



The Horse in Motion by Eadweard Muybridge, 19 June 1878.

UNFREEZING TIME

Patricia Fara*

Once it has wound down, an old-fashioned clock is fleetingly right twice in every 24 hours. Even when fully functioning, it is only correct intermittently: whereas its minute hands jerk forward at discrete intervals, time itself marches smoothly on without interruption. However fine-tuned the clock's components, its intermittent tick-tock action precludes continuity.

This is a familiar problem for horologists, but the eighteenth-century artist George Stubbs encountered it from the opposite direction. In order to convey the impression of a horse galloping across the canvas, he tried to freeze its fluid movement into a stationary image. But horses run so fast that human eyes are incapable of keeping up, and nobody knew whether they put down their hooves simultaneously or in turn, one after the other. Perhaps ancient cave-painters had been right to show them stretching all four legs out horizontally, almost as if they were flying parallel to the ground? Stubbs's paintings were

so realistic that he set the fashion for his successors, who imitated him by depicting horses in full flight with all four legs in the air at once and the back hooves turned upwards.

The quandary was finally resolved in 1878, when Eadweard Muybridge devised an ingenious method for photographing animals in motion. Born in England as Edward Muggerridge, he mostly lived in the United States and altered his name to make it sound both archaic and exotic. By then, he was suffering from the lasting effects of a stagecoach crash in Texas, when the severe injuries to his head precipitated such a marked personality change that he was acquitted of murder after killing his wife's lover.

Renouncing his sedate career as a book seller, Muybridge followed his doctor's recommendation of a change by dedicating himself to the relatively new field of photography. As if oblivious to the physical dangers of exceptionally high vantage-points, he took stunning wilderness pictures of

California and Alaska that rapidly established his reputation. He invented new camera processes, and also developed an imaginative technique for converting continuous vision into a deceptive impression of simultaneity.

Muybridge transferred his attention to urban landscapes, climbing up to the topmost turret of a tall building on San Francisco's Nob Hill. If you stand at a very high point, such as a clock tower, you may well be able to see the entire 360 degree scene around you, but only in separate sections as you rotate your body. After taking a series of shots from Nob Hill, each aligned in a different direction, he combined them into one long strip to create an intriguing but impossible vista. In his disconcerting panoramas, Muybridge condensed into a single two-dimensional image a circular view that could in reality only be perceived in successive moments.

Muybridge's most celebrated conquest of time was sponsored by Leland Stanford, an ambitious railway entrepreneur who had already shrunk the number of days it took to travel across the American continent. After a few years of trial and error to perfect his techniques, Muybridge eventually settled Stubbs' dilemma once and for all with this series of 12 photographs. Taken in short succession at Stanford's Palo Alto farm, they show one of his favourite race horses, Sally Gardner, being ridden along a track equipped

in advance with a series of trip wires, which each triggered the shutter of a camera when broken by the mare. As the third shot clearly shows, Stubbs had been wrong: horses do indeed lift all their hooves off the ground at once, but they bend their legs inwards rather than extending them outwards.

Muybridge later refined his system still further by incorporating clocks to fire the cameras. But although he provided the definitive answer to one question, he left another paradox unresolved. Our eyes are incapable of registering intervals shorter than a tenth or fifteenth of a second, so without mechanical help, nobody can detect exactly how a speeding horse moves its legs. These photographs display actuality, but they do not show what people actually see: they reveal positions lasting for such a short period of time that they are normally invisible. But would it have made sense for Stubbs to paint an impossible sight on his canvas? Can a single static image ever depict a moving subject realistically?

*Dr Patricia Fara is an historian of science and has been President of the AHS since 2016. This is the seventh in a series of short articles in which she discusses a number of images, each illustrating a different way of incorporating time and its passing within a picture without showing a clock.

To see the horse in motion, and more on Muybridge, you can watch a 4-minute video 'Slices of Time: Eadweard Muybridge's Cinematic Legacy', prepared by the San Francisco Museum of Modern Art, at <https://www.youtube.com/watch?v=wNU7sXkZmSw>