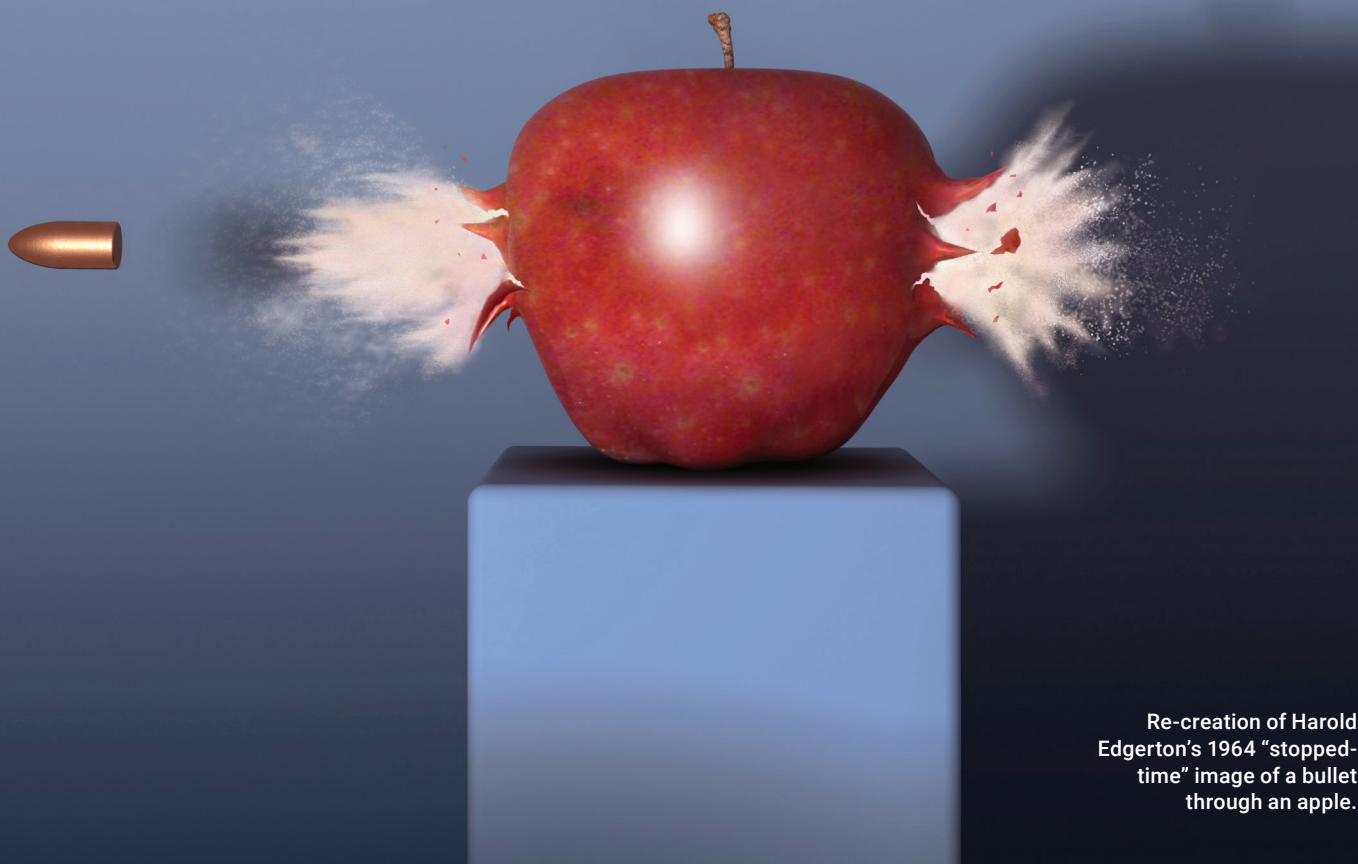




Re-creation of Harold Edgerton's 1964 "stopped-time" image of a bullet through an apple.

estt / Getty Images

LIGHT TOUCH

A Frozen Moment of Motion

Stephen R. Wilk tells the story of how William Henry Fox Talbot's markedly unremarkable photograph may have been the first demonstration of strobe photography.

British scientist and inventor William Henry Fox Talbot is one of the world's underappreciated polymaths. He was a pioneer in spectroscopy, deciphered cuneiform, discovered the Talbot effect and invented the calotype method of photography, which supplanted the daguerreotype process. In addition to these many and varied accomplishments, Talbot also took what is arguably the world's first strobe photograph.

Freezing motion

On 14 June 1851, Talbot conducted an experiment in a basement laboratory at the Royal Institution of Great Britain. He pinned a printed sheet to a disc, which was

set to rotate very rapidly in a completely darkened room. Talbot had a camera pointed at the spinning disc with no shutter or cap on and illuminated the disc with a single bright spark from a spark gap powered by a battery of Leyden jars. When the image was developed, it showed the printed page frozen in mid-spin, as if it were not rotating at all. He wrote of the results to fellow scientist Michael Faraday the next day and, on 19 June, presented his results in a report to the Royal Society entitled "Note on Instantaneous Photographic Images." Talbot remarked that he was unaware of any such previous experiment.

Talbot's report was reprinted in numerous other publications and was translated into French in the *Comptes Rendus*.

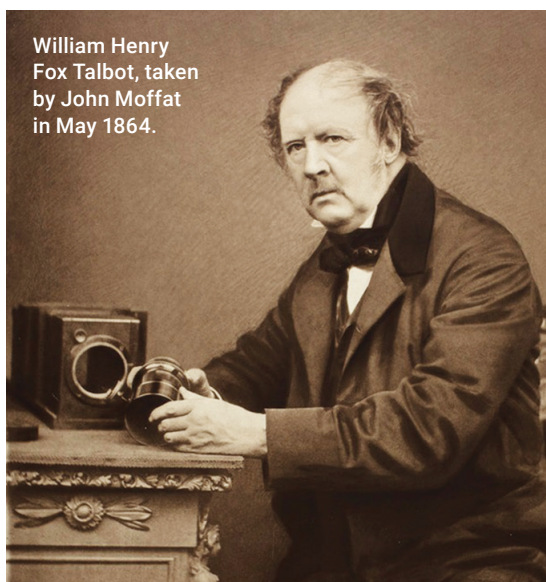
Talbot repeatedly called for the use of the principle but apparently never replicated the experiment himself, and no one else seems to have taken up the idea for many years. The next demonstrations came when Lord Rayleigh photographed water jets and droplets in 1891, Charles Vernon Boys photographed bullets in flight using “instantaneous illumination” from a spark in 1893, and Arthur Mason Worthington photographed splashing drops in 1894—40 years or more after Talbot’s first photograph.

Sadly, Talbot’s original photograph has vanished, and not even a reproduction remains. Why did his work, despite the interest it generated, disappear so soon, and why wasn’t it repeated?

A spark of doubt

To start with, Talbot’s contribution was his photographic process. In 1833, Talbot saw a demonstration given by Faraday and scientist and inventor Charles Wheatstone of the light from the spark gap and how it could “freeze” motion, using a rapidly rotating disc with painted sectors. At that early date, it got him thinking about the possibilities of using the technique to “stop time” and observe phenomena in a new way, and he may have even used the same equipment in his own experiment 18 years later, according to Larry J. Schaaf, leader of The Talbot Project.

However, Talbot was reportedly concerned about whether there would be enough light, and this worry persisted after his initial experiment. One would think that his successful demonstration in 1851 would prove to Talbot the feasibility of the method, but his insecurity



William Henry Fox Talbot, taken by John Moffat in May 1864.

George Eastman Museum, gift of Mrs. Alden Scott Boyer

Talbot had effectively invented and demonstrated flash photography long before it was practically used.

about its reproducibility has been proposed as a reason for the lack of further development.

Some have also suggested that the photograph did not produce useful results. It demonstrated, as Talbot himself observed, that “a truly instantaneous photographic representation of an object” in motion could be taken. But the photograph of that printed page revealed nothing new and gave no new physical insight into phenomena. A photograph of the non-rotating printed page would look the same.

Toward flash photography

Talbot’s experiment also opened the door to another possible application. The earliest photographs required

long exposures, up to half an hour in length. Talbot’s 1851 experiment not only demonstrated that motion could be frozen in time; it also showed that photographs of unmoving objects could be taken in a fraction of the time that had previously been required. Talbot had effectively invented and demonstrated flash photography long before it was practically used. Talbot apparently realized the potential of such a technique, which transformed practical photography in the 1860s, when magnetism flash

devices were first used. But, as with his work on strobe photography, he didn’t pursue spark-gap illumination for this purpose, either.

In 1931, Harold E. “Doc” Edgerton invented the xenon strobe light and used its brief, bright light to take “stopped-time” images. The system, which was relatively simple to use, could be deployed rapidly over and over. This allowed Edgerton to conduct experiments with much greater ease and versatility than his 19th-century predecessors. It’s significant, though, that his most famous and heavily reproduced images—a drop of milk caught in mid-splash, a rifle bullet cutting a playing card in half (or going through an apple or a bar of soap), or the droplets in a stream of water—were the very same ones used by Rayleigh, Boys and Worthington. Not found among his oeuvre is a stopped image of a printed page on a rotating disc. **OPN**

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