INTRODUCTION

THE DISCOVERY

There is in the future a possible development of this new art into one of the great elements of civilization, the handmaid of science and all the arts; there is no limit to its applications or to the usefulness.

—WILLIAM JAMES STILLMAN

The origins of photography can be traced to two significant discoveries, the first of which involved a natural optical phenomenon, identified as early as the fourth century BCE, in which light passing through a tiny hole into a dark room or chamber casts a reverse image on the opposite wall of whatever appears outside the opening. By the sixteenth century, this principle gained agency through its practical application in the camera obscura (Latin for "dark chamber"), which consists of a small box with a lens or hole through which an image can be projected onto the opposite wall and then traced. The second discovery occurred around 1717, when the German scientist Johann Heinrich Schulze proved that silver halides, or salts of silver (bromides, iodides, and chlorides), were sensitive to light and would permanently darken upon exposure. With the foundational knowledge of these two concepts, it was only a matter of time before some would-be alchemists found a way to combine them to permanently affix a projected image from nature onto a durable surface.

One of these alchemists, the English polymath William Henry Fox Talbot, had struggled to draw views with the assistance of a camera obscura during visits to Italy in 1823 and 1824 and eventually despaired of it. Then, in September 1824, his elder compatriot John Herschel (1792–1871) introduced him to the more practical camera lucida ("bright chamber"), patented by William Hyde Wollaston in 1806. Lightweight, portable, and with fewer visual distortions and a wider field of vision than its cousin, a camera lucida consists of a glass prism attached to a telescoping pole mounted above a piece of paper. The viewer sees the subject reflected through the prism and the paper simultaneously, and with a little training, the hand can trace the superimposed image onto the paper. To demonstrate its function, Herschel might have shown examples from his portfolio of drawings from his own recent trip to Italy.[1] One of these works, the panoramic cityscape *Rome from the Pincian Terrace Beyond the Villa Medici* (fig. 1), reproduces a remarkable level of detail across a cogently constructed composition with a delineated foreground, middle ground, and background. Herschel's notation of "Eye 13·0" and vertical and horizontal markings memorialize his use of the optical device whose verisimilitude would be

FIGURE 1

John Herschel, *Rome from the Pincian Terrace Beyond the Villa Medici*, August 8, 1824. Pencil on paper, 7⅞ × 12¼ in. (20.1 × 30.9 cm). McGuigan Collection.

surpassed only by photography. Herschel not only possessed one of the greatest scientific minds of his era and was deeply learned in optics and chemistry, but he also was adept with and devoted to the camera lucida.

This consequential meeting between the two English inventors stimulated the younger man's pioneering optical research and, as the photography historian Larry J. Schaaf commented, "established a friendship and a scientific collaboration crucial to Talbot's later success."[2] Talbot periodically grappled with the camera lucida over the next nine years until October 1833, when he was again in Italy, this time on his honeymoon in the picturesque village of Bellagio on Lake Como. There he finally admitted that—even with a mechanical aid—he was a deplorable draftsman. But he did not allow his shortcomings to defeat him; rather, he was inspired to devise new solutions to record visual phenomena with accuracy and ease. He pondered, "how charming it would be if it were possible to cause these natural images to imprint themselves durably, and remain fixed upon the paper!" Engrossed by this thought, he remembered, "I was then a wanderer in classic Italy, and, of course, unable to commence an inquiry of so much difficulty: but, lest the thought should again escape me between that time and my return to England, I made a careful note of it in writing, and also of such experiments as I thought would be most likely to realize it, if it were possible."[3]

Back home at Lacock Abbey in the county of Wiltshire, Talbot initiated his studies and named his earliest efforts "photogenic drawings" (Greek for "produced by light"). He began by soaking paper in salt water, then brushing one side with silver nitrate, to make salted paper. He took these sheets, placed botanical specimens and textile fragments on them, encased them between glass plates, and put them in the sun. While neither salt nor silver nitrate is photosensitive on its own, when combined they form silver chloride, with the result that the background darkened while the areas on which the objects had been laid appeared lighter. He stabilized these images in a salt bath (either potassium iodide or sodium chloride) but was unable to permanently fix them.[4]

Talbot graduated to placing his salted papers into several purpose-built camera obscuras (hereafter referred to as cameras) to photograph architecture and still lifes at Lacock Abbey. As all his photogenic drawings were negatives, he simply made negatives of his negatives in order to make positives. Although these early attempts were rudimentary and impermanent, Talbot nevertheless had discovered the means of producing photographs on paper. Aware of the implications for natural science, he sent thirty-six examples of his work to his friend and fellow botanist, Antonio Bertoloni, in Bologna, Italy, in 1839–40. These works, preserved today in the *Album di Disegni Fotogenici* at the Metropolitan Museum of Art, were some of the very first photographs to reach the Italian peninsula and were discussed widely in the press.

Talbot eventually presented his findings to the Royal Society on January 31, 1839, in order to claim credit for the invention of photography. But he was too late, as that honor had gone three weeks earlier to Louis-Jacques-Mandé Daguerre, a French painter, stage designer, and inventor of the diorama theater, a precursor to modern cinema. The complicated history of Daguerre's eponymous invention actually begins with his compatriot Joseph Nicéphore Niépce, who experimented with paper treated with light-sensitive chemicals in conjunction with a camera obscura as early as 1816. Around 1827, Niépce invented heliography (Greek for "sun writing"), using pewter plates coated with bitumen, resulting in the very first photographs. He improved upon this by switching to copper plates coated with burnished silver, then treating them with iodine vapor to fix them. In order to refine and market his invention, he entered into partnership with the impresario Daguerre in 1829.

It was only after Niépce's premature death in 1833 that Daguerre perfected their process by designing a better camera, employing a more sophisticated lens, and developing the plates with fumes of mercury, which made them more durable and appreciably sharper in appearance. Daguerre revealed his invention to the world in Paris on January 7, 1839, and demonstrated it before a joint session of the Académie des Sciences and the Académie des Beaux-Arts that August. The French government granted Daguerre a lifetime pension for sharing his discovery,[5] prompting the renowned French chemist Louis Joseph Gay-Lussac to declare, "It is the beginning of a new art in an old civilization; it will constitute a new era and secure for us a title to glory."[6]