

Animated cartoons, from the old to the new: evolution for the past 100 years

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This paper is a research project about animated cartoons and their history for the past 100 years. It covers several techniques used in cartoon animation, early creators, early devices and current trends. The focus is on American and European animated cartoons and covers some of the early contributors of cartoon animation like James Stuart Blackton as well as today's creators like John Lasseter. Examples of famous cartoon characters, short films and full length cartoon animated films are presented but the paper does not cover all animated films on the market today.

Keywords: *Animated cartoon, history of animation, technology, CGI*

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Introduction

The words animation and cartoon have been associated with lively and usually humorous images. Random House Webster's Unabridged Dictionary (2001) defines animation as giving life or liveliness to something and the word cartoon as sketches or drawings similar to the ones we have seen in newspapers. When these words are combined to *animated cartoon* they refer to a "motion picture consisting of a sequence of drawings, each so slightly different that when filmed and run through a projector the figures seem to move" (Random House, Inc., 2001, p. 82). The animated cartoons discussed in this research refer to the oldest form of animated cartoons, the traditional animation and the latest computerized technology of animation.

Cartoons or animation as we know it today have changed dramatically during the past 100 years. However, animation is much older than that. A recent discovery revealed a 5.200 year old bowl containing a series of related animations of a goat and a fish ("First Animation", 2004; "CHTHO", 2008; Ball, 2008; Beckerman, 2003). Thousand year old cave paintings and burial chambers which have series of animations that show images can also be related to animation but since there is no possibility of viewing them in motion they do not qualify as *animated cartoons*. Whether this sort of animation classifies as an early form of animation is highly debated (Beckerman, 2003).

The main aim of this paper is to inform readers of the history of animated cartoons in relation to their evolution through time and how they have followed latest technologies throughout the years. The focus is on American and European cartoon animation, since Asia has their well known Anime cartoons and they need a special research all together and will therefore not be covered here. Animation such as seen in Wallace and Gromit or Robot Chicken will not be covered either, but they do represent the stop motion technique mentioned later on. The paper will begin by covering the early creators of cartoon animation and early devices. It will then move on to cartoon animation as a business model and take a look at the latest trend and technology in cartoon animation. It ends with the authors conclusions about where cartoon animation is headed in the future.

Early creators

It is not often that a discovery is made and no one to give credit to. Nevertheless animated cartoons do not seem to have one single creator. In spite of this, few people can be mentioned

who contributed to animation in the beginning. Georges Méliès, a French magician and director of the Théâtre Robert-Haudin (Ezra, 2000), discovered a technique now known as stop-motion animation by accident when his camera broke down (Animation, n.d.). He is well known amongst the French community for his tribute to film animation during the first decades of the 20th century.

James Stuart Blackton was an American filmmaker who was one of the first people to use the techniques of stop-motion, discovered by Méliès, and hand-drawn animation. He is sometimes referred to as the father of American animation. He was a newspaper cartoonist who produced the first animated film ever made, *Humorous Phases of Funny Faces* in 1906. It was also the first cartoon to use the single frame method and was projected at 20 frames per second (Animation, n.d.). It must be mentioned that the film, *The Enchanted Drawing*, came out six years before *Humorous Phases of Funny Faces*, or in 1900 and was produced by the Edison Motion Picture Company (Beckerman, 2003). Blackton was also one of the co-founders of the first film studios, Vitagraph Company (Dirks, n.d.; Animation, n.d.; The Library of Congress, n.d.). Soon after the first two animated films in 1900 and 1906 came *Fantasmagorie* which is considered the first fully-animated film, produced by Emile Cohl, a French caricaturist (Beckerman, 2003).

The person which helped define this new industry was Winsor McCay who was a comic-strip animator and sketch artist at *New York Herald*. He was the first to establish the technical method of animating graphics (Dirks, n.d.). He used popular characters from his comic strip. First came Little Nemo in Slumberland (1911) with 4.000 hand-drawn frames, followed by How a Mosquito Operates (1912) with 6.000 frames. His first successful cartoon character was a brontosaurus named Gertie in Gertie the Dinosaur which came out in 1914 and consisted of 10.000 drawings (Dirks, n.d.; Animation, n.d.; Bukatman, 2006).

The most famous creator amongst today's youth is probably Walter Elias Disney who was born in Chicago in 1901 (Crafton, 1993) and a co-founder of Walt Disney productions. He went to France in 1918 and when he came back he decided to set up a commercial art studio with his friend, Ubbe Iwerks (1901-1971). Iwerks was the developer of Mickey Mouse the first big hit of Disney but was in the shadow of Walt Disney and not much has been written about him until lately.

Please note that this paper does not cover all creators and great entrepreneurs of cartoon animation in America and Europe. For further reading about people who have affected the world of animation take a look at *Who's who in animated cartoons* (2006) by Jeff Lenburg.

Early devices

The inspiration came from flipbooks – sequential drawings that produced an illusion of motion when thumbed. Published motion-study photographs of Muybridge and Marey provided all the data needed for the analysis and reconstruction of movement, image by image (Crafton, 1993). According to Crafton (1993) the earliest date for which animation was first commercially exploited was in 1898 despite lack of documentation. It is clear that animated films coincide with movie films. They were black and white at first, then came sound and color.

Evolution of cartoons as we know them today would not be possible if it weren't for the technology behind the scenes. There are a few devices which are a part of the early history of animation and these devices go back to the 19th century. The first device is the phenakistoscope (Greek for deceptive view or cheat) invented in 1831 by Joseph Plateau, a scientist and former art student (Phenakistoscope, n.d.; Phenakistoscope, n.d.; Beckerman, 2003). It



Figure 1. Disc for phenakistoscope (Phenakistoscope, n.d.)

can be described as a rotating disc with about 16 pictures, each slightly different, and can only be viewed by one person at a time (see figure 1).

Next came the Zoetrope designed by William George Horner in 1834 and was named “Daedalum” or the wheel of the devil. However it did not become popular until the 1860's when it was patented by makers in both England and America. The American developer, named the device Zoetrope which means wheel of life (see figure 2) (Highton, 2002; Zoetrope, n.d.; Beckerman, 2003).



Figure 2. Replica of a Zoetrope (Dunn, 2004)

The kinetoscope was a device designed for films to be viewed individually through the window of a cabinet housing its components. First described by Thomas Edison in 1888 but was largely developed by his employee William Kennedy Laurie Dickson around 1890. The same people invented the kinetograph, an innovative motion picture camera (Kinetoscope, n.d.).



Figure 3. An 1895 version of the kinetoscope (Kinetoscope, n.d.).

The Praxinoscope (see figure 3) came after the Zoetrope and was invented in France by Charles-Émile Renaud (Crafton, 1993). Like the Zoetrope, it used strips of pictures placed around the inner surface of a spinning cylinder. It was a sort of projector different from the devices, which had

emerged before, where just one person at a time could look at the films through a small hole. Similar to the nineteenth century lantern shows (Praxinoscope, n.d.).

The praxinoscope soon got replaced by the photographic film projector of the Lumière brothers, Auguste Marie Louis Nicolas and Louis Jean (Praxinoscope, n.d.).

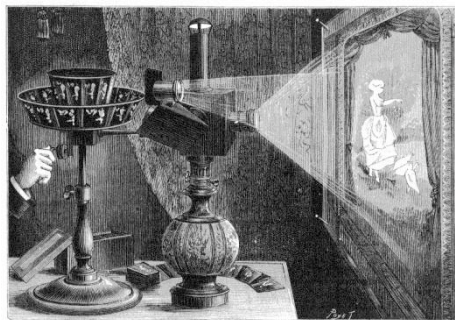


Figure 4. A praxinoscope (Praxinoscope, n.d.)

Techniques and cost of animation

The animated films were more expensive to produce during the first decades of the 20th century because of the frame-by-frame photography demanded. Yet they were sold on the open market and sold for the same price as ordinary films (Crafton, 1993). Since many companies were not ready to take the financial risk they did not want to play along. This can perhaps be looked at with Christensen's RPV theory, under estimating the opportunities which lay in cartoon animation (Christensen, 2004) and the public's interest. A brief summary of the techniques used for cartoon animation will now be given.

Cel animation is one of the oldest techniques used for cartoon animation and allows some parts of each frame to be repeated from frame to frame, which in turn saves labor. A descriptive sample can be seen on figure 5. Before this invention the whole drawing was made on a single frame and then photographed. Thus the cartoon had to be drawn again and again for each frame. A cartoon named Gertie the Dinosaur is an example of the first methods used in cartoon

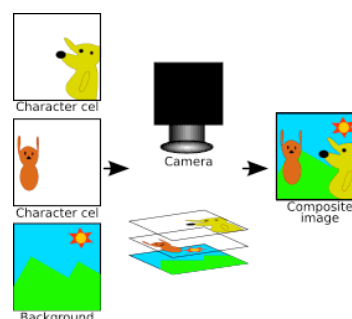


Figure 5. Animation cells (Traditional animation, n.d.)

animation. The cel animation process was invented by Earl Hurd and John Bray in 1915, but they, like so many other great inventors patented the process and collected royalties until the patent expired in 1932 (Pointer, n.d.; Traditional animation, n.d.). This is a technique well suited for low budget films and can be seen like working in a car factory and has sometimes been compared to Henry Ford's factory method where there are several people working on the same product to make it faster and cheaper in production.

Creating loops is another low cost and efficient way to create the illusion of motion. Eadward J. Muybridge (also known as Edward James Muggeridge) is well known for his

use of looping when he created the galloping horse (Eadweard Muybridge, n.d.; Animal Locomotion, n.d.). He used the method called rotoscoping which was invented by Max Fleischer and patented in 1917. Fleischer is known for famous cartoons such as Betty Boop and Gulliver's Travels (Rotoscoping, n.d.; Traditional animation, n.d.; Pointer, n.d.) and one of the Fleischer brothers.

As time passed new technology emerged and the device used for 2D cartoons was the multiplane camera which was a tool used to add depth to scenes in 2D animated movies. There have been a few made, but the one used by Walt Disney is the probably most famous one but was later replaced by the computerized CAPS process or computer animation production system (Traditional animation, n.d.; Multiplane camera, n.d.).

Technology progressed once again and the classical act of inking cels by hand moved to xerography where drawings could be copied directly onto the cels and the coloring left for the inkers. The movie one hundred and one Dalmatians was the first movie to use this technique. Later color toners became available. A similar process, called the APT process or animation photo transfer, was a major breakthrough in transferring the animator's art onto cels. This was invented by Dave Spencer in 1985 for the film *The Black Cauldron* (Traditional animation, n.d.).

The latest technology is CGI (computer-generated imagery). Many animated cartoons are first drawn and then digitized into the computer and put on a digital video format instead of the "good old film", others are simply made from scratch by powerful computers using a graphics tablet, Cintiq or a similar device. Some producers even use live actors to model for cartoons (Traditional animation, n.d.). However, it must be mentioned that this is a delicate process and some have gone too far and made the characters too realistic which is considered scary for young children and even adults.

It has not gone unnoticed that mixing cartoon animations and motion pictures has been tried throughout the years. Some have been quite successful, others have not. Who Framed Roger Rabbit? (1988) was a tribute to all the characters produced by Disney, MGM, Warner Bros and other studios a very humorous film where a mixture of live actors and cartoons are shown interacting. Cool World (1992) was distributed by Paramount pictures and featured Brad Pitt. Osmosis Jones (2001) and Space Jam (1996) were produced by Warner Bros. Space Jam featured Michael Jordan and the Looney Tunes (Bugs Bunny, Daffy Duck and more).

There is a different kind of mixture as well. What is common today is to bring comic books and their characters to life and this is done with cartoon animation techniques and CGI.

Sin City and *Kill Bill*, movies directed by Quentin Tarantino are in a different form. Chris Pallant (2007) a graduate student at the University of Wales, Bangor wrote an interesting article in the journal *Animation* about how Tarantino does it. Pallant refers to the word cartoonism, a process whereby filmic live action seeks to imitate or utilize the conventions of cartoon, namely the *mêlée* of comic strips. This is something that would be worth looking into but will not be done in more detail here.

The golden age - animation becomes big business

Animation was virtually unknown until 1907. It was then that the film, *L'Hotel hanté*, opened in Paris. The response from the public was strong and many producers picked their brains, trying to understand the tricks behind the moving objects. They used wires to make the objects move, which is a well known trick today (special effects), both by magicians and movies. This is when the battle started to be about the characters and not the technology since it was being standardized, as happens with new technology that becomes widespread. The film was produced by the Vitagraph company and directed by Blackton and his partner Albert E. Smith, but the idea had come from Méliès (Crafton, 1993).

Walt Disney Productions emerged in the 1920's and their main competitor was Fleishcer Studios, Inc., founded by Max Fleishcer who patented a new process called rotoscoping, as mentioned earlier. In 1930 Walt Disney Productions hit a rough patch but got back on their feet when the first full length animated film was introduced, *Snow White and the Seven dwarfs* in 1937 and was 1938's top moneymaker.

From the 1940's to the 1960's various companies came to the market as well such as MGM, Fox and Warner Bros. During that time there was some competition but Disney seems to have survived it all and will always be known for its family oriented films while the others were more in the short film business, programs varying from 5 – 20 minutes in length.

When *Steamboat Willie* came out in 1928 with sound, created by Powers system, it was "...said to be the first cartoon subject to be made specially for sound" and animation entered into a new era (Crafton, 1993).

It must be a vital part of any research on a historical topic like cartoon animation to cover a broad spectrum. This chapter will go through a few of the most popular animated cartoons, both short films and full length, from the beginning of the 20th century and stretch to animated cartoons we see today.

As has been mentioned, Gertie the Dinosaur was one of the first short animated cartoons which emerged in the beginning of the 20th century. Unfortunately, some have mistaken it to be the first one, perhaps it is because it has been on the news and has a certain quality to it.

Mickey Mouse, sometimes referred to as Mortimer Mouse, is one of Disney's most famous characters from the 1920's. The most famous cartoon with Mickey Mouse is Steamboat Willie which appeared in 1928. Disney also created characters like Donald Duck, Goofy, Pluto, Daisy Duck and more. It is worthwhile to mention that these characters are still "alive" and well today, although not in their original form. Disney is however best known today for its full length animated cartoons and movies. Their first production of animated cartoons in full length was Snow white and the seven dwarfs (1937), later came; Pinocchio (1940), Dumbo (1941), Bambi (1942), Cinderella (1950), Alice in Wonderland (1951) and Peter Pan (1953). In the 1950's the screen format changed. Lady and the Tramp which came out in 1955 was the first movie displayed in CinemaScope, a widescreen movie format. Sleeping Beauty (1959) also came in widescreen.

The Fleischer brothers', founders of Fleischer Studios, Inc., cartoons emerge around the same time as Disney and are Disney's main competitor until they are forced to resign by Paramount Pictures in 1941 (Fleischer Studios, n.d.). Some of the most famous cartoons produced by Fleischer Studios were Ko-Ko the Clown, Betty Boop and Popeye the Sailor. Fleischer Studios, Inc. also produced a series of seventeen Superman cartoons in an agreement with Paramount and DC Comics. The Fleischer Brothers only introduced two feature-length animations during their career, Gulliver's Travels (1939) and Mr. Bug goes to town (1941).

During the golden age of animation, Fox distributed one cartoon produced by TerryToons animation studio. Despite their lack of contribution to the world of animation they are worth mentioning as they brought the world Mighty Mouse which is said to be the first cartoon character to appear on Saturday mornings (Dirks, n.d.). Mighty Mouse's slogan was: "*Here I come to save the day!*"

Warner Bros contributed many great cartoons and characters as well, amongst them are the looney toon characters; Daffy Duck, Bugs Bunny, Road Runner, Pepe Le Pew and more. Chuck Jones was the creator of Road Runner and Pepe Le Pew but Tex Avery was the creator of Daffy Duck and Bugs Bunny. Warner Bros has made many cartoons and one of their best work in animation is What's opera doc?

MGM studios were not as great a threat as Warner Bros but they did bring characters like Adolf Wolf (the wolf the droppes his jaw) and Woody Woodpecker. It is worth mentioning that Tex Avery worked for Warner Bros, but moved to MGM and created the previously mentioned characters. Willam Hanna and Joseph Barbera, the creators of Tom and Jerry, worked at MGM in the beginning while creating the cat and mouse cartoons. Later they established their own company, Hanna-Barbera (Dirks, n.d.).

Hanna-Barbera has contributed more to later cartoons such as The Flintstones, The Jetsons, Scooby-Doo, Top Cat, Josie and the Pussycats, The Addams Family, Johnny Bravo, Cow and Chicken, Dexter's Laboratory and Johnny Bravo. Most of these have been shown on the known TV channel, Cartoon Network.

New technology and trends

In the 1980's the technology had a great impact on cartoon animation and how they were made. In the 1980's Steve Jobs, Bill Gates and others were introducing revolutionary equipment which would make life a little easier for everyone. In 1979 Pixar Studios was just a small division of Lucasfilm, but in 1986 Steve Jobs bought it and gave it its current name (Pixar, n.d.).

In the 1990's different animation films reached the market. Many might remember when the first CGI (computer-generated imagery) assisted movie in co-operation with Disney and Pixar came out. At Pixar (now Disney), John Lasseter, an American animator, works as chief creative officer. John Lasseter is the man everyone should know in relation to cartoon animation today when considering CGI. John worked at first for Disney but got fired as he was discovering the science of computers and their potential for new ways of producing cartoon animation. He is the creator, amongst his colleagues, of Toy Story which came out in 1995 and was considered revolutionary and was the company's first big film. From 1986 Pixar had been working on computer created shorts but went in cooperation with Disney in the 1990's (Schlender, 2006). Other names worth mentioning in today's new business of cartoon animation are Brad Bird director of The Incredibles and John Musker director of Aladdin.

Toy Story was a true revolution. Since then many cartoons have hit the market from various producers. DreamWorks was in co-operation with PDI (Pacific Data Images) and even Fox has tried to participate in the market. It does seem that it is not for everyone to

survive in this market, but DreamWorks and PDI have merged and in 2006 The Disney Company and Pixar merged as well (Pixar Corporate Overview, n.d.).

Since 1995, cartoons such as Finding Nemo (2003), The Incredibles, A Bugs Life (1998), Antz (1998), Dinosaur (2000) and the latest Wall-E (2008) have emerged. Most of these animated films are award winning for stunning graphics.

What is interesting to look at is why did this sort of animation not appear sooner? Pixar has been working on CGI shorts since 1984, but it first appears 10 years later. Perhaps it is the well known fact that it takes about 10 years to reach a critical stage. Maybe this can also be explained by Christiansens RPV theory, resources, processes and values. In his book *The Innovators Dilemma* (1997) he talks about three classes of factors that an organization can and cannot do. It could also be the simple fact that computers were simply not powerful enough but as Lasseter states in an article in fortune, the computer had so little power that they couldn't create the background for the short they made (Schlender, 2006).

Disney has always had great talents on their hands and they have always been a large corporation, but they didn't seem to see the need for CGI cartoons until everyone else wanted a piece and they saw what was happening in computer games, just remember, they fired John Lasseter , who is now in charge of their animation department.

The distribution medium has also been changing. Going from VHS to DVD to Blue ray, what is next? The world has gone from black and white mini television screens to multicolor, millions of pixels flat panels. What have the producers done? They have followed the technology and trends simply to keep up. It is not likely that The Walt Disney Company might have gone bankrupt in two years if not for Toy Story and others, but they might loose the market like IBM did when they just listened to their current customers and not the potential ones.

Disney's classics movies portrreit a lot of music, family oriented and entertaining material, but the youth today wants more. With the technology available today there are more requirements. Just look at computer games like EVE online produced by CCP, Resident Evil or Halo. These graphics are spectacular, perhaps a little too realistic at times.

It is vital not to forget the longest surviving cartoon animated TV show, The Simpsons. The Simpsons have been around for 20 years (1989-2009) and their shows are a good and clear example of the evolution which has taken place in cartoon animation. They started with cel animation and changed to digital ink and paint in season 14 (History of The Simpsons, n.d.). The creators even create a full length movie about the family in 2007, named *The Simpsons Movie*. The most recent change in their production is that they started showing

their episodes in HD (high definition) just a couple of weeks ago (McClean, 2009). What is even more interesting is that they took advantage of this and created more details for their viewers. This is one of the great things technology has brought to us.

The future

Steamboat Willie is a child of its time but today they have gone too far. They should try and compromise. Perhaps the reason is that they are trying to earn more money by saving time and employees since drawing frame by frame is a tedious and time consuming job compared to computerized work today.

It has certainly not gone unnoticed from cartoon enthusiasts that animated cartoons are taking a turn (to the worse some might say). The traditional hand drawn frame-by-frame films are being substituted by computerized cartoons like Shrek (2001), Ice Age (2002) and Wall-E (2008). Many of these are done with good taste. However famous characters like Mickey Mouse are being digitized and just look silly. Perhaps it is time for change or the skills are no longer within the company, it might be a simple mathematical problem. Today every company is in business to make as much money as possible. Some do it on the expense of their customers, some are on the legal site, and others just try to find cheap ways and time savers. With the evolution of technology many possibilities have opened up. Today there are several companies that specialize in animated cartoons with the assistance of computers and collaborate with well established companies like Walt Disney and DreamWorks. Due to changes on the market, technology prices falling and animation programs becoming commercially available (Lieberman, 2006) there might be some changes. Whether the market can handle them or not is another story. Perhaps mergers might just become even more popular as the companies realize that the market cannot handle the release of one or two dozen movies a year instead of the normal half a dozen (Lieberman, 2006).

Drawing films frame-by-frame is an old art form which has been around for about 100 years and it would be a shame to lose this knowledge just because we have the technology available to save us some time and spare workers from tedious work. These companies should be careful not to forget about their current customers as well as their potential customers.

Conclusion

It is apparent that although the animated cartoons we know today have a long history, technology and evolution are changing the way things are done. There is a shift in many cartoons and they are just being generated with the assistance of computers, but others still use hand drawn animations, but with a tactful use of CGI. It is great to be able to save time and focus on other essential details of the work which could not be done in the past, but the world must not forget where it originated from and must be in touch with reality. The latest version of Mickey Mouse is in no way the Mickey Mouse known 50 years ago which is sad. Having a mixture of both is the best way to go. Walt Disney has been producing both hand drawn and CGI films for some time now. Perhaps the reason is that they know what their consumers want. The younger people that do not know what was in the past might not care, but the older ones do. Cartoon animation is certainly not just for children, it is for the parents and grand parents as well. Hopefully companies will not close their hand drawing departments as some have done and simply focus on CGI. A mixture of both is essential.

There might be the debate about piracy and everything being digital and available on the internet and therefore they must do it with computers to save cost and try and earn some money. It will be great to see what men like John Lasseter can and will do for The Walt Disney Company and other producers in the years to come.

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