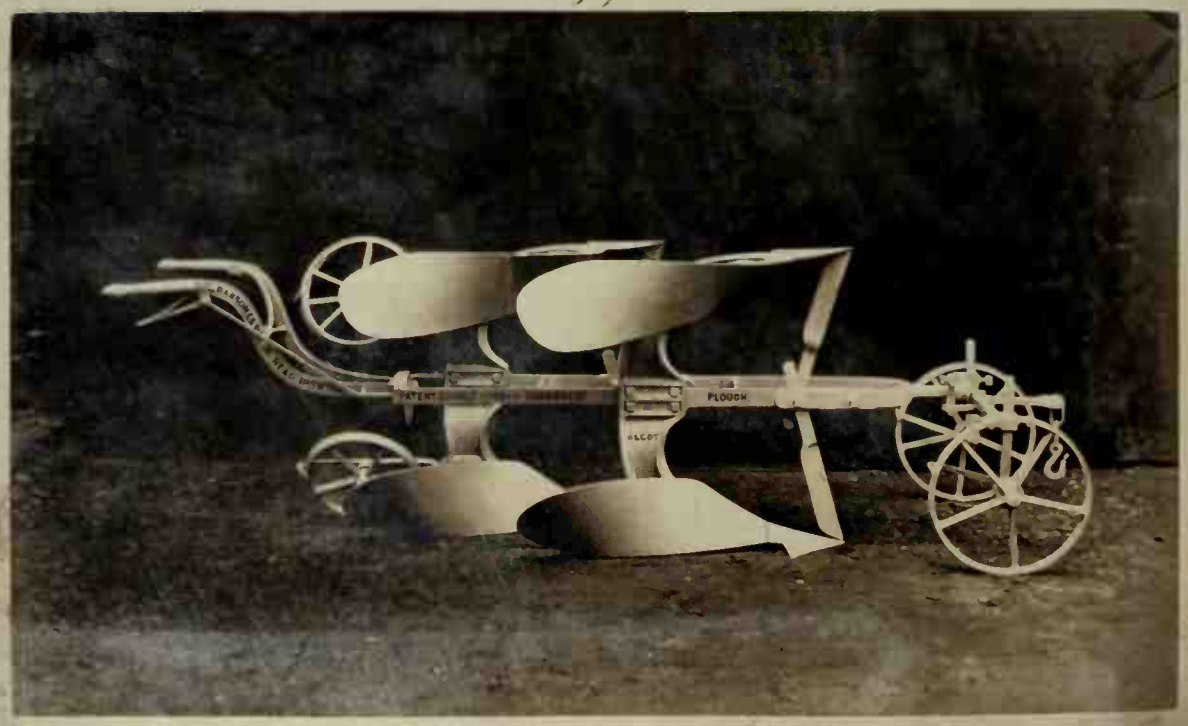
PRINTED IN THE UNITED STATES OF AMERICA

s 496. (Superseded by 524.)



R. S. D. P plough with subsoiler lifted

497.



R. L. C. D. T. plough