

MILESTONES IN OPHTHALMIC IMAGING



Timothy J Bennett, CRA, OCT-C, FOPS

*Milton S. Hershey Medical Center
Penn State Eye Center
500 University Drive, Suite 800
Hershey, PA 17033
717/531-5516
tbennett1@pennstatehealth.psu.edu*

Solving the Puzzle of History

This year marks the 50th Anniversary of the Ophthalmic Photographers' Society. As we pause to celebrate this occasion and reflect on the rich history of our organization, it also gives us an opportunity to take a closer look at the historical milestones that preceded the founding of our society. Welcome to *Milestones in Ophthalmic Imaging*, a new feature in the *Journal of Ophthalmic Photography* that will explore the history and evolution of ophthalmic imaging from the earliest days of photography through the development of retinal angiography and beyond. This recurring series will allow us to explore some fascinating material uncovered while researching the origins of photography and ophthalmic photography for a history symposium co-sponsored by the Ophthalmic Photographers' Society and the American Academy of Ophthalmology.

While searching for historical accounts and references, it quickly became obvious that reconstructing history is somewhat like completing a puzzle. Professional historians traditionally have had access to original source documents to support their historical research. Thanks to digital technology, many of these obscure resources are now publicly available through advanced search engines and extensive online collections of scanned historical journals and documents. New pieces

of the historical puzzle often become apparent when you can access these primary documents. The accounts in this series benefit from the availability of newly digitized documents, many of which were originally published over 100 years ago. The Internet Archives, Project Gutenberg, and Google Books provide access to digitized, publicly accessible books, periodicals, and journals that are now in the public domain by virtue of their age and expiration of copyright (Figures 1-4).

Unfortunately, there are still some missing pieces of the puzzle. The available literature sometimes contains conflicting information or apparent mistakes between different historical accounts. Some publications have also proven to be difficult to locate, either online or in print. These hard to find references were often published in the decades (1960's and 70's) just prior to routine digital

publication and may not yet be eligible for inclusion in public domain collections. In piecing this puzzle together, I found that it pays to read all referenced documents that historians have cited rather than rely on a citation of a "fact" actually being accurate. Mistakes are sometimes made and then blindly repeated or misinterpreted in subsequent accounts. For example, a non-existent reference title on the origins of fundus photography was accidentally published in multiple histori-



Figure 1: *The Pencil of Nature* is the first collection of photographic works published in book form by Fox Talbot in 1844. The photographs were printed separately and then mounted or "tipped in". Talbot claimed that his photographic process preceded that of Daguerre's in 1839. A digitized version of this book is available through Project Gutenberg.

cal reviews. Listed as “Barr E.: Drs. Jackman & Webster, Philadelphia Photographer June 5, 1886”, it combined fragments of two separate references and was most likely an author’s note to search for them both.^{1,2} After searching the online archives, I was able to confirm that the combined title doesn’t exist, yet more than one author

included it in their reference list.^{3,4} The authors may have also been confused because of a typographical error that appeared in multiple references. Elmer Barr was listed as author of an 1887 paper in the *American Journal of Ophthalmology*, as well as another article in the *Scientific American Supplement* from 1888.^{1,5} Both of these articles

describe the successful capture of a human fundus photo with more recognizable features than previous investigators. The author’s real name was Elmer Starr, but the typographical error was repeated several times causing an early pioneer in fundus photography to fade into obscurity and lose his rightful place in history. Being able to detect these mistakes and correct the historical record of our profession has been fascinating.

In piecing these puzzles together, a recurring theme soon became apparent. Photography was born in the Victorian Era, a time of great discovery, invention, and advancement in science and medicine. The Victorian Era roughly coincided with the Belle Epoch in Continental Europe and the Gilded Age in the United States. It was during this period that Darwin, Babbage, Pasteur, Maxwell, Morse, Helmholtz, and many others made important advancements in science, medicine and technology. As you will see in future installments of this series, it was also a time of fierce competition, rivalry and controversy. The brilliant minds of the day often had egos to match their great intellect. The race to be listed as the “first” to discover a scientific breakthrough could become an obsession. Eponyms were popular, and just about every important new discovery was named for the person that first described it.

A classic example of this competition and controversy occurred in a feud over the discovery of anesthesia in the 1840’s when American dentist Horace Wells and his former apprentice William Morton both claimed to be the first to discover the use of inhaled anesthesia. Wells had successfully used anesthesia on several occasions, but was discredited after a famously failed public demonstration. Humiliated after this one failure, he became deeply depressed, began abusing chloroform, and eventually committed suicide. Morton didn’t fare much better. He remained obsessed with recognition throughout his life. He tried to patent ether under a different name, and eventually died penniless. The American Dental Association honored Wells posthumously in 1864 as the discoverer of modern anesthesia and the American Medical Association recognized his achievement in 1870. Morton was similarly



Figure 2: Advertisements in *The Philadelphia Photographer* from June, 1886. Jackman and Webster’s landmark article on the first successful fundus photograph is included in this issue of the photographic periodical. It can be accessed and downloaded from the Internet Archives.

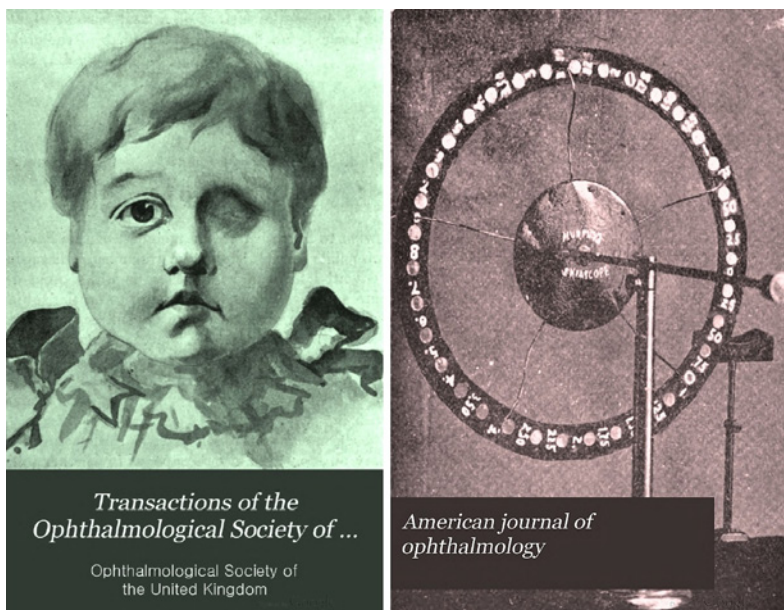


Figure 3: Covers from vintage journals accessed through Google Books. The 1894 *Transactions of the Ophthalmological Society of the United Kingdom* includes a paper on fundus photography by one of the early pioneers, Lucien Howe. *The American Journal of Ophthalmology* from 1899 includes a description of Thorner’s reflex-free ophthalmoscope. Thorner and others soon adopted the same optical design to build improved fundus cameras.



Figure 4: *Die Photographie des Augenhintergrundes* by Friedrich Dimmer is an atlas of fundus photographs published in 1907. It contains several amazing reflex-free photographs taken with a one-of-a-kind camera of Dimmer's own design. This book represents a major milestone in ophthalmic photography. It was digitized by The Internet Archives in 2011 with funding from Open Knowledge Commons and Harvard Medical School.

recognized later in life and again posthumously. Both were instrumental in this major medical advancement, but their egos prevented them from sharing in recognition of their achievement.

Communication of an important discovery also plays into historical recognition. William Henry Fox Talbot may have been the first to develop a photographic process, but Jacques Mande Daguerre was the first to communicate his success and is credited with having invented photography. Similarly, Charles Babbage is believed to be the first to construct an ophthalmoscope in 1847, but failed to publicize his invention after a physician he showed it to dismissed it without recognizing its potential.⁶ Hermann von Helmholtz published a monograph which described his ophthalmoscope four years later in 1851 and is recognized for revolutionizing ophthalmology (Figure 5).^{7,8} Several historians opine that had Babbage persisted in refining his design or sharing it with other physicians that might have recognized its great value, he would be honored for inventing the first ophthalmoscope rather than Helmholtz.⁹⁻¹³

Although he missed his place in ophthalmic history, Babbage was responsible for several notable technical innovations including his design of the calculating engine which is the forerunner of the modern computer. A contemporary of Talbot, Daguerre, Herschel, Brewster and several other notable inventors, he was the subject of the first known stereo portrait in 1841 by Henry Collen and Charles Wheatstone.¹⁴ The social connections and competition between these Victorian polymaths created a fertile environment for the development of numerous scientific and technological advancements. Some were physicians or ophthalmologists, while others were "Gentleman Scientists" wealthy enough to pursue their personal interests in science and technology. Several of



Figure 5: Herman von Helmholtz revolutionized the field of ophthalmology in 1851 with the introduction of this ophthalmoscope, allowing the first practical view of the ocular fundus. Although Charles Babbage designed a similar device four years earlier, it was incorrectly dismissed as ineffective and never shared with the medical community. Image courtesy of Chris Barry, CRA, FOPS and Professor Ian McAllister.

them made a great impact on the history of our profession. The next few episodes in this series will explore similar relationships, rivalries, feuds and debate surrounding several important milestones in the evolution of ophthalmic imaging:

The Priority Debate will take a look at the frantic race for recognition as the inventor of photography between Daguerre, Talbot, and others in 1839.

Stereo Photography examines the nineteenth century development of the stereoscope and competing theories on stereo vision that resulted in a bitter feud between Wheatstone and Brewster.

The First Human Fundus Photograph will explore several controversies and professional rivalries in the early days of fundus photography, including how Elmer Starr lost his place in history, as well as another rivalry that led to accusations of falsifying photographic results.

From there, *Milestones in Ophthalmic Imaging* will continue to explore the evolution of ophthalmic imaging by taking a look back at important individuals and events that shaped our field – and hopefully fill in a few more pieces of the historical puzzle that represents the legacy of our profession.

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