[Animation](https://en.wikipedia.org/wiki/Animation) is the process of making the [illusion](https://en.wikipedia.org/wiki/Illusion) of [motion](https://en.wikipedia.org/wiki/Motion_(physics)) and the illusion of change[[Note 1]](https://en.wikipedia.org/wiki/History_of_animation#cite_note-1) by means of the rapid display of a sequence of images that minimally differ from each other.

Humans have probably attempted to depict motion as far back as the [paleolithic](https://en.wikipedia.org/wiki/Paleolithic) period. While there were several predecessors, the 17th century invention of the [magic lantern](https://en.wikipedia.org/wiki/Magic_lantern)provided the first apparatus with which convincing moving images have been created. However, the movement of these images were the result of moving parts rather than a rapid succession of sequential images. The introduction of the [phenakistiscope](https://en.wikipedia.org/wiki/Phenakistiscope) in 1833 marks the start of true animation, although it could only show loops of a limited number of "frames".

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Early approaches to motion in art[[edit](https://en.wikipedia.org/w/index.php?title=History_of_animation&action=edit&section=1)]

Early examples of attempts to capture the phenomenon of [motion](https://en.wikipedia.org/wiki/Motion_(physics)) into a drawing can be found in [paleolithic](https://en.wikipedia.org/wiki/Paleolithic) [cave paintings](https://en.wikipedia.org/wiki/Cave_painting), where animals are often depicted with multiple legs in superimposed positions.[[1]](https://en.wikipedia.org/wiki/History_of_animation#cite_note-FOOTNOTEThomas19588-2) It has been claimed that the flickering light of flames can induce an illusion of motion in these paintings.[[2]](https://en.wikipedia.org/wiki/History_of_animation#cite_note-3)

There are some early examples of sequential images that may seem similar to series of animation drawings, but it's very unlikely that there were any contemporary means to show them in motion. For most the extremely low [frame rate](https://en.wikipedia.org/wiki/Frame_rate) also causes them to fall short of being true animation. Nonetheless, the practice of illustrating movement over time by creating a series of images arranged in chronological order provided a foundation for the development of the art.

Sequence of images that minimally differ from each other - from the site of the [Burnt City](https://en.wikipedia.org/wiki/Burnt_City) in Iran, late half of 3rd millennium B.C.

One early example is a 5,200-year old pottery bowl discovered in [Shahr-e Sukhteh](https://en.wikipedia.org/wiki/Shahr-e_Sukhteh), [Iran](https://en.wikipedia.org/wiki/Iran). The bowl has five sequential images painted around it that show phases of a goat leaping up to nip at a tree.[[3]](https://en.wikipedia.org/wiki/History_of_animation#cite_note-FOOTNOTEBall2008-4)[[4]](https://en.wikipedia.org/wiki/History_of_animation#cite_note-FOOTNOTECohn2006-5)

An [Egyptian](https://en.wikipedia.org/wiki/Egypt) [burial chamber](https://en.wikipedia.org/wiki/Burial_chamber) [mural](https://en.wikipedia.org/wiki/Mural), approximately 4000 years old, showing [wrestlers](https://en.wikipedia.org/wiki/Wrestler) in action.

An [Egyptian](https://en.wikipedia.org/wiki/Egypt) [mural](https://en.wikipedia.org/wiki/Mural) approximately 4000 years old, found in the tomb of [Khnumhotep](https://en.wikipedia.org/wiki/Khnumhotep) at the [Beni Hassan](https://en.wikipedia.org/wiki/Beni_Hassan) cemetery, features a very long series of images that apparently depict the sequence of events in a [wrestling](https://en.wikipedia.org/wiki/Wrestling) match.[[5]](https://en.wikipedia.org/wiki/History_of_animation#cite_note-lessing-6)

Seven drawings by [Leonardo da Vinci](https://en.wikipedia.org/wiki/Leonardo_da_Vinci) (c. 1510) extending over two folios in the Windsor Collection, *Anatomical Studies of the Muscles of the Neck, Shoulder, Chest, and Arm*, have detailed renderings of the upper body and less-detailed facial features. The sequence shows multiple angles of the figure as it rotates and the arm extends. Because the drawings show only small changes from one image to the next, together they imply the movement of a single figure.

Ancient Chinese records contain several mentions of devices, including one made by the inventor [Ding Huan](https://en.wikipedia.org/wiki/Ding_Huan), that were said to "give an impression of movement" to a series of human or animal figures on them,[[6]](https://en.wikipedia.org/wiki/History_of_animation#cite_note-FOOTNOTENeedham1962123.E2.80.93124-7) but these accounts are unclear and may only refer to the actual movement of the figures through space.[[7]](https://en.wikipedia.org/wiki/History_of_animation#cite_note-FOOTNOTERojas20135-8)

Since before 1000 CE the Chinese had a rotating lantern which had silhouettes projected on its thin paper sides that appeared to chase each other. This was called the "trotting horse lamp" [走馬燈] as it would typically depict horses and horse-riders. The cut-out silhouettes were attached inside the lantern to a shaft with a paper vane impeller on top, rotated by heated air rising from a lamp. Some versions added extra motion with jointed heads, feet or hands of figures triggered by a transversely connected iron wire.[[8]](https://en.wikipedia.org/wiki/History_of_animation#cite_note-9)

These and other occurrences of moving images, like for instance [shadow play](https://en.wikipedia.org/wiki/Shadow_play) with jointed puppets or moving parts in book illustrations, are not considered true animation. Technically they lack the rapid display of sequential images and the results are usually not very lifelike.

The Magic Lantern[[edit](https://en.wikipedia.org/w/index.php?title=History_of_animation&action=edit&section=2)]

*Main article:*[*Magic lantern*](https://en.wikipedia.org/wiki/Magic_lantern)

Christiaan Huygens' 1659 sketches for a projection of Death taking off his head

Slide with a fantoccini trapeze artist and a chromatrope border design (circa 1880)

Moving images were possibly projected with the magic lantern immediately since its invention by Christiaan Huygens in 1659. His sketches for magic lantern slides have been dated to that year and are the oldest known document concerning the magic lantern.[[9]](https://en.wikipedia.org/wiki/History_of_animation#cite_note-10) One encircled sketch depicts Death raising his arm from his toes to his head, another shows him moving his right arm up and down from his elbow and yet another taking his skull off his neck and placing it back. Dotted lines indicate the intended movements.

Techniques to add motion to painted glass slides for the magic lantern were descibed since circa 1700. These usually involved parts (for instance limbs) painted on one or more extra pieces of glass moved by hand or small mechanisms across a stationary slide which showed the rest of the picture.[[10]](https://en.wikipedia.org/wiki/History_of_animation#cite_note-Rossell2005-11) Popular subjects for mechanical slides included the sails of a windmill turning, a procession of figures, a drinking man lowering and raising his glass to his mouth, a head with moving eyes, a nose growing very long, rats jumping in the mouth of a sleeping man. A more complex 19th century rackwork slide showed the then known eight planets and their satellites orbiting around the sun.[[11]](https://en.wikipedia.org/wiki/History_of_animation#cite_note-12) Two layers of painted waves on glass could create a convincing illusion of a calm sea turning into a very stormy sea tossing some boats about by increasing the speed of the manipulation of the different parts.

In 1770 [Edmé-Gilles Guyot](https://en.wikipedia.org/wiki/Edm%C3%A9-Gilles_Guyot) detailed how to project a magic lantern image on smoke to create a transparent, shimmering image of a hovering ghost. This technique was used in the [**phantasmagoria**](https://en.wikipedia.org/wiki/Phantasmagoria) shows that became very popular in several parts of Europe between 1790 and the 1830s. Other techniques were developed to produce convincing ghost experiences. The lantern was handheld to move the projection across the screen (which was usually an almost invisible transparent screen behind which the lanternist operated hidden in the dark). A ghost could seem to approach the audience or grow larger by moving the lantern towards the screen, sometimes with the lantern on a trolley on rails. Multiple lanterns made ghosts move independently and were occasionally used for [superimposition](https://en.wikipedia.org/wiki/Superimposition) in the composition of complicated scenes.[[12]](https://en.wikipedia.org/wiki/History_of_animation#cite_note-Heard2006-13)

**Dissolving views** became a popular magic lantern show, especially in England in the 1830s and 1840s.[[12]](https://en.wikipedia.org/wiki/History_of_animation#cite_note-Heard2006-13) These typically had a landscape changing from a winter version to a spring or summer variation by slowly diminishing the light from one version while introducing the aligned projection of the other slide.[[13]](https://en.wikipedia.org/wiki/History_of_animation#cite_note-luikerdissolve-14) Another use showed the gradual change of for instance groves into cathedrals.[[14]](https://en.wikipedia.org/wiki/History_of_animation#cite_note-15)

Between the 1840s and 1870s several abstract magic lantern effects were developed. This included the chromatrope which projected dazzling colorful geometrical patterns by rotating two painted glass discs in opposite directions.[[15]](https://en.wikipedia.org/wiki/History_of_animation#cite_note-16)

Occasionally small shadow puppets had been used in phantasmagoria shows.[[12]](https://en.wikipedia.org/wiki/History_of_animation#cite_note-Heard2006-13) Magic lantern slides with jointed figures set in motion by levers, thin rods, or cams and worm wheels were also produced commercially and patented in 1891. A popular version of these "Fantoccini slides" had a somersaulting monkey with arms attached to mechanism that made it tumble with dangling feet. Fantoccini slides are named after the Italian word for puppets like marionettes or jumping jacks.[[16]](https://en.wikipedia.org/wiki/History_of_animation#cite_note-17)

Animation before film[[edit](https://en.wikipedia.org/w/index.php?title=History_of_animation&action=edit&section=3)]

Numerous devices that successfully displayed animated images were introduced well before the advent of the motion picture. These devices were used to entertain, amaze, and sometimes even frighten people. The majority of these devices didn't project their images, and accordingly could only be viewed by a single person at any one time. For this reason they were considered toys rather than devices for a large scale [entertainment industry](https://en.wikipedia.org/wiki/Entertainment_industry) like later animation. Many of these devices are still built by and for film students learning the basic principles of animation.

**Thaumatrope (1824)**[[edit](https://en.wikipedia.org/w/index.php?title=History_of_animation&action=edit&section=4)]

A [thaumatrope](https://en.wikipedia.org/wiki/Thaumatrope) is a simple toy that was popular in the 19th century. It is a small disk with different pictures on each side, such as a bird and a cage, and is attached to two pieces of string.[[17]](https://en.wikipedia.org/wiki/History_of_animation#cite_note-FOOTNOTESolomon19896.E2.80.937-18) When the strings are twirled quickly between the fingers, the pictures appear to combine into a single image. This demonstrates the [*persistence of vision*](https://en.wikipedia.org/wiki/Persistence_of_vision), the fact that the perception of an object by the eyes and brain continues for a small fraction of a second after the view is blocked or the object is removed. The invention of the device is often credited to [Sir John Herschel](https://en.wikipedia.org/wiki/Sir_John_Herschel), but [John Ayrton Paris](https://en.wikipedia.org/wiki/John_Ayrton_Paris) popularized it in 1824 when he demonstrated it to the [Royal College of Physicians](https://en.wikipedia.org/wiki/Royal_College_of_Physicians).[[18]](https://en.wikipedia.org/wiki/History_of_animation#cite_note-19)

**Phenakistoscope (1831)**[[edit](https://en.wikipedia.org/w/index.php?title=History_of_animation&action=edit&section=5)]

A [phenakistoscope](https://en.wikipedia.org/wiki/Phenakistoscope) disc by[Eadweard Muybridge](https://en.wikipedia.org/wiki/Eadweard_Muybridge) (1893).

The [phenakistoscope](https://en.wikipedia.org/wiki/Phenakistoscope) was an early animation device.[[19]](https://en.wikipedia.org/wiki/History_of_animation#cite_note-20) It was invented in 1831, simultaneously by the Belgian [Joseph Plateau](https://en.wikipedia.org/wiki/Joseph_Plateau) and the Austrian [Simon von Stampfer](https://en.wikipedia.org/wiki/Simon_von_Stampfer).[[20]](https://en.wikipedia.org/wiki/History_of_animation#cite_note-FOOTNOTESolomon19897-21) It consists of a disk with a series of images, drawn on radii evenly spaced around the center of the disk. Slots are cut out of the disk on the same radii as the drawings, but at a different distance from the center. The device would be placed in front of a[mirror](https://en.wikipedia.org/wiki/Mirror) and spun. As the phenakistoscope spins, a viewer looks through the slots at the reflection of the drawings, are momentarily visible when a slot passes by the viewer's eye.[[21]](https://en.wikipedia.org/wiki/History_of_animation#cite_note-22) This created the illusion of animation.

**Zoetrope (1834)**[[edit](https://en.wikipedia.org/w/index.php?title=History_of_animation&action=edit&section=6)]

The [zoetrope](https://en.wikipedia.org/wiki/Zoetrope) concept was suggested in 1834 by William George Horner, and from the 1860s marketed as the zoetrope. It operates on the same principle as the phenakistoscope. It was a cylindrical spinning device with several frames of animation printed on a paper strip placed around the interior circumference.[[22]](https://en.wikipedia.org/wiki/History_of_animation#cite_note-FOOTNOTESolomon19898.E2.80.9310-23) The observer looks through vertical slits around the sides to view the moving images on the opposite side as the cylinder spins. As it spins, the material between the viewing slits moves in the opposite direction of the images on the other side and in doing so serves as a rudimentary shutter. The zoetrope had several advantages over the basic phenakistoscope. It did not require the use of a mirror to view the illusion, and because of its cylindrical shape it could be viewed by several people at once.[[23]](https://en.wikipedia.org/wiki/History_of_animation#cite_note-24)

In ancient China, people used a device that one 20th century historian categorized as "a variety of zoetrope."[[6]](https://en.wikipedia.org/wiki/History_of_animation#cite_note-FOOTNOTENeedham1962123.E2.80.93124-7) It had a series of translucent paper or mica panels and was operated by being hung over a lamp so that vanes at the top would cause it to rotate as heated air rose from the lamp. It has been claimed that this rotation, if it reached the ideal speed, caused the same illusion of animation as the later zoetrope, but because there was no shutter (the slits in a zoetrope) or other provision for intermittence, the effect was in fact simply a series of horizontally drifting figures, with no true animation.[[24]](https://en.wikipedia.org/wiki/History_of_animation#cite_note-FOOTNOTERonanNeedham1985-25)[[25]](https://en.wikipedia.org/wiki/History_of_animation#cite_note-26)[[26]](https://en.wikipedia.org/wiki/History_of_animation#cite_note-27)

**Flip book (1868)**[[edit](https://en.wikipedia.org/w/index.php?title=History_of_animation&action=edit&section=7)]

An 1886 illustration of the kineograph.

[John Barnes Linnett](https://en.wikipedia.org/wiki/John_Barnes_Linnett) patented the first [flip book](https://en.wikipedia.org/wiki/Flip_book) in 1868 as the *kineograph*.[[27]](https://en.wikipedia.org/wiki/History_of_animation#cite_note-FOOTNOTESolomon19898-28) A flip book is a small book with relatively springy pages, each having one in a series of animation images located near its unbound edge. The user bends all of the pages back, normally with the thumb, then by a gradual motion of the hand allows them to spring free one at a time. As with the phenakistoscope, zoetrope and praxinoscope, the illusion of motion is created by the apparent sudden replacement of each image by the next in the series, but unlike those other inventions no view-interrupting shutter or assembly of mirrors is required and no viewing device other than the user's hand is absolutely necessary. Early film animators cited flip books as their inspiration more often than the earlier devices, which did not reach as wide an audience.[[28]](https://en.wikipedia.org/wiki/History_of_animation#cite_note-FOOTNOTECrafton19937-29)

The older devices by their nature severely limit the number of images that can be included in a sequence without making the device very large or the images impractically small. The book format still imposes a physical limit, but many dozens of images of ample size can easily be accommodated. Inventors stretched even that limit with the [mutoscope](https://en.wikipedia.org/wiki/Mutoscope), patented in 1894 and sometimes still found in amusement arcades. It consists of a large circularly-bound flip book in a housing, with a viewing lens and a crank handle that drives a mechanism that slowly rotates the assembly of images past a catch, sized to match the running time of an entire reel of film.

**Praxinoscope (1877)**[[edit](https://en.wikipedia.org/w/index.php?title=History_of_animation&action=edit&section=8)]

The first known animated projection on a screen was created in France by [Charles-Émile Reynaud](https://en.wikipedia.org/wiki/Charles-%C3%89mile_Reynaud), who was a French science teacher. Reynaud created the [Praxinoscope](https://en.wikipedia.org/wiki/Praxinoscope) in 1877 and the Théâtre Optique in December 1888.[[29]](https://en.wikipedia.org/wiki/History_of_animation#cite_note-FOOTNOTEBendazzi19944.E2.80.935-30) On 28 October 1892, he projected the first animation in public, [*Pauvre Pierrot*](https://en.wikipedia.org/wiki/Pauvre_Pierrot), at the Musée Grévin in Paris.[[29]](https://en.wikipedia.org/wiki/History_of_animation#cite_note-FOOTNOTEBendazzi19944.E2.80.935-30) This film is also notable as the first known instance of film perforations being used. His films were not photographed, but drawn directly onto the transparent strip. In 1900, more than 500,000 people attended these screenings.

Traditional animation[[edit](https://en.wikipedia.org/w/index.php?title=History_of_animation&action=edit&section=9)]

The first film recorded on [standard picture film](https://en.wikipedia.org/wiki/Standard_picture_film) that included animated sequences was the 1900 [Enchanted Drawing](https://en.wikipedia.org/wiki/The_Enchanted_Drawing), which was followed by the first entirely animated film, the 1906[*Humorous Phases of Funny Faces*](https://en.wikipedia.org/wiki/Humorous_Phases_of_Funny_Faces) by [J. Stuart Blackton](https://en.wikipedia.org/wiki/J._Stuart_Blackton)—who is, for this reason, considered the father of American animation.

The first animated film created by using what came to be known as [traditional (hand-drawn) animation](https://en.wikipedia.org/wiki/Traditional_animation)—the 1908 [*Fantasmagorie*](https://en.wikipedia.org/wiki/Fantasmagorie_(1908_film)) by [Émile Cohl](https://en.wikipedia.org/wiki/%C3%89mile_Cohl)

In Europe, the French artist, [Émile Cohl](https://en.wikipedia.org/wiki/%C3%89mile_Cohl), created the first animated film using what came to be known as [traditional animation](https://en.wikipedia.org/wiki/Traditional_animation)creation methods—the 1908 [*Fantasmagorie*](https://en.wikipedia.org/wiki/Fantasmagorie_(1908_film)).[[30]](https://en.wikipedia.org/wiki/History_of_animation#cite_note-FOOTNOTEBeckerman200317.E2.80.9318-31) The film largely consisted of a [stick figure](https://en.wikipedia.org/wiki/Stick_figure) moving about and encountering all manner of morphing objects, such as a wine bottle that transforms into a flower. There were also sections of live action where the animator’s hands would enter the scene. The film was created by drawing each frame on paper and then shooting each frame onto [negative film](https://en.wikipedia.org/wiki/Negative_film), which gave the picture a blackboard look.

The more detailed hand-drawn animations, requiring a team of animators drawing each frame manually with detailed backgrounds and characters, were those directed by [Winsor McCay](https://en.wikipedia.org/wiki/Winsor_McCay), a successful newspaper cartoonist, including the 1911[*Little Nemo*](https://en.wikipedia.org/wiki/Little_Nemo_(1911_film)), the 1914 [*Gertie the Dinosaur*](https://en.wikipedia.org/wiki/Gertie_the_Dinosaur), and the 1918 [*The Sinking of the Lusitania*](https://en.wikipedia.org/wiki/The_Sinking_of_the_Lusitania).[[31]](https://en.wikipedia.org/wiki/History_of_animation#cite_note-FOOTNOTESolomon198914.E2.80.9319-32)[[32]](https://en.wikipedia.org/wiki/History_of_animation#cite_note-FOOTNOTECrafton1993116-33)

During the 1910s, the production of animated short films, typically referred to as "cartoons", became an industry of its own and cartoon shorts were produced for showing in [movie theaters](https://en.wikipedia.org/wiki/Movie_theaters). The most successful producer at the time was [John Randolph Bray](https://en.wikipedia.org/wiki/John_Randolph_Bray), who, along with [animator](https://en.wikipedia.org/wiki/Animator) [Earl Hurd](https://en.wikipedia.org/wiki/Earl_Hurd), patented the [cel animation](https://en.wikipedia.org/wiki/Traditional_animation#Cels) process that dominated the animation industry for the rest of the decade.[[33]](https://en.wikipedia.org/wiki/History_of_animation#cite_note-FOOTNOTECrafton1993152.E2.80.93154-34)

**The silent era**[[edit](https://en.wikipedia.org/w/index.php?title=History_of_animation&action=edit&section=10)]

Charles-Émile Reynaud's [Théâtre Optique](https://en.wikipedia.org/wiki/Th%C3%A9%C3%A2tre_Optique) is the earliest known example of projected animation. It predates even photographic motion picture devices such as [Thomas Edison](https://en.wikipedia.org/wiki/Thomas_Edison)'s 1893 invention, the [Kinetoscope](https://en.wikipedia.org/wiki/Kinetoscope), and the [Lumière brothers](https://en.wikipedia.org/wiki/Lumi%C3%A8re_brothers)' 1894 invention, the [cinematograph](https://en.wikipedia.org/wiki/Cinematograph). Reynaud exhibited three of his animations on October 28, 1892 at Musée Grévin in Paris, France. The only surviving example of these three is Pauvre Pierrot, which was 500 frames long.[[34]](https://en.wikipedia.org/wiki/History_of_animation#cite_note-Animated_Films_Part_100000-35)

[Play media](https://upload.wikimedia.org/wikipedia/commons/9/95/Emile_Cohl_-_Fantasmagorie_1908_-_YouTube.theora.ogv)

[Émile Cohl](https://en.wikipedia.org/wiki/%C3%89mile_Cohl)'s [*Fantasmagorie*](https://en.wikipedia.org/wiki/Fantasmagorie_(1908_film))

After the cinematograph popularized the motion picture, producers began to explore the endless possibilities of animation in greater depth.[[35]](https://en.wikipedia.org/wiki/History_of_animation#cite_note-FOOTNOTECrafton19939-36) A short stop-motion animation was produced in 1897 by [Albert E. Smith](https://en.wikipedia.org/wiki/Albert_E._Smith_(producer)) and [J. Stuart Blackton](https://en.wikipedia.org/wiki/J._Stuart_Blackton) called [*The Humpty Dumpty Circus*](https://en.wikipedia.org/wiki/The_Humpty_Dumpty_Circus).[[36]](https://en.wikipedia.org/wiki/History_of_animation#cite_note-FOOTNOTECrafton199321-37) [Stop motion](https://en.wikipedia.org/wiki/Stop_motion) is a technique in which real objects are moved around in the time between their images being recorded, so that when the images are viewed at a normal [frame rate](https://en.wikipedia.org/wiki/Frame_rate) the objects appear to move by some invisible force. It directly descends from various early [trick film](https://en.wikipedia.org/wiki/Trick_film) techniques that created the illusion of impossible actions.

A few other films that featured stop motion technique were released afterward, but the first to receive wide scale appreciation was Blackton's *The Haunted Hotel*, which baffled viewers and inspired much further development.[[37]](https://en.wikipedia.org/wiki/History_of_animation#cite_note-FOOTNOTECrafton199311-38) In 1906, Blackton also made the first drawn work of animation on standard film, *Humorous Phases of Funny Faces*. It features faces that are drawn on a chalkboard and then suddenly move autonomously.[[38]](https://en.wikipedia.org/wiki/History_of_animation#cite_note-FOOTNOTEBeckerman200316.E2.80.9318-39)

[*Fantasmagorie*](https://en.wikipedia.org/wiki/Fantasmagorie_(1908_film)), by the French director [Émile Cohl](https://en.wikipedia.org/wiki/%C3%89mile_Cohl) (also called Émile Courtet), is also noteworthy.[[39]](https://en.wikipedia.org/wiki/History_of_animation#cite_note-FOOTNOTEBendazzi19949-40) It was screened for the first time on August 17, 1908 at Théâtre du Gymnase in Paris. Cohl later went to [Fort Lee, New Jersey](https://en.wikipedia.org/wiki/Fort_Lee,_New_Jersey) near New York City in 1912, where he worked for French studio Éclair and spread its animation technique to the US.

[Play media](https://upload.wikimedia.org/wikipedia/commons/2/2d/Katsud%C5%8D_Shashin_%281907%29.webm)

*Katsudō Shashin*

[*Katsudō Shashin*](https://en.wikipedia.org/wiki/Katsud%C5%8D_Shashin), from an unknown creator, was discovered in 2005 and is speculated to be the oldest work of [animation in Japan](https://en.wikipedia.org/wiki/Anime), with Natsuki Matsumoto,[[Note 2]](https://en.wikipedia.org/wiki/History_of_animation#cite_note-41)[[40]](https://en.wikipedia.org/wiki/History_of_animation#cite_note-FOOTNOTEMatsumoto201198-42) an expert in [iconography](https://en.wikipedia.org/wiki/Iconography) at the [Osaka University of Arts](https://en.wikipedia.org/wiki/Osaka_University_of_Arts)[[41]](https://en.wikipedia.org/wiki/History_of_animation#cite_note-FOOTNOTEClementsMcCarthy2006169-43) and animation historian Nobuyuki Tsugata[[Note 3]](https://en.wikipedia.org/wiki/History_of_animation#cite_note-44)determining the film was most likely made between 1907 and 1911.[[42]](https://en.wikipedia.org/wiki/History_of_animation#cite_note-FOOTNOTEL.C3.B3pez2012584-45) The film consists of a series of cartoon images on fifty frames of a[celluloid](https://en.wikipedia.org/wiki/Celluloid) strip and lasts three seconds at sixteen [frames per second](https://en.wikipedia.org/wiki/Frame_rate).[[43]](https://en.wikipedia.org/wiki/History_of_animation#cite_note-FOOTNOTEAnime_News_Network_staff2005-46) It depicts a young boy in a [sailor suit](https://en.wikipedia.org/wiki/Sailor_suit) who writes the [kanji](https://en.wikipedia.org/wiki/Kanji) characters "活動写真" (*katsudō shashin*, or "moving picture"), then turns towards the viewer, removes his hat, and offers a salute.[[43]](https://en.wikipedia.org/wiki/History_of_animation#cite_note-FOOTNOTEAnime_News_Network_staff2005-46) Evidence suggests it was mass-produced to be sold to wealthy owners of home projectors.[[44]](https://en.wikipedia.org/wiki/History_of_animation#cite_note-FOOTNOTEMatsumoto2011116.E2.80.93117-47) To Matsumoto, the relatively poor quality and low-tech printing technique indicate it was likely from a smaller film company.[[45]](https://en.wikipedia.org/wiki/History_of_animation#cite_note-FOOTNOTELitten201415-48)

Influenced by Émile Cohl, the author of the first [puppet](https://en.wikipedia.org/wiki/Puppet)-animated film (i.e., The Beautiful Lukanida (1912)), Russian-born (ethnically [Polish](https://en.wikipedia.org/wiki/Poles)) director Wladyslaw Starewicz, known as [Ladislas Starevich](https://en.wikipedia.org/wiki/Ladislas_Starevich), started to create stop motion films using dead [insects](https://en.wikipedia.org/wiki/Insects) with wire limbs and later, in France, with complex and really expressive puppets. In 1911, he created [*The Cameraman's Revenge*](https://en.wikipedia.org/w/index.php?title=The_Cameraman%27s_Revenge&action=edit&redlink=1), a complex tale of [treason](https://en.wikipedia.org/wiki/Treason) and[violence](https://en.wikipedia.org/wiki/Violence) between several different insects. It is a pioneer work of [puppet animation](https://en.wikipedia.org/wiki/Puppet_animation), and the oldest animated film of such dramatic complexity, with characters filled with motivation, desire and feelings.

[Play media](https://upload.wikimedia.org/wikipedia/commons/3/3b/Gertie_the_Dinosaur.ogv)

*Gertie the Dinosaur* (1914)

In 1914, American cartoonist [Winsor McCay](https://en.wikipedia.org/wiki/Winsor_McCay) released [*Gertie the Dinosaur*](https://en.wikipedia.org/wiki/Gertie_the_Dinosaur), an early example of character development in drawn animation.[[46]](https://en.wikipedia.org/wiki/History_of_animation#cite_note-FOOTNOTEBendazzi199417-49) The film was made for McCay's vaudeville act and as it played McCay would speak to Gertie who would respond with a series of gestures. There was a scene at the end of the film where McCay walked behind the projection screen and a view of him appears on the screen showing him getting on the cartoon dinosaur's back and riding out of frame. This scene made *Gertie the Dinosaur* the first film to combine live action footage with hand drawn animation. McCay hand-drew almost every one of the 10,000 drawings he used for the film.[[47]](https://en.wikipedia.org/wiki/History_of_animation#cite_note-Crandol-50)

Also in 1914, [John Bray](https://en.wikipedia.org/wiki/John_Randolph_Bray) opened [John Bray Studios](https://en.wikipedia.org/wiki/Bray_Productions), which revolutionized the way animation was created.[[48]](https://en.wikipedia.org/wiki/History_of_animation#cite_note-FOOTNOTESolomon198922.E2.80.9323-51) [Earl Hurd](https://en.wikipedia.org/wiki/Earl_Hurd), one of Bray's employees patented the [cel technique](https://en.wikipedia.org/w/index.php?title=Cel_technique&action=edit&redlink=1).[[49]](https://en.wikipedia.org/wiki/History_of_animation#cite_note-FOOTNOTECrafton1993153.E2.80.93154-52) This involved animating moving objects on transparent celluloid sheets.[[50]](https://en.wikipedia.org/wiki/History_of_animation#cite_note-FOOTNOTECrafton1993150-53) Animators photographed the sheets over a stationary background image to generate the sequence of images. This, as well as Bray's innovative use of the assembly line method, allowed John Bray Studios to create [Colonel Heeza Liar](https://en.wikipedia.org/wiki/Colonel_Heeza_Liar), the first animated series.[[51]](https://en.wikipedia.org/wiki/History_of_animation#cite_note-FOOTNOTESolomon198924.E2.80.9326-54)[[52]](https://en.wikipedia.org/wiki/History_of_animation#cite_note-McLaughlin-55)

In 1915, [Max](https://en.wikipedia.org/wiki/Max_Fleischer) and [Dave Fleischer](https://en.wikipedia.org/wiki/Dave_Fleischer) invented [rotoscoping](https://en.wikipedia.org/wiki/Rotoscoping), the process of using film as a reference point for animation and their studios went on to later release such animated classics as [*Ko-Ko the Clown*](https://en.wikipedia.org/wiki/Ko-Ko_the_Clown), [*Betty Boop*](https://en.wikipedia.org/wiki/Betty_Boop), [*Popeye the Sailor Man*](https://en.wikipedia.org/wiki/Popeye_the_Sailor_Man), and [*Superman*](https://en.wikipedia.org/wiki/Superman). In 1918 McCay released *The Sinking of the Lusitania*, a wartime propaganda film. McCay did use some of the newer animation techniques, such as cels over paintings—but because he did all of his animation by himself, the project wasn't actually released until just shortly before the end of the war.[[52]](https://en.wikipedia.org/wiki/History_of_animation#cite_note-McLaughlin-55) At this point the larger scale animation studios were becoming the industrial norm and artists such as McCay faded from the public eye.[[47]](https://en.wikipedia.org/wiki/History_of_animation#cite_note-Crandol-50)

[Play media](https://upload.wikimedia.org/wikipedia/commons/5/56/FelixTheCat-1919-FelineFollies_silent.ogv)

The 1919 *Feline Follies* by Pat Sullivan

The first known animated [feature film](https://en.wikipedia.org/wiki/Feature_film) was [*El Apóstol*](https://en.wikipedia.org/wiki/El_Ap%C3%B3stol), made in 1917 by [Quirino Cristiani](https://en.wikipedia.org/wiki/Quirino_Cristiani) from [Argentina](https://en.wikipedia.org/wiki/Argentina).[[53]](https://en.wikipedia.org/wiki/History_of_animation#cite_note-FOOTNOTEFinkielman200420-56) He also directed two other animated feature films, including 1931's [*Peludópolis*](https://en.wikipedia.org/wiki/Pelud%C3%B3polis), the first feature length animation to use synchronized sound. None of these, however, survived.[[54]](https://en.wikipedia.org/wiki/History_of_animation#cite_note-FOOTNOTEBendazzi1996-57)[[55]](https://en.wikipedia.org/wiki/History_of_animation#cite_note-FOOTNOTEBeckerman200325-58)[[56]](https://en.wikipedia.org/wiki/History_of_animation#cite_note-Quirio_Cristiani.27s_page_Spanish-59)

In 1920, [Otto Messmer](https://en.wikipedia.org/wiki/Otto_Messmer) of [Pat Sullivan Studios](https://en.wikipedia.org/w/index.php?title=Pat_Sullivan_Studios&action=edit&redlink=1) created [Felix the Cat](https://en.wikipedia.org/wiki/Felix_the_Cat). [Pat Sullivan](https://en.wikipedia.org/wiki/Pat_Sullivan_(film_producer)), the studio head took all of the credit for Felix, a common practice in the early days of studio animation.[[57]](https://en.wikipedia.org/wiki/History_of_animation#cite_note-FOOTNOTEBeckerman200327.E2.80.9328-60) Felix the Cat was distributed by [Paramount Studios](https://en.wikipedia.org/wiki/Paramount_Studios), and it attracted a large audience.[[58]](https://en.wikipedia.org/wiki/History_of_animation#cite_note-FOOTNOTESolomon198934-61)Felix was the first cartoon to be merchandised. He soon became a household name.

In [Germany](https://en.wikipedia.org/wiki/Germany), during the 1920s the [abstract animation](https://en.wikipedia.org/wiki/Abstract_animation) was invented by Walter Ruttman, [Hans Richter](https://en.wikipedia.org/wiki/Hans_Richter_(artist)), and [Oskar Fischinger](https://en.wikipedia.org/wiki/Oskar_Fischinger), however, the[Nazis](https://en.wikipedia.org/wiki/Nazism) censorship against so-called "[degenerate art](https://en.wikipedia.org/wiki/Degenerate_art)" prevented the abstract animation from developing after 1933.

The earliest surviving animated feature film is the 1926 silhouette-animated [*Adventures of Prince Achmed*](https://en.wikipedia.org/wiki/Adventures_of_Prince_Achmed), which used [colour-tinted film](https://en.wikipedia.org/wiki/Film_tinting).[[59]](https://en.wikipedia.org/wiki/History_of_animation#cite_note-FOOTNOTEBeckerman200344-62)It was directed by German [Lotte Reiniger](https://en.wikipedia.org/wiki/Lotte_Reiniger) and French/Hungarian [Berthold Bartosch](https://en.wikipedia.org/wiki/Berthold_Bartosch).[[60]](https://en.wikipedia.org/wiki/History_of_animation#cite_note-FOOTNOTEBeckerman200383-63)

**Walt Disney & Warner Bros.**[[edit](https://en.wikipedia.org/w/index.php?title=History_of_animation&action=edit&section=11)]

In 1923, a studio called [Laugh-O-Grams](https://en.wikipedia.org/wiki/Laugh-O-Grams) went bankrupt and its owner, [Walt Disney](https://en.wikipedia.org/wiki/Walt_Disney), opened a new studio in Los Angeles. Disney's first project was the [*Alice Comedies*](https://en.wikipedia.org/wiki/Alice_Comedies) series, which featured a live action girl interacting with numerous cartoon characters.[[61]](https://en.wikipedia.org/wiki/History_of_animation#cite_note-FOOTNOTEBeckerman200329.2C_35-64) Disney's first notable breakthrough was 1928's [*Steamboat Willie*](https://en.wikipedia.org/wiki/Steamboat_Willie), the third of the [Mickey Mouse](https://en.wikipedia.org/wiki/Mickey_Mouse)series.[[62]](https://en.wikipedia.org/wiki/History_of_animation#cite_note-FOOTNOTESolomon198940.E2.80.9341-65) It was the first cartoon that included a fully post-produced soundtrack, featuring voice and sound effects printed on the film itself ("[sound-on-film](https://en.wikipedia.org/wiki/Sound-on-film)"). The short film showed an [anthropomorphic](https://en.wikipedia.org/wiki/Anthropomorphic) mouse named [Mickey](https://en.wikipedia.org/wiki/Mickey_Mouse) neglecting his work on a [steamboat](https://en.wikipedia.org/wiki/Steamboat) to instead make music using the animals aboard the boat.[[63]](https://en.wikipedia.org/wiki/History_of_animation#cite_note-FOOTNOTEMaltin198034-66)

In 1933, [Warner Brothers Cartoons](https://en.wikipedia.org/wiki/Warner_Bros._Cartoons) was founded. While Disney's studio was known for its releases being strictly controlled by Walt Disney himself, Warner brothers allowed its animators more freedom, which allowed for their animators to develop more recognizable personal styles.[[47]](https://en.wikipedia.org/wiki/History_of_animation#cite_note-Crandol-50)

The first animation to use the full, three-color [Technicolor](https://en.wikipedia.org/wiki/Technicolor) method was [*Flowers and Trees*](https://en.wikipedia.org/wiki/Flowers_and_Trees)*,* made in 1932 by Disney Studios, which won an [Academy Award](https://en.wikipedia.org/wiki/Academy_Award) for the work.[[34]](https://en.wikipedia.org/wiki/History_of_animation#cite_note-Animated_Films_Part_100000-35) Color animation soon became the industry standard, and in 1934, Warner Brothers released [*Honeymoon Hotel*](https://en.wikipedia.org/wiki/Honeymoon_Hotel_(1934_film)) of the [Merrie Melodies](https://en.wikipedia.org/wiki/Merrie_Melodies) series, their first color films.[[64]](https://en.wikipedia.org/wiki/History_of_animation#cite_note-FOOTNOTESolomon1989101-67) Meanwhile, Disney had realized that the success of animated films depended upon telling emotionally gripping stories; he developed an innovation called a "story department" where [storyboard artists](https://en.wikipedia.org/wiki/Storyboard_artist) separate from the animators would focus on story development alone, which proved its worth when the Disney studio released in 1933 the first-ever animated short to feature well-developed characters, [*Three Little Pigs*](https://en.wikipedia.org/wiki/Three_Little_Pigs_(film)).[[65]](https://en.wikipedia.org/wiki/History_of_animation#cite_note-FOOTNOTELee201255.E2.80.9356-68)[[66]](https://en.wikipedia.org/wiki/History_of_animation#cite_note-FOOTNOTEKrasniewicz201060.E2.80.9364-69)[[67]](https://en.wikipedia.org/wiki/History_of_animation#cite_note-FOOTNOTEGabler2007181.E2.80.93189-70) In 1935, [Tex Avery](https://en.wikipedia.org/wiki/Tex_Avery) released his first film with Warner Brothers.[[64]](https://en.wikipedia.org/wiki/History_of_animation#cite_note-FOOTNOTESolomon1989101-67) Avery's style was notably fast paced, violent, and satirical, with a slapstick sensibility.[[68]](https://en.wikipedia.org/wiki/History_of_animation#cite_note-FOOTNOTEMaltin1980250-71)

***Snow White and the Seven Dwarfs***[[edit](https://en.wikipedia.org/w/index.php?title=History_of_animation&action=edit&section=12)]

Many consider Walt Disney's 1937 [*Snow White and the Seven Dwarfs*](https://en.wikipedia.org/wiki/Snow_White_and_the_Seven_Dwarfs_(1937_film)) the first animated feature film, though at least [seven films](https://en.wikipedia.org/wiki/List_of_animated_feature_films_before_1940) were released earlier.[[69]](https://en.wikipedia.org/wiki/History_of_animation#cite_note-FOOTNOTESolomon198961.E2.80.9362-72) However, Disney's film was the first one completely made using hand-drawn animation. The previous seven films, of which only four survive, were made using [cutout](https://en.wikipedia.org/wiki/Cutout_animation), [silhouette](https://en.wikipedia.org/wiki/Silhouette_animation) or [stop motion](https://en.wikipedia.org/wiki/Stop_motion), except for one—also made by Disney seven months prior to Snow White's release—[*Academy Award Review of Walt Disney Cartoons*](https://en.wikipedia.org/wiki/Academy_Award_Review_of_Walt_Disney_Cartoons). This was an [anthology film](https://en.wikipedia.org/wiki/Anthology_film) to promote the upcoming release of Snow White. However, many do not consider this a genuine feature film because it is a [package film](https://en.wikipedia.org/wiki/Anthology_film). In addition, at approximately 41 minutes, the film does not seem to fulfill today's expectations for a [feature film](https://en.wikipedia.org/wiki/Feature_film). However, the official [BFI](https://en.wikipedia.org/wiki/British_Film_Institute), [AMPAS](https://en.wikipedia.org/wiki/Academy_of_Motion_Picture_Arts_and_Sciences) and [AFI](https://en.wikipedia.org/wiki/American_Film_Institute) definitions of a feature film require that it be over 40 minutes long, which, in theory, should make it the first animated feature film using traditional animation.

But as Snow White was also the first one to become successful and well-known within the English-speaking world, people tend to disregard the seven films. Following Snow White's release, Disney began to focus much of its productive force on feature-length films. Though Disney did continue to produce shorts throughout the century, Warner Brothers continued to focus on features.

**The television era**[[edit](https://en.wikipedia.org/w/index.php?title=History_of_animation&action=edit&section=13)]

[Color television](https://en.wikipedia.org/wiki/Color_television) was introduced to the US Market in 1951. In 1958, [Hanna-Barbera](https://en.wikipedia.org/wiki/Hanna-Barbera) released [*The Huckleberry Hound Show*](https://en.wikipedia.org/wiki/The_Huckleberry_Hound_Show), the first half-hour television program to feature only animation. [Terrytoons](https://en.wikipedia.org/wiki/Terrytoons) released [*Tom Terrific*](https://en.wikipedia.org/wiki/Tom_Terrific) the same year.[[70]](https://en.wikipedia.org/wiki/History_of_animation#cite_note-FOOTNOTEBeckerman200361-73) In 1960, Hanna-Barbera released another monumental animated television show, [*The Flintstones*](https://en.wikipedia.org/wiki/The_Flintstones), which was the first animated series on prime time television.[[71]](https://en.wikipedia.org/wiki/History_of_animation#cite_note-FOOTNOTESolomon1989239.E2.80.93240-74) Television significantly decreased public attention to the animated shorts being shown in theatres.

Animation Techniques[[edit](https://en.wikipedia.org/w/index.php?title=History_of_animation&action=edit&section=14)]

Innumerable approaches to creating animation have arisen throughout the years. Here is a brief account of some of the non traditional techniques commonly incorporated.

**Stop motion**[[edit](https://en.wikipedia.org/w/index.php?title=History_of_animation&action=edit&section=15)]

This process is used for many productions, for example, the most common types of puppets are clay puppets, as used in [*The California Raisins*](https://en.wikipedia.org/wiki/The_California_Raisins) , [*Wallace and Gromit*](https://en.wikipedia.org/wiki/Wallace_and_Gromit) and [*Shaun the Sheep*](https://en.wikipedia.org/wiki/Shaun_the_Sheep) by [*Aardman*](https://en.wikipedia.org/wiki/Aardman), and figures made of various rubbers, cloths and plastic resins, such as [*The Nightmare Before Christmas*](https://en.wikipedia.org/wiki/The_Nightmare_Before_Christmas) and [*James and the Giant Peach*](https://en.wikipedia.org/wiki/James_and_the_Giant_Peach). Sometimes even objects are used, such as with the films of [Jan Švankmajer](https://en.wikipedia.org/wiki/Jan_%C5%A0vankmajer).

Stop motion animation was also commonly used for special effects work in many live-action films, such as [the 1933 version of *King Kong*](https://en.wikipedia.org/wiki/King_Kong_(1933_film)) and [*The 7th Voyage of Sinbad*](https://en.wikipedia.org/wiki/The_7th_Voyage_of_Sinbad).

**CGI animation**[[edit](https://en.wikipedia.org/w/index.php?title=History_of_animation&action=edit&section=16)]

The first fully computer-animated feature film was [Pixar](https://en.wikipedia.org/wiki/Pixar)'s [*Toy Story*](https://en.wikipedia.org/wiki/Toy_Story) (1995).[[72]](https://en.wikipedia.org/wiki/History_of_animation#cite_note-FOOTNOTEBeckerman200383.E2.80.9384-75) The process of [CGI](https://en.wikipedia.org/wiki/Computer-generated_imagery) animation is still very tedious and similar in that sense to traditional animation, and it still adheres to many of the same principles.

A principal difference of CGI animation compared to traditional animation is that drawing is replaced by 3D modeling, almost like a virtual version of stop-motion. A form of animation that combines the two and uses 2D computer drawing can be considered computer *aided* animation.

Most CGI created films are based on animal characters, monsters, machines, or cartoon-like humans. Animation studios are now trying to develop ways to create realistic-looking humans. Films that have attempted this include [*Final Fantasy: The Spirits Within*](https://en.wikipedia.org/wiki/Final_Fantasy:_The_Spirits_Within) in 2001, [*Final Fantasy: Advent Children*](https://en.wikipedia.org/wiki/Final_Fantasy:_Advent_Children) in 2005, [*The Polar Express*](https://en.wikipedia.org/wiki/The_Polar_Express_(film)) in 2004, [*Beowulf*](https://en.wikipedia.org/wiki/Beowulf_(2007_film)) in 2007 and[*Resident Evil: Degeneration*](https://en.wikipedia.org/wiki/Resident_Evil:_Degeneration) in 2009. However, due to the complexity of human body functions, emotions and interactions, this method of animation is rarely used. The more realistic a CG character becomes, the more difficult it is to create the nuances and details of a living person, and the greater the likelihood of the character falling into the [uncanny valley](https://en.wikipedia.org/wiki/Uncanny_valley). The creation of hair and clothing that move convincingly with the animated human character is another area of difficulty. [*The Incredibles*](https://en.wikipedia.org/wiki/The_Incredibles) and [*Up*](https://en.wikipedia.org/wiki/Up_(2009_film)) both have humans as protagonists, while films like [*Avatar*](https://en.wikipedia.org/wiki/Avatar_(2009_film)) combine animation with live action to create humanoid creatures.

Cel-[shading](https://en.wikipedia.org/wiki/Shader) is a type of [non-photorealistic rendering](https://en.wikipedia.org/wiki/Non-photorealistic_rendering) intended to make [computer graphics](https://en.wikipedia.org/wiki/Computer_graphics) appear hand-drawn. It is often used to mimic the style of a [comic book](https://en.wikipedia.org/wiki/Comic_book) or [cartoon](https://en.wikipedia.org/wiki/Cartoon). It is a somewhat recent addition to computer graphics, most commonly turning up in [console](https://en.wikipedia.org/wiki/Video_game_console) video games. Though the end result of cel-shading has a very simplistic feel like that of[hand-drawn animation](https://en.wikipedia.org/wiki/Traditional_animation), the process is complex. The name comes from the clear sheets of acetate (originally, celluloid), called [cels](https://en.wikipedia.org/wiki/Cel), that are painted on for use in traditional 2D animation. It may be considered a "[2.5D](https://en.wikipedia.org/wiki/2.5D)" form of animation. True real-time cel-shading was first introduced in 2000 by [Sega](https://en.wikipedia.org/wiki/Sega)'s [*Jet Set Radio*](https://en.wikipedia.org/wiki/Jet_Set_Radio) for their [Dreamcast](https://en.wikipedia.org/wiki/Dreamcast) console. Besides video games, a number of anime have also used this style of animation, such as [*Freedom Project*](https://en.wikipedia.org/wiki/Freedom_Project) in 2006.

[Machinima](https://en.wikipedia.org/wiki/Machinima) is the use of real-time [3D computer graphics](https://en.wikipedia.org/wiki/3D_computer_graphics) [rendering](https://en.wikipedia.org/wiki/3D_rendering) engines to create a cinematic production. Most often, [video games](https://en.wikipedia.org/wiki/Video_game) are used to generate the [computer animation](https://en.wikipedia.org/wiki/Computer_animation). Machinima-based artists, sometimes called **machinimists** or **machinimators**, are often [fan laborers](https://en.wikipedia.org/wiki/Fan_labor), by virtue of their re-use of copyrighted materials.