

STANFORD

M A G A Z I N E

The Man Who Stopped Time

Photographer Eadward Muybridge stunned the world when he caught a horse in the act of flying.

by Mitchell Leslie

Related Sites: **ON A BRIGHT**, balmy morning in June of 1878, a crowd of racing enthusiasts and newspapermen huddled beside the track on the Palo Alto Stock Farm, waiting to see a horse run. Leland Stanford had invited them to his estate and horse-training mecca to witness a photographic first.

[A reference site on Muybridge](#)

The nation was swept up in a technological explosion. Americans swooned over inventions like the telephone and phonograph, while Edison prepared to unveil the lightbulb and Eastman set his sights on a handheld box camera. Having served his term as governor and launched a railroad empire, *Leland Stanford* was savoring life as a country gentleman.

Horses were his passion. For him, the racetrack demonstration would culminate five years of experiments, undertaken with photographer Eadward Muybridge, to clinch a pet theory about equine gait. Is a running horse ever completely aloft? Stanford insisted the answer was yes.

Stanford and Muybridge opened the day's spectacle by showing off their meticulous preparations. On one side of the track stood a whitewashed shed, with an opening at waist level across the front. Peeking out were a dozen bulky cameras, lined up like cannons in a galleon. On the opposite side, a sloping white backdrop had been raised to maximize contrast. The show began as one of Stanford's prize trotters, driven by master trainer Charles Marvin, sped down the track pulling a two-wheeled cart called a sulky. Across the horse's path were 12 wires, each connected to a different camera. When a

sulky wheel rolled over one of the wires, it completed an electrical circuit, tripping the shutter of the attached camera. The shutters firing in quick succession sounded like a drumroll.

A single exposure could take minutes in those days, but the state-of-the-art cameras managed all 12 shots in less than half a second. Within 20 minutes, Muybridge had developed the plates and laid out the results for the visitors to admire. The series made a brief filmstrip of the horse's progress along the track--capturing, for the first time, ephemeral details the eye couldn't pick out at such speeds, such as the position of the legs and the angle of the tail. Stanford got the evidence he wanted, and the world got a stunning dissection of motion. "It was a brilliant success," one reporter wrote. "Even the threadlike tip of Mr. Marvin's whip was plainly seen in each negative, and the horse was exactly pictured."

Those hoofbeats reverberated in art and science and are still being heard today. In pursuing for Stanford the secrets of equine gait, Muybridge unwittingly set the stage for a spectacular invention a decade later--the motion picture. The racehorse experiment also taught scientists to see photos as data, launching the study of animal locomotion. And the images shook the art world by exposing postural errors in classic equine sculptures and paintings.

Muybridge was hailed as a photographic wizard, Stanford as his visionary patron. The collaboration was, in Muybridge's words, "an exceptionally felicitous alliance," with each man generously crediting the other at first. But just as their achievement was making its biggest impact, something shattered the long and cozy partnership. Muybridge ended up suing Stanford, accusing him of wrecking his reputation. A clash of potent egos and ambitions, the blow-up was fueled by Stanford's single-mindedness and the powder-keg persona of Muybridge--a tempestuous and grandiose genius who seemed to throw sparks wherever he went.

EADWARD MUYBRIDGE was one of those outlandish characters novelists wish they'd invented. Often described as flamboyant or odd, he called himself a "photographic artist" and went by at least five different names during a life packed with adventure, melodrama and swings of fortune. You couldn't pass him on the street without taking a second look. With fierce, deep-set eyes, white hair and a tobacco-stained beard tumbling halfway down his chest, he reminded one contemporary of "Walt Whitman ready to play King Lear."

Muybridge fits into the tradition of great English eccentrics, says Phillip Prodger, a photographic historian and Muybridge scholar in Princeton, N.J. Occasionally his behavior went beyond whimsical peculiarities, erupting in a violent outburst, but in social situations he was amiable and mannerly--sometimes even charming.

Leland Stanford sought him out not for his charisma but for his facility with the camera. Stanford had taken a stand in a popular dispute of the day: whether all four legs of a horse come off the ground at any point in a trot or gallop. A relative newcomer to the exclusive coterie of horse fanciers, he had put his reputation on the line, and now he was looking for proof.

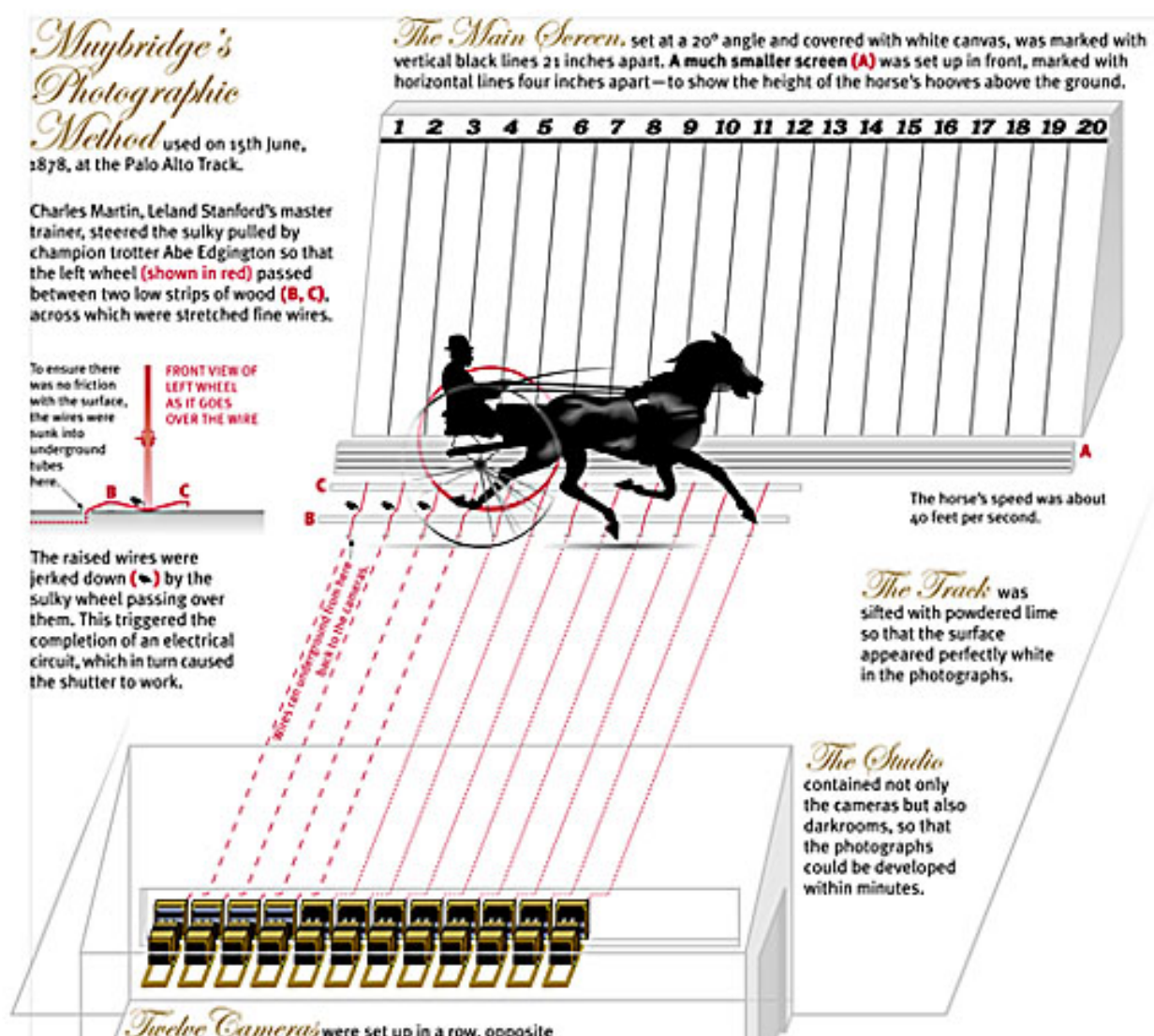
It sounds like a trivial question, but the possibility that horses briefly flew had seized the

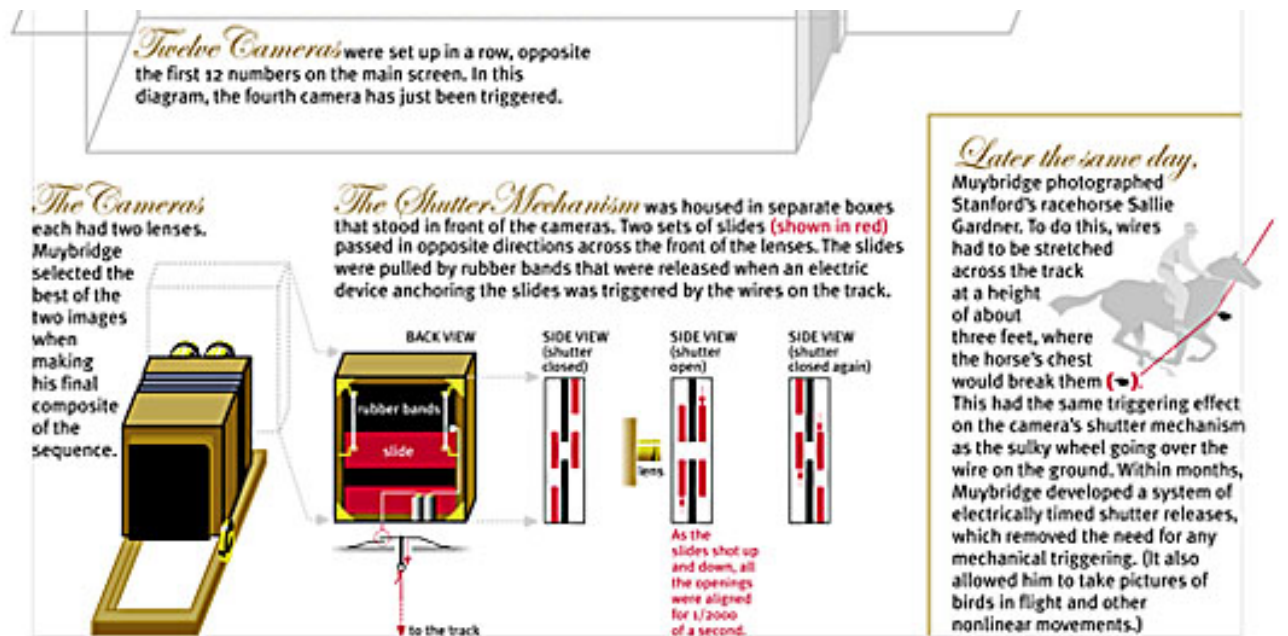
attention of scientists, artists and "turfmen" alike. Stanford sided with the advocates of "unsupported transit," who swore they could discern all four hooves in the air. Their opponents denied the possibility with equal certainty, arguing that the horse would collapse without the support of at least one leg. In truth, the human eye couldn't pick out enough detail to resolve the issue.

Legend has it that Stanford had a \$25,000 wager riding on the outcome. Virtually every serious historian to look into this, however, has concluded there was no bet. As a horseman, Stanford sought prestige, not money. And behind his interest in equine locomotion lay the desire to breed and train the fastest horses in the world.

Stanford's fervor for horse racing developed after the stress of completing the transcontinental railroad (in 1869) nearly destroyed his health, notes biographer George Clark in *Leland Stanford* (Stanford University Press, 1931). His doctor prescribed relaxing outdoor activities and steered him toward horses. "He became passionately fond of the animals," Clark writes, and "would drop business at any time to talk about them." Stanford wanted to revamp traditional training systems to emphasize speed over endurance, and a better understanding of how horses run could help him advance those efforts.

And so, in 1872, he turned to Muybridge to settle the question of unsupported transit.





Graphic by Nigel Holmes

AT THE TIME of their first meeting, Muybridge, 42, was the top photographer on the West Coast and was gaining an international reputation--not bad for someone who'd taken up photography just five years before as a second career. He was born Edward Muggeridge in Kingston-upon-Thames, a river port near London, in 1830. Before emigrating in the early 1850s, Edward became Eadweard (same pronunciation), borrowing the odd spelling from a monument to Anglo-Saxon kings in his hometown. During his first decade in America, he worked as a bookseller in New York and San Francisco. Then, changing his last name, he reinvented himself as a photographer specializing in Western landscapes--and discovered an untapped gift.

"His photographs are beautiful," says Prodger. "He had a wonderful eye for composition and could make pictures that were fresh and compelling."

But Leland Stanford wanted hard evidence, not pretty pictures, and was offering him \$2,000 to produce it. At first, Muybridge declared the task impossible. He knew the limitations of photographic technology. Cameras and film of the day were ill suited to capturing motion, which usually showed up as a blur. For one thing, the shutters were too slow. Though mechanical shutters were becoming available, most photographers relied on the lens cap, a board or even a hat--anything that could be used to cover and uncover the lens. As for film, photographers made their own on the spot by pouring a goopy solution known as wet collodion onto a glass plate, then priming the plate in a solution of silver nitrate. The concoction was more than 300 times less light-sensitive than modern film. One manual advised that "the time of exposure in the camera is entirely a matter of judgment and experience," adding that on bright days, "from fifteen seconds to one minute will answer."

To discern the movements of a horse whipping along at some 40 feet per second, that kind of leisurely exposure wouldn't answer; the picture would have to be taken in a fraction of a second. No wonder Muybridge initially scoffed--but Stanford finally convinced him to have a go.

It might not have been the beginning of a beautiful friendship, but it was the start of a productive partnership. The impetuous photographer and the stolid governor became so close that Muybridge joined the exclusive group of people who could visit Stanford at any

time, and he was, in fact, a frequent guest at the former governor's mansions.

Stanford seemed to have plenty of time, patience and money--a good thing, since progress was slow and the overall project wound up costing some \$50,000. It took five years to get a shot of a running horse that Muybridge considered satisfactory. True, he had other projects going (his photos of Yosemite won the gold medal at a Vienna exhibition in 1873). But an extraordinary personal event also interrupted the experiments: Muybridge went into exile for a year after hunting down and killing his young wife's lover.

THE OPERATIC EPISODE began on October 17, 1874, when Muybridge discovered his wife's adultery. In 1872, he had married a 21-year-old divorcée named Flora Stone. When she bore a son in the spring of 1874, Muybridge believed that the child, Floredo Helios Muybridge, was his own--until he came across letters exchanged between Flora and a drama critic named Harry Larkyns. The most damning evidence was a photo of Floredo enclosed with one of the letters: Flora had captioned it "Little Harry."

Convinced he'd been cuckolded, Muybridge collapsed, wept and wailed, according to a nurse who was present. That night, he tracked Larkyns to a house near Calistoga and shot him through the heart.

At his murder trial in 1875, the jury rejected an insanity plea but accepted the defense of justifiable homicide, finding Muybridge not guilty of murder. After the acquittal, Muybridge sailed for Central America and spent the next year in "working exile."

Such volatility can't be dismissed as a bad case of artistic temperament, says Arthur Shimamura, a psychologist at UC-Berkeley whose recent research has focused on Muybridge's mental condition. Shimamura thinks the photographer's risky deeds and emotional explosions were telltale signs of damage to the frontal cortex, the brain region responsible for emotional control. He notes that the strange behavior began after Muybridge suffered a head injury in an 1860 stagecoach accident. He lay in a coma for days--and then, for three months afterward, had double vision and couldn't smell, taste or hear. Frontal-lobe injury usually leaves the intellect intact, Shimamura says, but when provoked or aroused, Muybridge would have been unable to keep his emotions in check.



WHEN MUYBRIDGE RETURNED from Central America, most San Franciscans accepted him back, apparently seeing the shooting as frontier justice. Leland Stanford certainly wasn't put off. In fact, according to Muybridge biographer Robert Bartlett Haas, Stanford had helped arrange the photographer's defense.

The photographic project resumed in 1877 at Sacramento's Union Park racetrack. Muybridge was now shooting for ever-sharper photos, having surmounted many technical obstacles during the earlier

LIGHTS, CAMERA, ACTION: Muybridge's famous 1878 photo sequence depicts three full strides made by Stanford's prize trotting horse, Abe Edgington. Around the middle of each stride, all four feet lift at once--as shown, for instance, in the next-to-last frame.

Stanford Archives

a second, a gap opened that was sufficient to expose the film.

sessions. In 1872, for instance, he had tried to expose the film manually, by snatching off the lens cap just as the horse streaked past. When that failed, he rigged up a crude shutter made of two slats, tripped by a string running across the track at chest height. When the horse broke the string, the two slats slid in opposite directions across the front of the camera--and for a fraction of

On July 1, 1877, Muybridge used this setup and newer, more sensitive solutions to snap an "automatic electro-photograph" of Stanford's beloved horse Occident on the run, apparently aloft. The press got excited over the feat, but doubts about this photo linger because the published version was not the original--it was a woodcut of a photo of a painting of the original photo. (Such "improvement" was common at the time.) On the other hand, Haas notes that Muybridge displayed the negative in his studio, where many witnesses saw it.

That success inspired the pair to plan a grander project, using photography to analyze entire strides. Instead of a single camera, Stanford and Muybridge proposed to use a dozen, ordering the finest cameras from New York and the most advanced lenses from London. The locale shifted from Sacramento to the Palo Alto Stock Farm.

BY JUNE 15, 1878, everything was ready. On the day of the demonstration, the horses ran, the cameras clicked and reporters scurried off to spread word of the stunning results. Muybridge quickly began selling copies as "photo cards." Newspapers, not yet able to reproduce photos, depicted them with woodcuts. *Scientific American* ran drawings of the photos in October, and the French scientific journal *La Nature* introduced the images, in the form of etched "heliographs," to a European audience that December.

Artists of the day were both thrilled and vexed, because the pictures "laid bare all the mistakes that sculptors and painters had made in their renderings of the various postures of the horse," as French critic and poet Paul Valéry wrote decades later. The most common error had been to show the running animal in a "hobbyhorse" pose, with front and hind legs extended. Once Muybridge's photos appeared, painters like Edgar Degas and Thomas Eakins began consulting them to make their work truer to life. Other artists took umbrage. Auguste Rodin thundered, "It is the artist who is truthful and it is photography which lies, for in reality time does not stop."

Within a year of the track demonstration, Muybridge had produced not only the first sequential photos of rapid motion, but also the first machine to project moving photographic images. That novelty, based on a popular children's toy called the zoetrope, caused nearly as big a stir as the horse photos. Muybridge adapted the zoetrope to reanimate the trotting sequences and project them onto a screen. The "film" in his new machine, which he called the zoopraxiscope, was a large glass disk about the size of dinner plate, with the figures running around the edge.

Technically, the zoopraxiscope didn't project any of Muybridge's photos. The images on the plate had to be stretched out in order to look normal on the screen, requiring an artist to redraw the photos on the glass, adding the right amount of distortion. But film

historians consider the zoopraxiscope a forerunner to the movie projector because it did show the first images based on action photos and, unlike the zoetrope, projected those images so that many people could watch at once.

Muybridge reserved the premiere of the zoopraxiscope for his patron, showing the world's first "movie" to the Stanfords and a few friends in the fall of 1879. The movie had no sound, of course, and lasted barely long enough for a bite of popcorn. Nevertheless, after a public showing in San Francisco the following spring, a newspaper reporter rhapsodized about the realism: "Nothing was wanting but the clatter of hoofs upon the turf and the occasional breath of steam to make the spectator believe he had before him the flesh and blood steeds."

More triumphs followed. Having wowed America, Muybridge took his magical show on a European lecture tour paid for by Leland Stanford. He was fawned over in Paris and lionized in England. In London, his dazzled audiences included Thomas Huxley, William Gladstone, Alfred Lord Tennyson and the Prince of Wales. Throughout this period of growing fame, Stanford and Muybridge carefully emphasized that their work was a collaboration--a theme echoed in the press. "It is difficult to say to whom we should award the greater praise," one reporter wrote, "to Governor Stanford, for the inception of an idea so original . . . or to Muybridge, for the energy, genius and devotion with which he has pursued his experiments."

But not long afterward, Muybridge would denounce Stanford's actions as "the contemptible tricks of a man whom I thought was a generous friend, but whose liberality turns out to have been an instrument for his own glorification." And Stanford would complain to a colleague about Muybridge's swelling ego: "I think the fame we have given him has turned his head."

THE EVENT THAT SPLIT the partnership was the publication of a book called *The Horse in Motion as Shown by Instantaneous Photography* (Osgood & Co., 1882). A detailed summary of the new discoveries about equine gait, it was written by Stanford's friend J.D.B. Stillman, a physician. Stanford apparently left most of the preparation to Stillman, but he financed the printing and approved the title page that would inspire so much controversy.

Although claiming to rely on "instantaneous photography," the book displayed none of Muybridge's photos. Instead, it offered nearly 100 drawings and engravings based on his shots. There's no doubt the analysis drew heavily on the photographs--but to Muybridge's horror, his role was barely mentioned. The title page did not acknowledge him; the introduction failed to cite his contribution except in a sentence describing him as Stanford's employee. Muybridge was nowhere else in the book except a technical appendix based on an account he had written.

He concluded that Stanford was trying to rob him of his credit for the years of



EQUINE SIDELINE: The Palo Alto Stock Farm was the site for training and breeding fast horses.

Stanford Archives

photographic work. *The Horse in Motion* became, to his mind, a challenge to his honor--and Muybridge didn't countenance challenges to his honor. So he filed suit, accusing Stanford of damaging his reputation and jeopardizing his career.

Was Muybridge just flying off the handle again? In truth, the book did temporarily damage his reputation; at one point, it seemed likely to scupper his career. Earlier that year, Britain's Royal Society of Arts had been so impressed by his work that it offered to finance further photographic investigations of animal movement. Then *The Horse in Motion* appeared without Muybridge's name on the title page, and the society summoned him for an explanation. When Muybridge couldn't prove he'd played a major role in the research, the offer was rescinded.

The judge dismissed his suit against Stanford before it ever got to trial. Since the written decision has disappeared, we can't dissect the legal reasoning. But from the depositions on both sides, which are in the University archives, it's easy to guess why Muybridge lost. He took credit for everything but the balmy Palo Alto weather on that momentous morning in June, burying his legitimate complaints under a heap of laughable exaggerations and petty gripes. At one point, he even claimed that he, not Stanford, had been the original proponent of unsupported transit, contradicting a newspaper account he himself had written just two years before.

Whatever the merits of Muybridge's case, Stanford's own behavior raises a few questions. Prodger, the historian, suggests his use of sketches instead of photos was essentially a pragmatic decision. Methods for printing photos in books were still experimental and very expensive, and the only other option--pasting copies of the photos directly into books--was slow and equally costly. The kind of book Muybridge envisioned to show off his photos just wouldn't be practical for several more years, Prodger says. And showing off photos was never Stanford's goal. His aim, as a collector of fast horses, was simple and narrow. The groundbreaking photos became superfluous to him after they proved his theory correct.

But the more puzzling question persists: what was Stanford thinking when he omitted due credit to Muybridge on the title page of the book?

It's possible his motive was pure self-promotion. Or maybe, says Prodger, he wasn't thinking much at all. The slight, while tactless and egocentric, may have been largely unintentional. Like many of his contemporaries, Stanford saw photographers as technicians, Prodger notes. His deposition indicates that he didn't value Muybridge's contribution above those of the dozens of other specialists who helped with the experiments, from engineers and electricians to grooms and trainers. If that is true, then the failure to fully acknowledge Muybridge may have been less an intentional insult than a reflection of Stanford's view that photography was just another trade, the photographer just another employee.

To Muybridge, the self-proclaimed "photographic artist," this attitude was insulting. "Muybridge, of course, believed in the special power of photographs to convince viewers," Prodger says. And when he didn't get the credit he thought an artist deserved, he was outraged. Thus, the two men's fundamental difference over the rightful place of photography may have made their split inevitable.



MULTI-TALENTED: Leland Stanford trained horses after serving as governor and completing the transcontinental railroad.

IN THE LONG RUN, the Stanford-Muybridge clash, while it broke up a good team, didn't hamper either man. Leland Stanford continued to lavish attention and money on his beloved horses and never got involved in another photographic study. After heading off to the U.S. Senate in 1885, he began preparing his Farm to be a different kind of training ground.

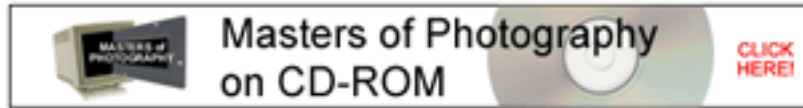
The status of photographers did not diminish. To the contrary, says Prodger, Muybridge's spurned photos helped push society to recognize photography as an art by revealing an aspect of the world hidden to the painter's eye.

And Muybridge did not suffer long. By the time the judge dismissed his suit, he had won over another group of patrons and launched a two-year study of animal and human motion at the University of Pennsylvania. With 36 cameras operating simultaneously, he and his assistants snapped more than 30,000 photos of adults, children and animals performing almost every imaginable action--from a nude Muybridge swinging a pick to a series titled "Chickens Being Frightened by a Torpedo." These sequential photos, which Muybridge later presented in three books, were a hit, and he continued his triumphant lecture tours in America and Europe, including a return engagement at the Royal Society of Arts. For animators and other artists, the images he captured in the sessions at Penn remain a standard reference, a dictionary of movement.

Nevertheless, it was the medium he helped invent that finally put him out to pasture. Motion pictures, which came on the scene in the early 1890s, eclipsed the novelty of Muybridge's work, and he returned to England for the last decade of his life. Eccentric to the end, he died in 1904 while building a model of the Great Lakes in his backyard. Death spared him knowledge of the final indignity: engraved on his headstone was the name "Eadweard Maybridge."

Mitchell Leslie, of Albuquerque, N.M., is a frequent contributor to STANFORD. Intern *Jennie Berry, '01*, conducted the archival research.

[Minolta digital](#)
[camera](#)
[reviews and](#)
[prices](#)
DIGITAL
CAMERA HQ



EADWEARD MUYBRIDGE

[articles](#) | [photographs](#) | [resources](#)

CDROM VERSION

POSTER STORE

ABBOTT

ANSEL ADAMS

ROBERT ADAMS

ALVAREZ BRAVO

ARBUS

ATGET

BELLOCQ

BLOSSFELDT

BOURKE-WHITE

BRANDT

BRASSAÏ

CALLAHAN

CAMERON

COBURN

CUNNINGHAM

DeCARAVA

DOISNEAU

EGGLESTON

EVANS

FRIEDLANDER

GOWIN

GUTMANN

HINE

KARSH

KERTÉSZ

KLEIN

KOUDELKA

LANGE

Text from [The Encyclopedia of Photography](#) (1984)

Muybridge, Eadweard

British, 1830-1904

Eadweard Muybridge was the most significant contributor to the early study of human and animal locomotion. His extensive studies and inventions were acknowledged by such pioneers of motion pictures as E. J. Marey, the Lumiere brothers, and Thomas Edison.

Muybridge was born Edward James Muggeridge at Kingston-on-the-Thames, England, in 1830. (He adopted early in life the Saxon spelling of his name.) He attended school in Kingston, and worked in his family's stationery and papermaking business in London. He was employed by the London Printing and Publishing Co. and came to the U.S. in 1852 as their representative. In San Francisco he learned photography from daguerreotypist Silas Selleck in the early 1860s, and worked for Carleton E. Watkins, the major West Coast scenic photographer, before striking out on his own. He made photographic surveys for the firm of Thomas Houseworth and worked for the U.S. War Department documenting areas of the West Coast.

Muybridge first gained recognition in 1867 for a prize-winning series of dramatic Yosemite views. The following year, he was the official photographer with the American military presence in recently-purchased Alaska. He took over 2000 photographs of the American Far West between 1868 and 1873.

In 1872 Muybridge was enlisted by Leland Stanford to settle a wager regarding the position of a trotting horse's legs. Using the

[LARTIGUE](#)
[LAUGHLIN](#)
[LEVITT](#)
[MAPPLETHORPE](#)
[MEATYARD](#)
[MODEL](#)
[MODOTTI](#)
[MUYBRIDGE](#)
[NADAR](#)
[NEWMAN](#)
[O'SULLIVAN](#)
[OUTERBRIDGE](#)
[PARKS](#)
[PENN](#)
[RIIS](#)
[RODCHENKO](#)
[SALGADO](#)
[SHERMAN](#)
[SHORE](#)
[SMITH](#)
[SOMMER](#)
[STEICHEN](#)
[STIEGLITZ](#)
[STRAND](#)
[TALBOT](#)
[UELSMANN](#)
[WALDMAN](#)
[WATKINS](#)
[WEEGEE](#)
[WESTON](#)
[WHITE](#)
[WINOGRAND](#)
[WOLLEH](#)

fastest shutter available, Muybridge was able to provide only the faintest image. He was more successful five years later when, employing a battery of cameras with mechanically tripped shutters, he [showed clearly the stages of the horse's movement](#): at top speed, a trotting horse had all four hooves off the ground simultaneously, and in a different configuration from that of a galloping horse.

In the interim between these two studies, Muybridge photographed ruins and Indian village life in Central America. He had left the U. S. after killing his wife's lover. Though acquitted at trial, he did not return to the U.S. until 1877.

Muybridge concentrated his efforts on studies of the motion of animals and human models. His work in stop-action series photography soon led to his invention of the "zoopraxiscope," a primitive motion-picture machine which recreated movement by displaying individual photographs in rapid succession. This machine was demonstrated privately in America as early as 1879, and at public gatherings in Europe over the next two years. Muybridge demonstrated and lectured on his work at the Royal Institution and Royal Academy, London, in 1882 and in major American cities in 1883.

[Thomas Eakins](#), who painted motion subjects, helped arrange for Muybridge to work at the University of Pennsylvania, Philadelphia. Muybridge's major accomplishments date from his threeyear stay there, during which he was able to improve his techniques. In 1887 his most important work, [Animal Locomotion](#), was published in 11 volumes. It contained over 100,000 photographs taken between 1872 and 1885.

Muybridge lectured at "Zoopraxographical Hall" at the World's Columbian Exposition of 1893 in Chicago. He returned to England in 1894 and did little photography in his last years. His book *The Human Figure in Motion* was published in 1901. He died three years later at his native Kingston-on-the-Thames.

[home](#) | [faq](#) | [contact](#)

[webgalleries.com](#)

D-Day War Title Sale

Experience the stories from
the men who lived them.

Shop Now!



PBS HOME

PROGRAMS A-Z

TV SCHEDULES

SUPPORT PBS

SHOP PBS

SEARCH PBS

NEW PERSPECTIVES ON **THE WEST**

THE PROGRAM

PEOPLE

PLACES

EVENTS

RESOURCES

LESSON PLANS

QUIZ

PEOPLE

A-C

D-H

I-R

S-Z

Sacagawea

Santa Anna, Antonio

López de

Seguin, Juan

Serra, Father Junipero

Sheridan, Philip

Sherman, William

Tecumseh

Singleton, Benjamin

"Pap"

Sitting Bull

Smith, Joseph

Stanford, Leland

Strauss, Levi

Sutter, John

Tatanka-Iyotanka

(Sitting Bull)

Terry, Alfred

Turner, Frederick

Jackson

Udall, Ida Hunt and

David King

Vallejo, Mariano

Vanderbilt, William K.

Wells, Emmeline

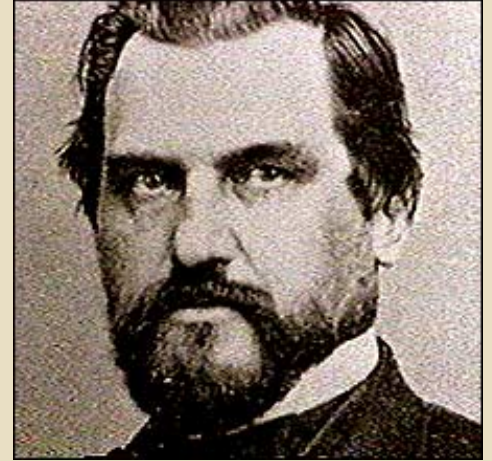
Whitman, Narcissa

and Marcus

Woodruff, Wilford

Wovoka

Young, Brigham

Leland Stanford**(1824-1893)**

One of the "Big Four" who built California's Central Pacific railroad, Leland Stanford brought a sweeping political influence to the partnership that insured this privately financed project all the advantages of public funding.

Stanford was born into a well-off farming family in Watervliet, New York. After a superb secondary education and several years of higher education, Stanford entered an elite law office to prepare for a career as an attorney, passing his bar exam in 1848. He soon moved to Wisconsin, where he began to practice his profession.

After three years in Wisconsin, Stanford and his new wife decided to move to California, where several of his brothers had already found success as merchants. Stanford joined them in 1852 and soon began making enormous sums of money by selling equipment to miners in northern California. He also became involved in politics, first as a justice of the peace, then as the unsuccessful 1857 Republican candidate for state treasurer, and in 1859 as the unsuccessful Republican gubernatorial candidate. Stanford was finally elected governor in 1861, when the Civil War split the Democratic vote, and he played a part in keeping California loyal to the Union.

During his tenure, Stanford made no attempt to separate his political office from his private business interests. With Mark Hopkins, Collis Huntington and [Charles Crocker](#), Stanford was one of the "Big Four" planning to build the eastbound section of the transcontinental railroad, and his contribution to the partnership was to come in the form of political influence. As governor, Stanford kept this pledge, despite his responsibilities to the public, by helping to secure massive state investment and land grants for the railroad project.

When his term ended in 1863, Stanford declined to run for governor again, choosing instead to become president of the Central Pacific, a post he held until his death. He was also a major stakeholder in and longtime president of the Southern Pacific, as well as owner of many of the construction companies that did most of the actual

railroad building. Later in the century, as public pressure mounted for government regulation of such monopolies, Stanford's political connections in California continued to keep his railroad business interests on track.

The immense wealth Stanford acquired from railroad building enabled him to live a lavish life. He maintained enormous vineyards and owned a large horse-raising ranch near Palo Alto. In 1884, the death of their fifteen-year-old son prompted the Stanfords to found and endow Stanford University in his memory. In 1885, Stanford arranged for the California legislature to appoint him to the United States Senate, where he served without distinction but with pleasure until his death in 1893.

[The Program](#) | [People](#) | [Places](#) | [Events](#) | [Resources](#) | [Lesson Plans](#) | [Quiz](#)

© 2001 THE WEST FILM PROJECT and [WETA](#)

[Credits](#)

Lewis Mumford

Lewis Mumford ([October 19, 1895](#) -[January 26, 1990](#)) was an [American historian](#) of [technology](#) (by Mumford referred to as *technics*) and [science](#), also noted for his study of [cities](#). He was a disciple of the Victorian historian Sir Patrick Geddes and a contemporary and friend of Fred Osborne and [Vannevar Bush](#).

Table of contents

- [1 Life](#)
- [2 Ideas](#)
- [3 Books](#)
- [4 Reference](#)

Life

Mumford was born in [Flushing, New York](#), and studied at the New York School for Social Research. In [1919](#) he became associate editor of the *Dial* and wrote architectural criticisms, as well as commentating on urban issues.

His early writings established him as an authority in US architecture and urban life, which he interpreted in a social context.

Mumford was involved in numerous research positions and received the US Medal of Freedom in [1964](#). In [1943](#) Mumford was decorated Knight of the Order of the British Empire.

Mumford died at his home in Amenia, New York.

Ideas

A key idea, introduced in his best-known work *Technics and Civilization* ([1934](#)) was that technology was twofold:

- *Polytechnic*, a technology style that rhymes with the human nature and
- *Monotechnic* which is technology for the sake of technology, oppressing humanity as it moves along it's own trajectory.

Mumford also discusses large [hierarchical](#) organizations in terms of the *megamachine*, a [machine](#) using humans as its components. The buildings of the [Pyramids](#), the [Roman Empire](#) and the armies of the world wars are examples of such machines.

Mumford divides human civilization into three distinct epochs:

- *Eotechnic* (the [middle ages](#))
- *Paleotechnic* (the time of the [industrial revolution](#)) and
- *Neotechnic* (later, present-day)

In his earlier writings, Mumford was optimistic about human abilities, and wrote that the human race would use [electricity](#) and [mass communication](#) to build a better world for all humankind. He would later take a more pessimistic stance.

One of the more well-known studies of Mumford is of the way the [clock](#) was created by monks in the middle ages and subsequently adopted by the rest of society. He view this device as the key invention of the whole industrial revolution. He wrote for instance:

The clock is a piece of machinery whose 'product' is seconds and minutes.

Books

- *Sticks and Stones* ([1924](#))
- *The Golden Day* ([1926](#))
- *The Brown Decades: A Study of the Arts in America, 1865–1895* ([1931](#))
- "Renewal of Life" series
 - *Technics and Civilization* ([1934](#))
 - *The Culture of Cities* ([1938](#))
 - *The Condition of Man* ([1944](#))
 - *The Conduct of Life* ([1951](#))
- *The City in History* ([1961](#)) often considered his most important work
- *The Myth of the Machine* ([1967](#) - [1970](#), 2 volumes)
- *My Work and Days: A Personal Chronicle* ([1979](#))

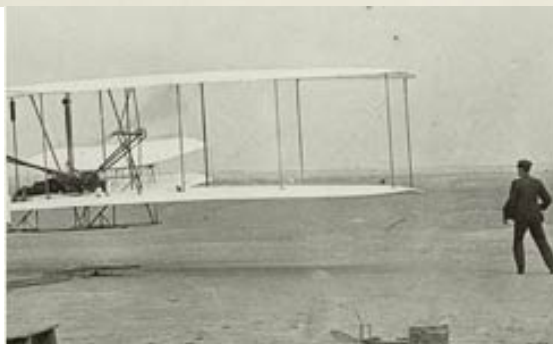
Reference

- Donald Miller, *Lewis Mumford: A Life* (New York: Weidenfeld & Nicolson, 1989)

This article is from [Wikipedia](#). All text is available under the terms of the [GNU Free Documentation License](#).



WHO WERE WILBUR
& ORVILLE?



INVENTING A
FLYING MACHINE



THE AERIAL AGE
BEGINS



On December 17, 1903, at Kitty Hawk, North Carolina, the Wright Flyer became the first powered, heavier-than-air machine to achieve controlled, sustained flight with a pilot aboard.

December 2003 will mark the 100th Anniversary of this historic and groundbreaking achievement. Learn how two small town businessmen invented a technology that would define the 20th century.

❧ INTERACTIVE EXPERIMENTS ❧

Experiment with Pitch, Roll and Yaw! >>

❧ CLASSROOM ACTIVITIES ❧

Create a Wright biography! >>

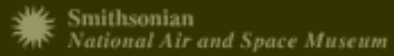
❧ SEND AN E-CARD ❧

See how far your e-card can travel >>

"Twelve Seconds That Changed
the World"

[Program Schedule >>](#)

[Interactive Experiments](#) | [Classroom Activities](#)



[Press Kit](#) | [Sponsors](#) | [Credits](#)

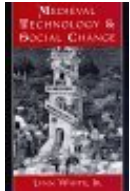


Search:

Browse:

Medieval Technology and Social Change

by Lynn Townsend White



List Price: \$11.65

Price: **\$11.65** & eligible for **FREE Super Saver Shipping** on orders over \$25. [See details.](#)

Availability: Usually ships in 24 hours

[see product details](#)

READY TO BUY?

[Sign in](#) to turn on 1-Click ordering.

MORE BUYING CHOICES

45 used & new from **\$2.10**

Search inside this book:

Browse sample pages:

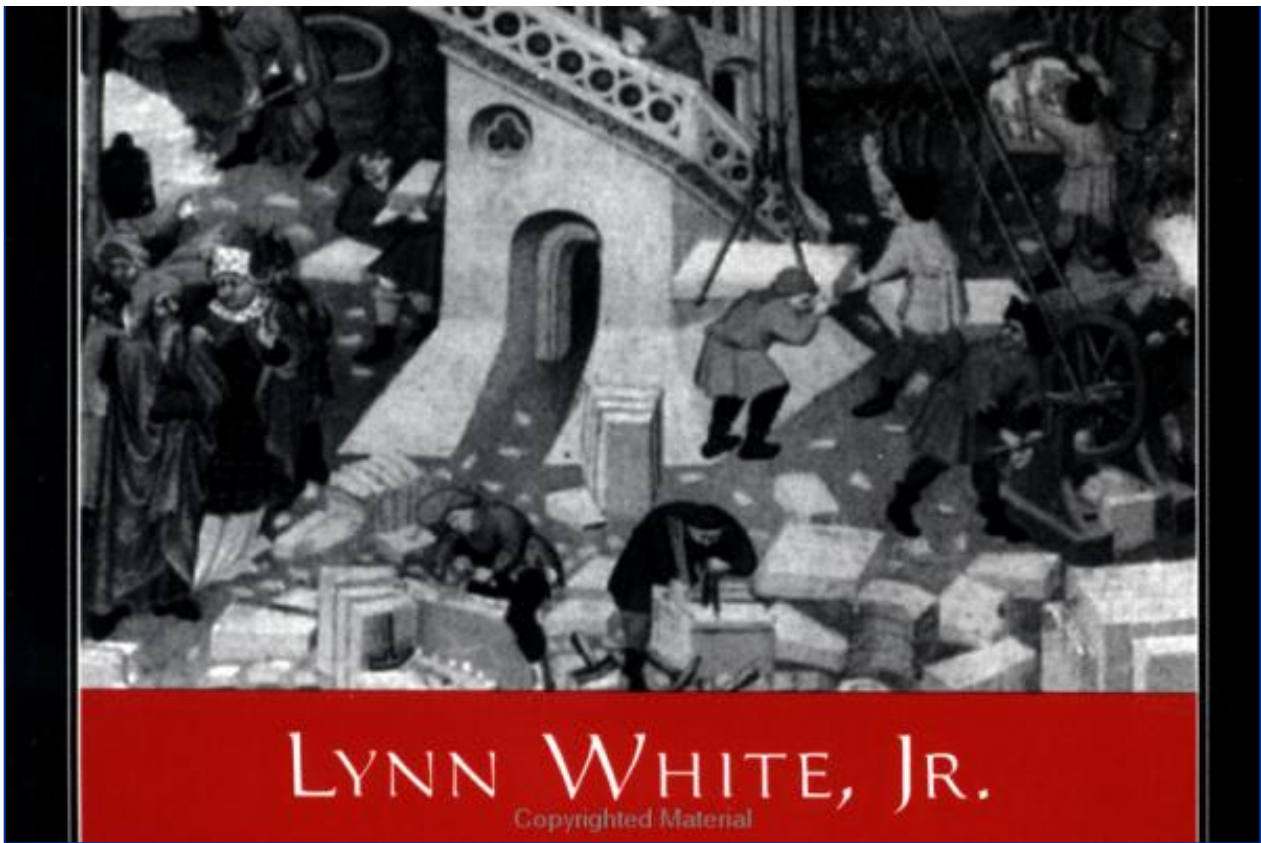
[Front Cover](#) | [Table of Contents](#) | [Copyright](#) | [Excerpt](#) | [Index](#) | [Back Cover](#)

◀ Previous Page

+ Zoom in

Next Page ▶





[◀ Previous Page](#)

[+ Zoom in](#)

[Next Page ▶](#)

Price: **\$11.65**

Publishers/Authors: [Find out how](#) to include your books in our Search Inside the Book program.

[Amazon.com Privacy Statement](#)

[Amazon.com Shipping Information](#)

[Amazon.com Returns & Exchanges](#)

Where's My Stuff?

- Track your [recent orders](#).
- View or change your orders in [Your Account](#).

Shipping & Returns

- See our [shipping rates & policies](#).
- [Return](#) an item (here's our [Returns Policy](#)).

Need Help?

- Forgot your password? [Click here](#).
- [Redeem](#) or [buy](#) a gift certificate.
- [Visit our Help department](#).

Search

for

[Amazon.com Home](#) | [Directory of All Stores](#)

Our International Sites: [Canada](#) | [United Kingdom](#) | [Germany](#) | [Japan](#) | [France](#)

[Contact Us](#) | [Help](#) | [Shopping Cart](#) | [Your Account](#) | [Sell Items](#) | [1-Click Settings](#)

[Investor Relations](#) | [Press Releases](#) | [Join Our Staff](#)

[Conditions of Use](#) | [Privacy Notice](#) © 1996-2004, Amazon.com, Inc. or its affiliates