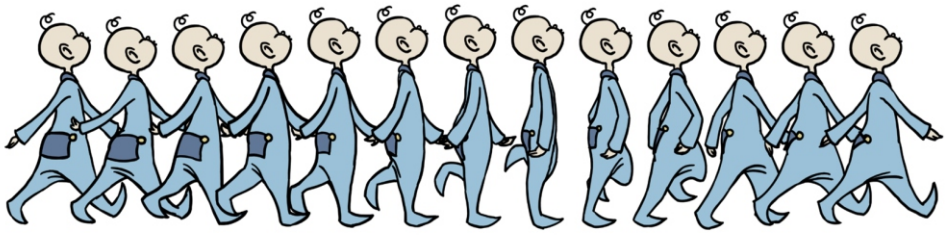
Part 1

Fundamentals of Animation



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Chapter Contents

Introduction to Computer Animation

The history of animation is rich with innovation, beginning in the nineteenth century and continuing right through to the present day. The earliest animation techniques employed optical toys, followed by the creation of animated films. The great cinematic achievements that we know today are the result of ongoing artistic and technological experimentation and discovery.

History of Animation ----------→ Lesson 1

The history of animation is rich with innovation, beginning in the nineteenth century and continuing right through to the present day. The earliest animation techniques employed optical toys, followed by the creation of animated films. The great cinematic achievements that we know today are the result of ongoing artistic and technological experimentation and discovery.

In the Beginning

Many of the nineteenth century inventions designed to animate images were initially created as amusements for children. Most of these were optical toys that in time grew more sophisticated, resulting in a form of entertainment that proved popular with everyone. These toys are:

- The Praxinoscope
- The Zoetrope
- The Thaumatrope
- The Flip Book

What is an Optical Toy?

An optical toy is an item that uses persistence of vision to fool the eye into perceiving a series of still images, one shown quickly after the other, as a continuous moving image.

What is Persistence of Vision?

Persistence of vision is when your eye's retina retains an image for a fraction of a second, before replacing it with a new image. If the images before you are moving fast enough, you will have the impression that you are seeing both images at the same time.

This persistence of vision allows us to "fill in" movement from one image to the next when viewing media on screen, which is usually filmed at 24 frames per second. In animation, it is also typical for an animator to use 24 images for one second of screen time.

We recommend that you, as a beginning animator, use 12 frames per second when you are working on the activities in the first few animations that you will be making.

The Zoetrope

The zoetrope creates the illusion of a moving picture. The first zoetrope was created in China, while the modern zoetrope, essentially a cylinder with vertical openings around the circumference, was invented in 1834 by Englishman William George Horner. Affixed to the inside edge of the circumference are a series of pictures that, when viewed through the openings of the spinning cylinder, appear to form a seamless moving image.

The Thaumatrope

This optical toy was invented by the English physician John A. Paris in 1825. The thaumatrope is a simple disc with two different pictures on each side. Strings are attached to each side of the disc and when pulled, the disc spins and the images appear to merge, creating a single illustration.

The Flip Book

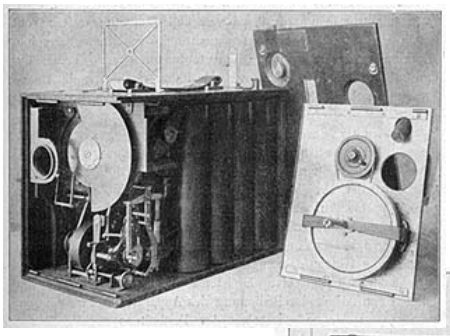
The first flip book was invented in 1868 by John Barnes Linnet. This was another device that relied upon the illusion of movement to suggest a seamless moving image. A flip book is a set of printed or drawn pictures, featured in sequence on the pages of a book. When the pages of the book are flipped at high speed, it creates an illusion of movement.

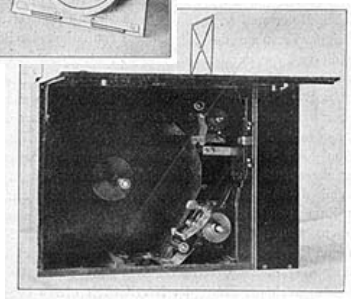
The Praxinoscope

The praxinoscope was invented by French photographer Emile Reynaud in 1831. This device was a more advanced version of the zoetrope, also relying on a spinning cylinder, now fixed with a series of mirrors. Reynaud also developed a larger version of the praxinoscope, so he could project the moving pictures onto a screen.

The Movie Camera

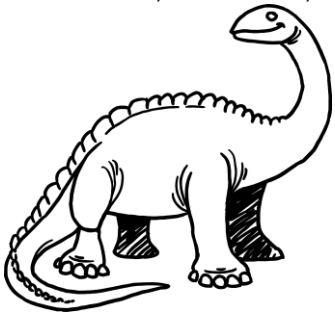
The movie camera was invented in the early 1900s. The camera was equipped with a hand-crank to transport the unexposed film frame-by-frame through the camera. This mechanism allowed the user to start and stop filming as necessary. People quickly discovered that the frame-by-frame technique would allow them to animate images drawn on paper. Emile Cohl was one of the first to experiment with this form of animation.





Winsor McCay and Gertie the Dinosaur

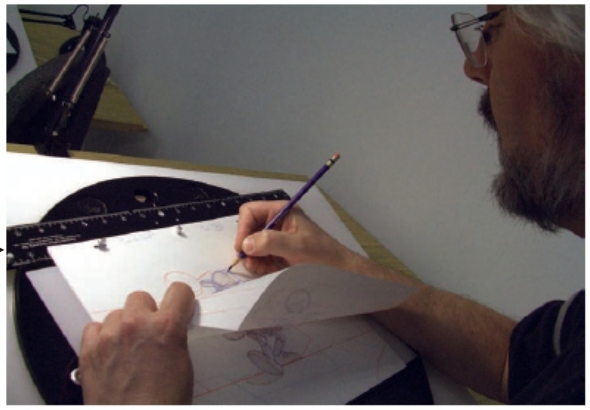
In February 1914, Winsor McCay created an animated film of a dinosaur he called Gertie. It was the first time that an animated character exhibited personality. Gertie the Dinosaur would hide behind rocks, drink water, dance and even cry!



McCay brought Gertie to life through thousands of hand drawn images on paper. He would carefully flip through the drawings to ensure that the animation appeared smooth and fluid.

The Peg Bar

Around 1915, French Canadian painter Raoul Barré created standard perforations on drawing paper and the peg bar that are still in use today. The holes in the paper serve to perfectly align each drawing on the peg bar, preventing any jerkiness in the animation once it is filmed.



The Rotoscope

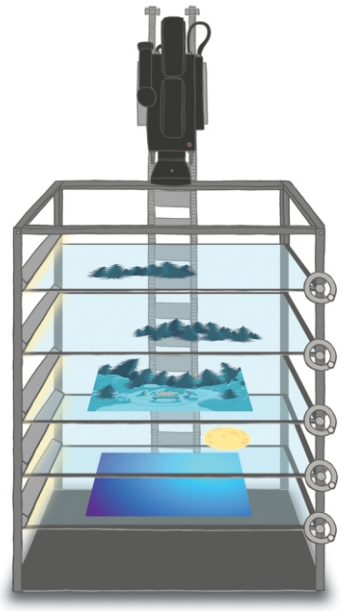
Around 1915, Max Fleischer invented the rotoscope. This machine allowed the user to transfer a live-action film into frame-by-frame drawings to create animation.

Innovations of Walt Disney Studios in Early times

Walt Disney was a pioneer in what was to become the standard methods of production in an animation studio. The Walt Disney Studios introduced the storyboard, a visual script that helps animators keep track of what is transpiring in a film whilst it is being created.

Many of the animated short movies created by the Walt Disney Studios have made history. In 1928, Steamboat Willie was the first cartoon to use synchronized sound. In this film, Mickey Mouse whistles a tune, the boat's whistles toot, while birds and animals squawk, all of them synchronized with the music and sound effects accompanying the film. In 1932, the film Flowers and Trees was the first animation to introduce the Technicolor process technology.

In 1933, the former Walt Disney Studios animator Ub Iwerks invented the multiplane camera. This special camera is used to move through a number of different layers in a scene to create the perception of depth. The multiplane camera, which was set up vertically much like a photographic enlarger, would shoot down through as many as five planes.



The planes were attached to vertical posts that allowed four of the planes to move independently of one another. The first two planes were used for animation, the next two were for backgrounds, and the fifth was fixed and used for sky backgrounds. The finished result produced a depth of perspective which had not previously been seen in animated film.

Part 1

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Laboratory Manual

ANIMATING IN THE 19TH CENTURY

Lab 1.1

Work File: 19thCenturyAnimation.ist

Directions:

1. Launch Inspiration
2. Open the template 19th Century Animation.ist
3. Follow the directions indicated in the file.
4. Save your activity file in your folder.