

Chapter

1

Animation

Animated films and persistence of vision

An animated film is easily defined as any film where each frame is produced individually (or frame-by-frame) and where the illusion of movement is achieved by the lining up of either two-dimensional (2D) drawings or computer generated images or three-dimensional (3D) objects such as clay or Plasticine. When these frames are photographed by a camera, compiled together and then projected at a speed of 16 frames or faster per second, the illusion of continuous movement is achieved. For many years this illusion was explained by a phenomenon called the persistence of vision. In 1828 a Frenchman by the name of Paul Roget described it as an effect usually attributed to a 'defect' of the eye (or in some accounts the 'eye-brain combination'). What this means is that when the human eye views a set of images at high speed, as well as recognising the image directly in front of it, it also briefly retains the previous image. The images appear to be continuous and the illusion of movement is created.

Persistence of vision is also known in psychology as the effect of 'positive after images'. There are a few other theories out there regarding this phenomenon, but this is the most popular philosophy used to explain the mechanism for motion perception in cinema.

Animation is a highly creative film category. The term itself comes from the Latin word *animate*, which means to bring life to or to invoke life—a divine task indeed! The process of producing animation definitely brings to life something

that didn't previously exist, except in the minds of the idea creators. These ideas are transposed through the creative and production processes to wind up as the wonderful images we see on the big or small screen. These images have the power to elate an audience, ignite fear or horror, or bring a tear to the eye.

What is animation production?

Animation production is the process that brings the envisaged product to life by taking it from the esoteric level of an idea to the level of physical existence.

Animation production is commonly divided into the following segments:

- development
- pre-production
- production
- post-production

What is an animated project?

An animation project is any kind of visual structure created frame-by-frame. It is a micro-organisational entity that needs to be cultivated and cherished until it reaches the stage of being a finished product.

Why is it a micro-organisational entity? The major definition of organisational structures tells us that there are three key organisational levels: macro, mezzo and micro.

The macro-organisational level can be defined as the level of a particular branch at the country or state level. For example, a state government would fall into this category. Mezzo is the mid-organisational level and a good example of this would be any medium to large business. An animation company (Disney, for example) would fall into this section. The micro level would be used to define the individual projects being undertaken by any of those companies. So, the mezzo-organisational structure, say an animation studio, is producing an animated television series (that's the micro-organisational level), while adhering to the rules set out by the macro-organisational structure (in this case, the government).

In discussing what makes an animated project it is important to identify the different types of animation. The list below is a breakdown of the various types of animation based on their technological differences:



- Stop motion animation refers to the process of capturing or photographing an image one frame at a time. The image will be posed slightly differently in each frame or sequence of frames. Stop motion subjects can be created with clay, Plasticine, wood, wire and even patient humans. Animation that contains models made of clay will sometimes be referred to as Claymation. This term is actually a registered trademark of Will Vinton studios, who produced clay-animated advertising during the 1980s and 1990s.
- Pixilation is a branch of stop motion animation and uses live objects (usually people) as the subject.
- Puppet animation is yet another branch of stop motion animation. However, this genre uses marionettes or puppets as the subject.
- Computer-generated animation, or CGI, is any animation created using computer technology. Images can either be scanned into, or wholly created within, the computer environment. They are then manipulated using a variety of available software packages to create the desired effect.
- Cut-out animation or collage is the animation of flat elements (characters, props and backgrounds) that have been cut out of photographs, magazines, paper, cardboard or fabric. Today these cut-outs can be wholly generated digitally or taken from tangible objects such as those mentioned above, and scanned into a computer for further manipulation.
- Direct-on-film animation is created by painting, etching or drawing directly on to raw film stock.
- Drawn animation is created using images drawn on a plastic cel, paper or a similar medium. Historically, this has been the dominant form of animation production.
- Silhouette animation uses cut-outs to create a silhouette effect.

Mixing the above-mentioned categories, either among themselves or with live action footage, can also form different animation hybrids. The most common hybrids are 2D drawn animation with 3D elements and vice-versa.

Undisputedly the three major and most popular categories of animation are:

- 2D drawn animation such as *The Simpsons* or *Rugrats*
- 3D computer animation such as *Monsters Inc.* or *The Incredibles*
- 3D stop motion such as *Wallace and Gromit*

Applications for animation

Animation has many different applications. Here are the main divisions:

- product commercials
- educational films
- feature films (a theatrical film that is longer than 60 minutes)
- music videos
- web animation
- original animated video (a program created for home video playback, be it videotape, laserdisc or DVD)
- short feature films (a theatrical film that is longer than 30 minutes but shorter than 60 minutes)
- short or experimental subjects (a theatrical or television film that is shorter than 30 minutes)
- broadcast television series (at least 30 minutes in length, including segments)
- broadcast television specials (an hour in duration, including segments)
- broadcast television short subjects (also a series, but one which is between 1 and 21 minutes long)
- television bumpers (introductions/endings of program segments, only a couple of seconds long)
- video games
- architectural animation
- medical or other industrial films
- multipath movies
- logos, intros and credits for other structures
- avatars, banners and web advertising
- mobile phone images

Development of the animation industry

The animation industry has come a long way since 1906 when J. Stuart Blackton made the first animated film, *Humorous Phases of Funny Faces*. Blackton's film employed the methods of both drawn animation and stop motion by using hand-drawn faces against a blackboard, shot frame by frame. For each new frame he would simply rub out the previous face and draw another one.

In the past century, animation has grown from an experimental fringe art form into a staple of television broadcasting, advertising, cinema and web entertainment. Animation is a very labour-intensive and costly exercise and the development in production techniques for this medium have been closely related to the overall desire to decrease costs and production times. The animation industry in the early 1900s was made up of very small studios creating short films for the cinema. The first major development in this direction was the invention of the celluloid sheet by Earl Hurd in 1913. This opened up the idea of layering elements on top of one another so that static drawings, such as backgrounds, could be drawn just once and character elements could be animated over the top on clear cels, thus allowing the background to be seen. This technique saved an enormous amount of time and money in production because previously each animated frame had been entirely redrawn. In 1914 John Bray of JR Bray Studios pioneered the idea of the animation assembly line, which is still largely in use today. He later joined forces with Earl Hurd, to combine their methodologies and form the Bray-Hurd Process Company.

While World War I was waged, many European studios were unable to continue their experimental works. The United States, on the other hand, continued to produce and develop their domestic animation industry, laying the groundwork for their domination of the worldwide market. US studios flourished and as demand grew, animation production became a more realistic commercial venture. In 1928 Walt Disney released *Steamboat Willie*, the first successful animation short to use synchronised sound. During the 1930s and 1940s animation was regularly used in movie houses across the United States as a warm-up piece before the main movie. Disney, Fleischer Studios, Warner Brothers and MGM were making literally hundreds of short animated films for this market.

However the production boom was short-lived. In 1955, the animation industry in the United States began to crumble. Television had arrived, and animation was deemed to be much too expensive for this new medium. By the end of the 1950s many of Hollywood's animation studios had closed their doors. Something had to change in order for the industry to survive.

That change came in the form of a brand-new animation technique, pioneered by artists at UPA studios some years earlier and adopted by many of the larger companies in the 1950s as a way to produce cost-effective animation for the television market. This system was called 'limited animation' and effectively cut down on a lot of the repetitive work involved in redrawing entire characters for each frame of picture. Instead, the animation was limited, keeping character bodies static (like backgrounds) wherever possible and simply animating only the moving body parts on a separate level. For example, characters that were not required to

move or speak would be drawn as static images with only their eyes animated to blink on a separate level. Character bodies would be held static while their heads, mouths and eyes were drawn on separate levels and animated. This new system also made use of walk cycles or common animation sequences throughout the course of a series, as opposed to using them only once. These changes had a dramatic effect on the cost of producing animation. The technique wasn't without its critics though, with many in the industry complaining that studios had been too heavy-handed with its use, resulting in a sharp decline in the quality of animation being produced for television.

Cartoons became the staple of Saturday morning children's television throughout the 1960s, 1970s and 1980s. In the 1980s a revolution was to take place, again driven by the desire to cut the cost of producing animation.

The idea of finding cheaper labour offshore caught hold of the industry. Studios would retain the creative development and pre-production in-house, while all non-creative elements such as in-betweening and painting would be completed offshore, where the prices were cheaper. Many countries, like the United States, Australia, France, Great Britain, Canada and Germany outsource a great deal of their production work to this day.

Initially, animation was sent to China, Korea and Taiwan. After the fall of the Berlin Wall a few new players joined the game. Former Soviet republics, Poland and Hungary began to vie for their own place in the competitive animation market. The current hot spot for animation growth is in India, with the local industry becoming heavily involved in the 3D market. A lot of other 2D servicing studios have recently become involved in the 3D market as well. Increased competition in this market has resulted in a drastic reduction in the cost of producing animation.

There are other valid reasons for outsourcing part of an animation production. In the United States the reasons are purely financial. Canada and Australia also outsource for financial reasons, but the lack of traditional animators in these countries also makes outsourcing an attractive prospect. An interesting point is that both the Canadian and Australian governments have set up programs and initiatives for the protection and development of local content. This means that the creative elements make the projects eligible for some degree of taxation relief. A similar situation also exists within several European countries.

The seeds of another trend, which was to forever alter the landscape of animation production, began to gain momentum during the 1970s and 1980s. That trend was computer animation. While experimentation was done during the 1960s in laboratories, it took a while for the artistic community to be convinced that these cold and lifeless machines could be capable of producing art. Three-dimensional

imaging began developing during the 1970s but the largest step towards computerising the industry came in the 1980s with the development of digital ink and paint packages for 2D studios.

In 1990 computer animation became a standard process at Disney Studios and replaced the traditional method of hand-painting cels with a digital ink and paint package. *The Rescuers Down Under* was the first Disney feature to utilise this software. Two-dimensional computer animation with a small mix of limited 3D special effects became a popular choice for many animated features throughout the 1990s, such as *Aladdin* and *The Prince of Egypt*. In the early 1990s, three-dimensional imaging was still finding its feet and was still very expensive to produce, even by animation standards. The full 3D explosion occurred roughly midway through the 1990s. By this time, technology had advanced to the point where it became viable to start thinking about producing entire films in this genre. Pixar's *Toy Story* (1995) became the first feature to be fully animated in 3D and opened a veritable floodgate of high-quality 3D films.

Pixar was initially an arm of LucasFilm and was bought for US\$10 million in 1986. At the time the company's main business was focused on the development of high-end visual processing computers for the medical industry, but the company also produced short animations as a way of demonstrating the power of the hardware they were trying to sell. The hardware never took off, but the short animations managed to capture people's attention. The animation department began to overtake the development department in terms of sales success when they began taking on advertising jobs. Pixar eventually cut back on their computer department and increased staff numbers in their animation department. This change of business tactic was marked by the company's US\$26 million deal with Disney Studios to produce *Toy Story*. Pixar continues to be the trailblazer in 3D animation production, having followed up *Toy Story* with several high box-office grossing 3D features.

The majority of animated programs today are serials made for television and cable distribution. Technology is constantly evolving and animation design is becoming more abstract, with outlandish styles ranging from *Ren and Stimpy* to *The Powerpuff Girls* to *Dexter's Laboratory*. Shows like *The Simpsons* and *South Park* have bolstered the adult prime time market for animated shows.

Animé has become a driving force in the animation world in the past decade, with Manga gaining enormous popularity throughout Western countries. Some of the more well-known titles in this genre are *Ghost in the Shell*, *Princess Mononoke* and *Spirited Away*. The first animé series to gain popularity was Osamu Tezuka's *Astro Boy* in 1963. Animé developed further during the 1970s and by the 1980s

was one of the most popular animation forms in Japan. Animé is usually characterised by limited animation. However, many of the studios have elaborated on this technique through the use of still shots, with characters being moved across the screen, scrolling or repeating backgrounds, and using static images of talking characters and animating only their mouths. One of the most successful Japanese animé production houses is Studio Ghibli, which was founded in 1985. Often referred to as 'The Disney of the East', Studio Ghibli has been at the forefront of animé feature film production in Japan. Higher production values and attention to storytelling techniques have seen the studio produce the highly successful *Princess Mononoke*.

Technological advancements, both in the animation industry and with the Internet, have brought animation production literally to the people. Nowhere is this more evident than with Macromedia's Flash program. Developed throughout the 1990s as a program for web design, it has evolved into a robust program capable of creating streaming animation from a home computer. Studios, which were once shy of a program like Flash, are now beginning to sit up and take notice. As a result, the program is being heavily incorporated into professional studios for the production of broadcast-quality material.

Animation in one form or another is now firmly entrenched in film, television, advertising, music clips and games. The popularity of the animated feature appears to be growing. Some animated shows made initially for television have spawned such a cult following that they have been reworked for the big screen. A hit film can now spin off into an animated television show or computer game. Armed with a great idea and the practical know-how, the sky is the limit for animation production.