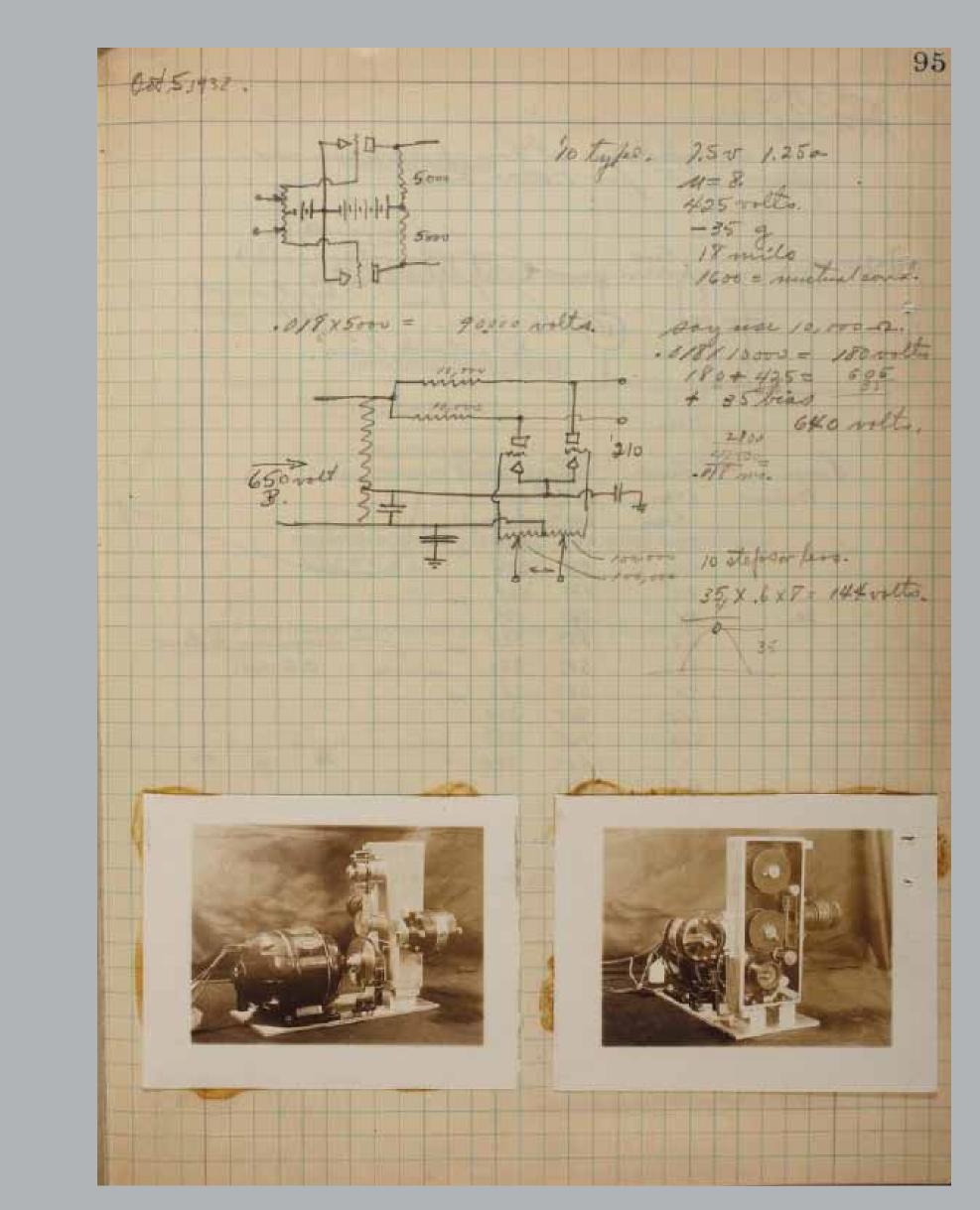
There is no end to this type of work when you are looking at things that happen so fast that you can't see them."

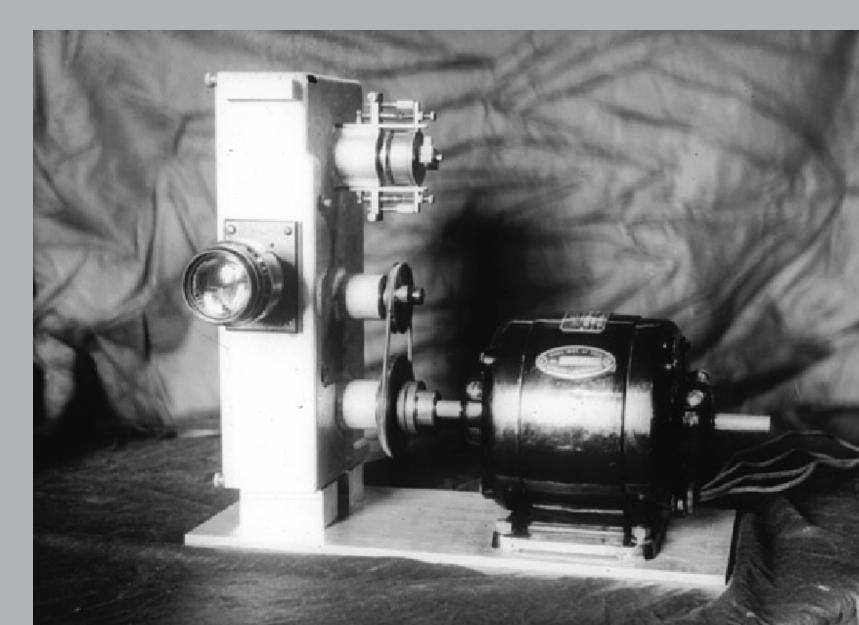
Harold "Doc" Edgerton's Seeing the Unseen amazed audiences across the United States. But how did an electrical engineer from MIT get involved in filming milk drops and hummingbirds? Edgerton became interested in high-speed film as a tool for diagnosing problems with motors.

New Tools, New Ways of Seeing

Engineer at Work



October 5, 1932 notebook page describing Edgerton's motion picture camera development.



High-speed camera. Notice the large motor on the right, for pulling the film through rapidly.

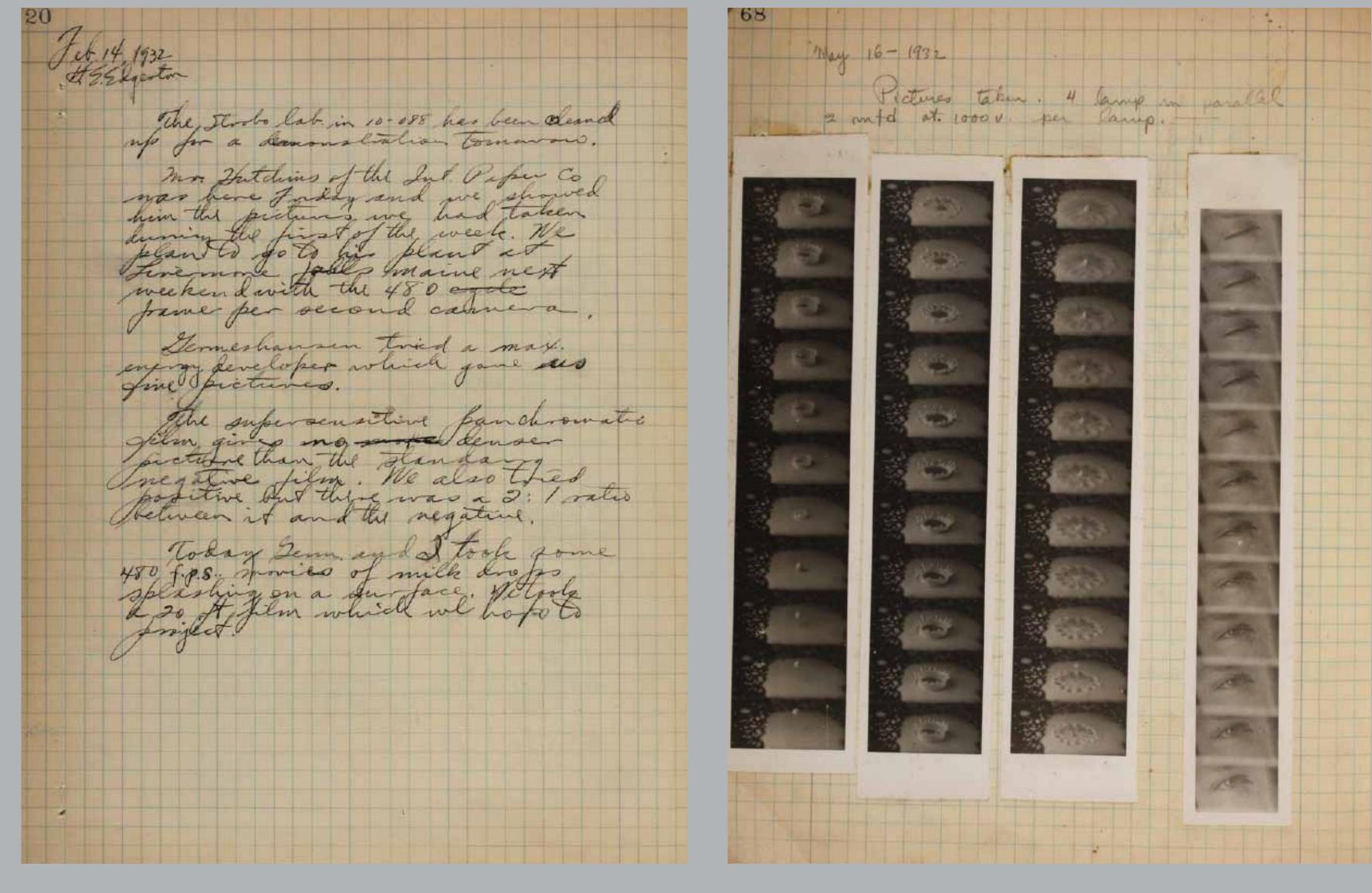
In 1930, "high-speed" film meant about 240 frames per second (or 10 times faster than normal), but this was much too slow for Edgerton.

Instead of trying to make a faster mechanical shutter, Edgerton removed the shutter and used the flashes of his stroboscope—burst after burst of exceptionally bright light —to expose the film. By adding special motors to the camera, Edgerton could whip the film through at tremendous speeds.

His very first films were shot at 480 frames per second, but he soon developed cameras that shot at 1,000, then 2,000, and then 4,000 frames per second. The maximum speed of film through the camera approached 200 miles per hour.

Edgerton released his first high-speed film—of motors—in 1931 at a convention of the American Institute of Electrical Engineers.

Engineer at Play



Edgerton's notebooks attest to his desire to combine work and play. February 14, 1932.

Edgerton recorded two of his most famous subjects—the milk drop and winking eye—on May 16, 1932. "How quick is a wink?" asked Edgerton. "Ultrahigh-speed motion-pictures supply the answer: about 1/40 of a second."

The synchronization of speed and light in Edgerton's motion picture cameras was considered a technical triumph. Though Edgerton developed his tools and techniques for scientific and industrial applications, he also enjoyed filming more everyday subjects, from milk drops to eyelids.

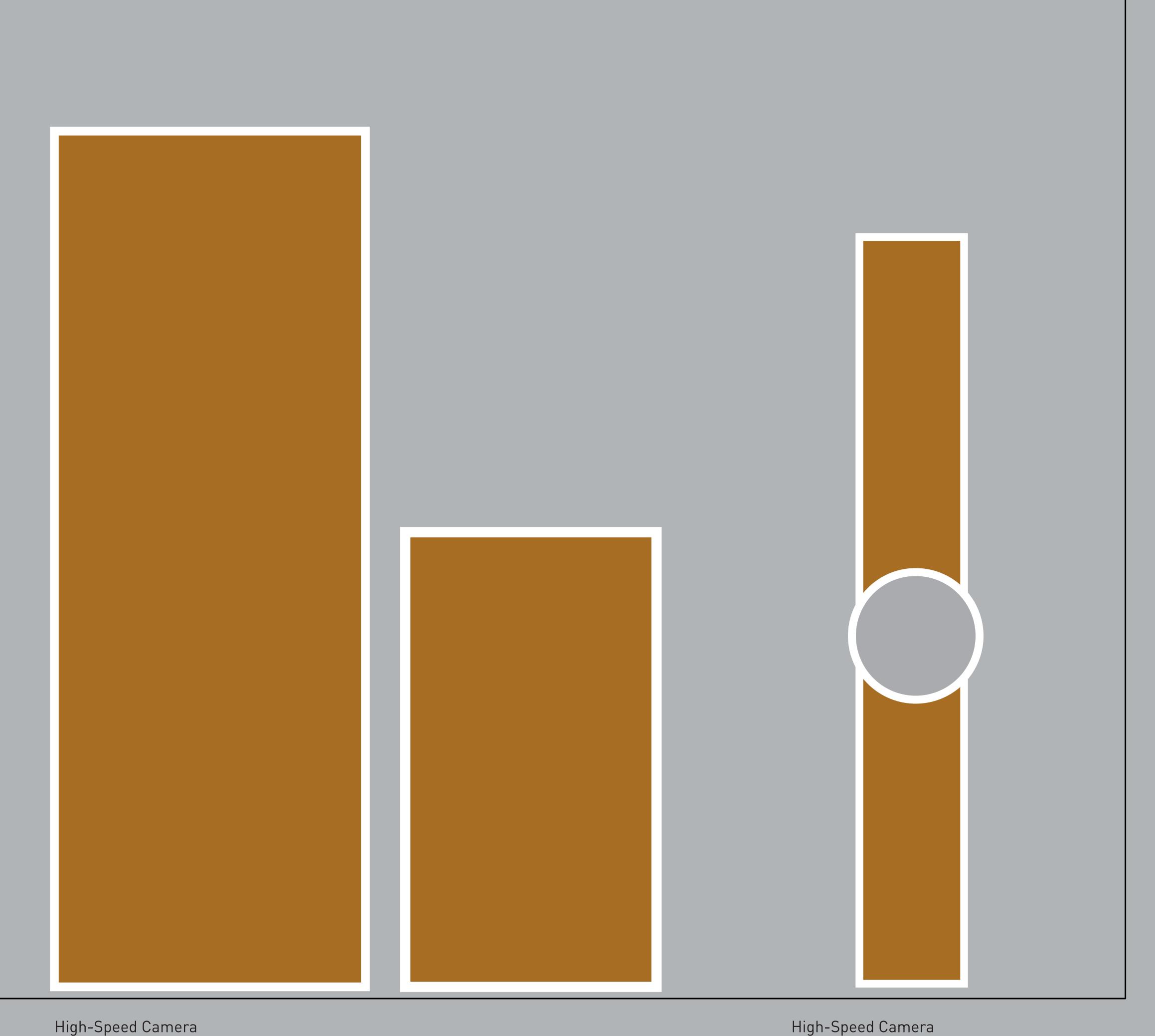


Indoor and outdoor setups for photographing hummingbirds.



In this high-speed photograph, a hummingbird looks motionless despite a wing speed of about 65 beats per second.





Modified by Harold Edgerton about 1939 (based on 1935 design)

Edgerton got the idea for his continuously moving This high-speed camera was used in filming film camera in 1935. A special motor had to be Quicker 'n a Wink. attached to rush the film past the lens while the



Ernemann-Werke AG, modified by Harold Edgerton

strobe light flashed.

Pete Smith (left), director of *Quicker 'n a Wink*, and Harold Edgerton (right) in a high-speed photograph, as an egg yolk is scattered by moving fan blades

Seeing the Unseen caught the attention of Hollywood's MGM Studios. In 1939, they collaborated with Doc to produce Quicker 'n a Wink. The film won an Academy Award for Best Short Subject in 1941 and made Edgerton's high-speed work world famous.

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