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Social Studies

Hollywood Special Effects

by L. L. Owens

Vocabulary

blue screen

cinema

continuous motion

matte painting

optical illusion

sensors

technology

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Hollywood Special Effects

by L. L. Owens

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Defining Special Effects

Envision yourself in a dark movie theater. You're about to see a new science-fiction film, which you've heard has mesmerizing special effects. You can't wait for it to start!

Does such a scene sound familiar? You've probably seen lots of movies with fantastic special effects. But what does this phrase "special effects" actually mean?

Special effects refers to the artificially created visual or sound effects shown in a motion picture. But did you know that film *itself* creates a special effect? Films are composed of thousands of different images that are placed in sequence one after another. When they're run at high speed through a film projector, it looks as if the characters and objects flickering on the screen are actually moving. This creates the illusion, or special effect, of **continuous motion,** which you will read more about later.

But our definition for special effects creates a problem. If every visual or sound effect were a special effect, then there wouldn't be anything special about them in the first place! So when people talk about "special effects," they're really referring to the most incredible special effects, the ones that make filmgoers think *wow, that was amazing!*

The following pages describe the history of Hollywood's most incredible special effects. Keep reading to learn more about this fascinating feature of filmmaking!

Posters for Hollywood movies often promote a movie's special effects.

CHAPTER 1

A Night at the Cinema

By the end of the nineteenth century, scientists were perfecting the **technology** that would give birth to motion pictures. In 1891 a major breakthrough occurred when Thomas Edison invented the Kinetoscope machine. Edison's creation was the first to allow people to view moving pictures. In 1896 Edison's company purchased the rights to a new type of projector that had been invented by C. Francis Jenkins and Thomas Armat. Naming it the Vitascope, Edison quickly began manufacturing the new projector and was instrumental in making it one of the first film projectors to be sold throughout the United States.

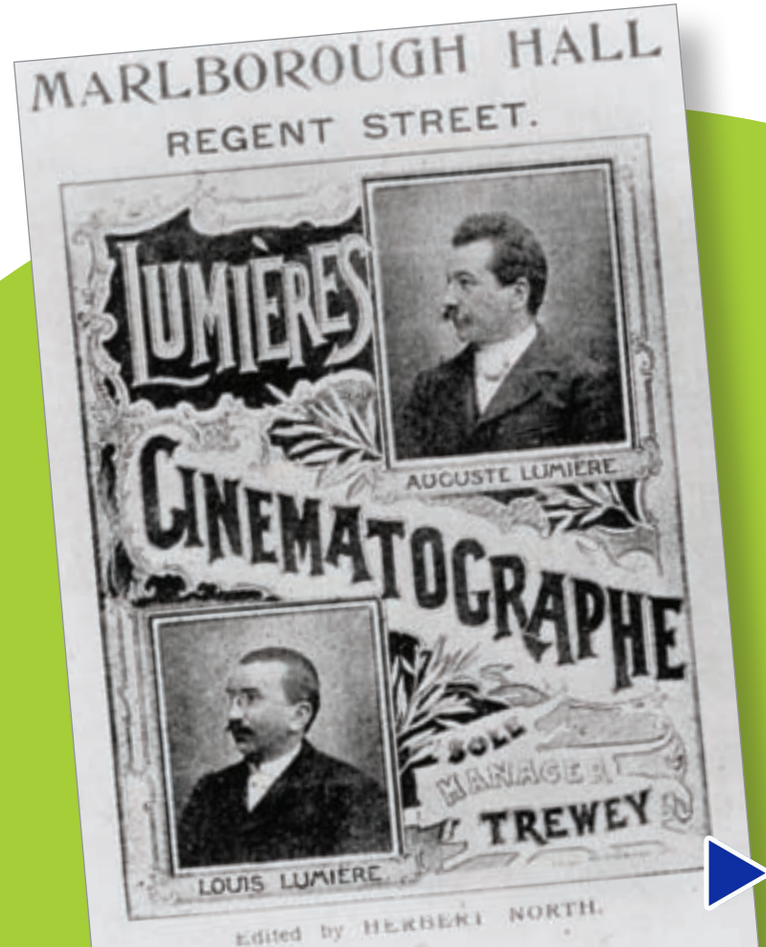
Despite Edison's pioneering efforts, it would be left to two French brothers, Louis and Auguste Lumière, to establish the first movie theater, or **cinema.** The Lumières had developed the Cinematographe, which, by combining a motion-picture camera with a projector, made it possible to show motion pictures to large audiences. In order to showcase their brilliant new invention (which would render the Kinetoscope obsolete), the Lumières built a cinema in the basement of Paris's Grand Café, and it debuted to the world on December 28, 1895. It was showtime!

By gazing through a peephole, Kinetoscope users could watch moving pictures.

The Lumières showed ten films on the night they opened their cinema, with each film averaging two minutes in length. The most memorable film featured an onrushing train that appeared to be coming straight at the audience.

None of the audience members had ever seen such a thing. To them, it seemed as if the train were about to leap off the screen and come crashing through the theater. People were so terrified by what was transpiring on the screen that they screamed, jumped out of their seats, and even fled the theater.

It is unlikely that today's audiences would panic at the image of an onrushing train. But remember that no one had ever seen a film prior to that night, and, as a result, people were not prepared for the illusion of continuous motion.



The Rise of the Talkies

During the early 1900s, movie theaters spread throughout Europe and the United States. The movies the theaters showed lacked both color and sound, and their special effects were primitive, often consisting of stage magicians performing filmed versions of magic tricks.

Althought these first films seem amateur and simplistic today, early audiences didn't care. For the first filmgoers, it didn't really matter *what* was being played, just as long as they could see *something*. However, by the 1920s, audiences had become more sophisticated and were demanding better special effects. The major movie studios in Europe and the United States responded by creating separate special effects departments. They also invented talkies, a term used in the 1920s and 1930s to describe films with sound.

Once talkies were invented, moviegoers could at last hear dialogue, sound, and music. Talkies had an impact on acting as well. Actors during the silent-movie era had to deliver more dramatic and exaggerated physical performances in order to transmit their characters' feelings and actions to the audience. Talkies allowed actors to act in a far more natural manner, as they no longer needed to overcompensate for the lack of sound. The first full-length feature film to use sound technology was Warner Brothers' 1927 hit *The Jazz Singer*, starring Al Jolson.

In 1927, *The Jazz Singer* was a phenomenon.

CHAPTER 2

Types of Special Effects

Nowadays, filmmakers hire computer artists to create special effects that earlier directors could only dream about making. Computers are capable of making far more complicated special effects, but in many cases computer-based special effects have been mixed and matched with more traditional special effects. Among the most popular of the traditional special effects are trick photography, special-effects makeup, animation, split screen, and blue screen.

Some modern movies, especially "indies" (short for "independent"), or those made outside of the traditional Hollywood studio system, use few if any of these techniques. However, as you will read, many of Hollywood's historic films could not have been made without them.

Trick Photography

Trick photography has been around since the dawn of film. Some early examples are found in the minute-long 1899 film *The Conjuror*. The film, created by the French magician and inventor Georges Méliès, uses trick photography to make it appear as if Méliès and his female assistant have magically vanished from the screen.

In 1902 Méliès attained even greater fame with his fourteen-minute science-fiction film *A Trip to the Moon*. This film uses trick photography to make it look as if a rocket ship hits the mythical "man in the moon" directly in the eye.

Special-Effects Makeup

Special-effects makeup is different from trick photography. Nevertheless, it has just as long a history. Filmmakers can do many things with special-effects makeup. For example, they can create the illusion that a young lady has suddenly aged into an elderly woman. They can add a distinctive feature, such as a mole or scar, to someone's face, or make live actors look as if they have been dead for some time. Perhaps most impressive of all, filmmakers can use special-effects makeup to make an actor look like an imaginary creature. This lattermost ability has made directors of horror and science-fiction films heavily dependent on special-effects makeup.

The horror movies of the 1930s and 1940s demonstrate great advances in special-effects makeup.

Sound Effects

Sound effects have a long history in Hollywood filmmaking. Many sound effects are re-creations of sounds you might hear in everyday life. Examples of such sounds include the chirping of birds and buzzing of insects that help make an onscreen forest seem like the real thing.

Other sound effects involve sounds that a listener rarely hears during everyday life. Such sound effects include the ear-splitting chaos of a battle and the roar of an erupting volcano. Do you remember the squeaking sounds made by *The Wizard of Oz*'s Tin Man when he needed oil? Those were sound effects. So was the sound of blowing wind that you heard when the tornado took Dorothy to Oz.

Physical Effects

Physical effects include on-screen depictions of rain, snow, wind, fire, and explosions. Such effects can now be created entirely by computers. But in the years before computers came to Hollywood, different methods were used. For example, in the 1952 film musical *Singin' in the Rain*, the film's crew put together a set that made diluted milk cascade down on the actors like a torrential rain.

A scene from *Singin' in the Rain*

Models

A model is a replica of an object, person, or landscape. Models used for special effects can be life-size copies or miniature representations. They can also be digital images designed using a computer, or robotics-based systems created through a sophisticated technology called animatronics. Models are especially effective in films that call on their actors to interact with imaginary creatures.

Matte Painting

The **matte painting** effect combines painted artwork with live-action footage. An example of matte painting would be when a filmmaker builds a front porch for an actor to stand on, but then has an artist paint the rest of the house on a sheet of glass. Onscreen, the matte painting makes it look as if the whole house exists, even when only a porch has been built. In *Gone with the Wind* (made in 1939, the same year as *The Wizard of Oz*), matte painting was used to create images of a pre-Civil War mansion, called *Tara*, where much of the movie's action took place. More recently, matte painting was used throughout the 1997 movie *Titanic*.

Much of the work that was done using matte painting is now created through computers. In place of traditional matte paintings, special effects artists now use computers to blend 3-D artwork with live action.

Animation

Animation has been used since the days of silent films. It works on the same principles as regular filmmaking, with the exception that in animation the filmmakers photograph images of drawings or models instead of human actors. When an animated film is played, it creates the same illusion of continuous motion that regular films do. The animation process is very time consuming because each frame of animation must be created individually.

What do you think of when you hear the term "animation"? Most people think of cartoon characters like Bugs Bunny, or films, such as *Snow White and the Seven Dwarfs* (1937) or *Finding Nemo* (2003). For *Snow White*, the first feature-length animated film, a huge number of drawings were photographed and projected in sequence, so the figures appeared to move. In contrast, more than sixty-five years later, the animation used in *Finding Nemo* was entirely computerized.

An animator works on his computer on *Shrek the Third*.

Split Screen

The split-screen process has been used in filmmaking for decades. It is frequently employed in films that involve a single actor playing two different roles, and is also extremely popular for showing a telephone conversation between different actors. Split screen creates the **optical illusion,** or visual trick, that two different people are appearing simultaneously onscreen. In reality you are seeing different images of the same actor, filmed on two separate occasions.

To better understand how split screen works, imagine that a filmmaker is filming a scene that shows an argument between twins, both of whom, in reality, are played by the same actor. First, the actor is filmed delivering one twin's lines. Then, the actor is filmed delivering the other twin's lines. Finally, the filmmaker combines the two separate shots into one. The finished product shows identical twins arguing onscreen simultaneously. Split screen was used in the movie *The Parent Trap* (1998) to make actress Lindsay Lohan appear to be talking to her twin in scenes that in fact only involved her!

The split-screen process was used to create this image of twins.

Blue Screens

Like the split-screen process, the **blue screen** process is a staple of Hollywood filmmaking. Among a host of different images, blue screen has produced the illusion of people flying in movies ranging from *Mary Poppins* (1968) to *E.T.* (1982). Here's how it works.

First, an actor stands in front of a special screen, which is often blue because of movie film's special sensitivity to blue light (hence the generic name of "blue screen"). The filmmaker then films the actor acting out the role.

This type of filming produces three different images. One shows the actor against a transparent background. Another is the action matte, which shows the outline of the actor's image against the yet-to-be-created background. The third image is the area reserved for what will become the scene's final background, the one that audiences see.

After the filming, the background is photographed or created on a computer. That created background is then printed into the film that was made earlier, along with the images of the actor. At this point, the special-effects work is finished, and the illusion is complete!

A scene being filmed using the blue-screen process.

CHAPTER 3

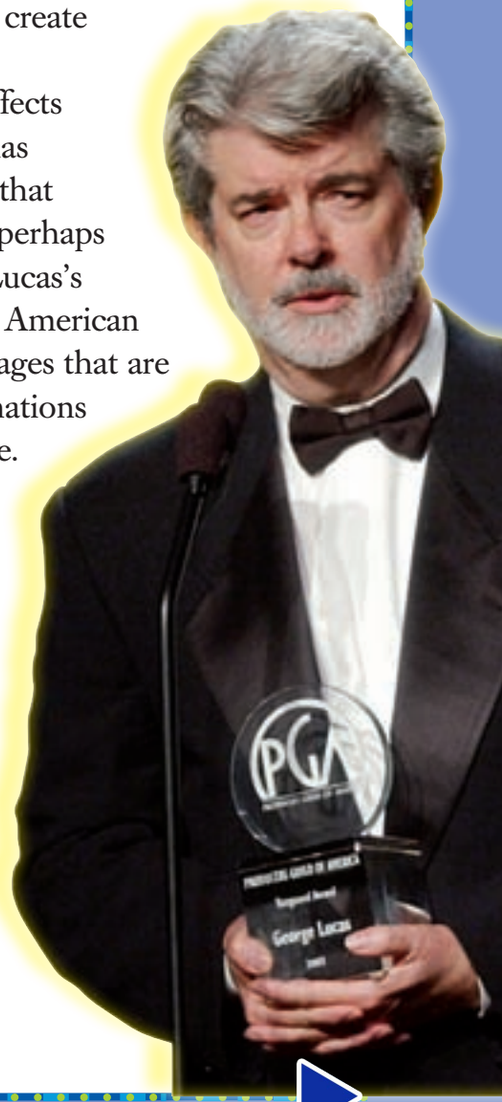
George Lucas's Special Effects

Many talented professionals work together to create the memorable special effects shown in movies. They include set designers, camera operators, film editors, stunt people, makeup artists, prop builders, costume designers, and sound engineers.

To coordinate these dozens of different special effects workers, filmmakers usually hire a director of special effects. The best of these directors are often called "wizards" for their seemingly magical ability to create amazing special effects.

One of the very best special effects wizards is George Lucas. Lucas has created special effects for movies that have made hundreds of millions, perhaps even billions, of dollars. George Lucas's films have also greatly influenced American popular culture, creating vivid images that are permanently etched in the imaginations of millions of filmgoers worldwide. Through his efforts, Lucas has helped to usher in a new era in Hollywood filmmaking, one in which special effects are king!

George Lucas's special effects have changed moviemaking forever.



George Lucas was born in 1944 in the central California farming community of Modesto. During the late 1960s, he studied film at the University of Southern California's film school. Almost immediately, Lucas began earning attention as a serious filmmaker. One of his student films won first prize in the 1967–1968 National Student Film Festival.

In 1969, Lucas moved to Northern California, where he cofounded the American Zoetrope film company with director Francis Ford Coppola. Then, in 1973, Lucas directed *American Graffiti*, a film loosely based on his childhood in Modesto. The film's nostalgia for a more innocent era struck a chord among moviegoers and gained Lucas a reputation as a great young filmmaker.

George Lucas wrote the story for the movie *Willow*, from which this scene is taken.

Lucas's Special-Effects Studio

While Lucas was directing movies, he was also creating his own filmmaking empire. In 1971, he formed his own independent filmmaking company, called Lucasfilm Ltd. Four years later, he created Industrial Light & Magic, a separate special-effects studio within his film company.

Lucas secured his reputation as a special-effects wizard through the creation of Industrial Light & Magic. Between 1977 and 2002, the studio won fourteen Academy Awards for its amazing special effects. It also played a key role in ushering in the era of modern, computer-based special effects.

During the 1970s, many of Hollywood's most influential producers, filmmakers, and studio executives thought that computer-based special effects were too expensive and could not produce high-quality images. Industrial Light & Magic proved that computers could be used to create special effects that were not only reasonable in cost, but also looked amazing to audiences!

Industrial Light & Magic uses many traditional special effects techniques, such as matte painting and the blue-screen process. But it would be impossible for the modern special-effects studio to exist without the use of computers.

CHAPTER 4

The Future of Special Effects

So what does the future hold for the art and science of movie special effects? Seeing as special effects studios have had two decades to perfect computer-based special effects, many would argue that the future is already here.

If you saw *The Polar Express* (2004), then you've had a taste of what the future of computer-based special effects might look like. The film, based on Chris Van Allsburg's children's book of the same name, was created using the most modern computer-based special effects.

In *The Polar Express*, the actors give live performances, but they don't appear onscreen. What does this mean? It means that their images and gestures were added into the film by computer.

For example, actor Tom Hanks performed while wearing a full-body suit that was dotted with **sensors,** which are devices that react to heat, light, and pressure in a way that transmits a signal. The suit's sensors recorded Hanks's facial expressions and body movements. Then, using the image of a character that had already been designed, a computer artist used a computer to re-create those expressions and movements. This method allowed Hanks to play five roles in the movie.

In the years to come, filmmakers' ability to create amazing special effects will be limited only by their imaginations. With the opportunities created by computer technology, we can expect bigger and better things from special effects for years to come!

An example of special effects from *The Polar Express*

Now Try This

Make Your Own Model

Have you ever built a model car or airplane? If so, then, in a sense, you've already had experience as a special effects artist.

As you know from this book, models are an important type of traditional special effects. The following activity lets you try your hand at special-effects work by building a model that could be used to create special effects.

Before you start the activity, go back to page 13 and reread the description of the types of models used to create Hollywood special effects. Then carry out the instructions on the following page. If you get hooked, who knows—you might have a future in moviemaking.

Models are a traditional type of special effects.

Here's How to Do It!

Spend some time thinking about what you'd like to build. You might use the photo below as inspiration or build something from your imagination.

Next, draw a sketch of your model. Depending on what you're creating, you might need cardboard, craft sticks, pipe cleaners, or fabric. Think through the project and make a list. Don't forget things like scissors, string, glue, and tape.

After you've gathered your supplies, start building your model. Once you've finished, display it in class. Be sure to label the various parts of your model and write a brief description of how it could be used to create a special effect in a film.

Finally, try to come up with an idea for a movie that would allow you to showcase your finished model. Write a one-paragraph plot summary that describes how your movie would unfold. Include specific references to the ways in which your model would be used to create the movie's special effects.

Glossary

blue screen *n.* special background screen against which actors are filmed and used to create special effects.

cinema *n.* another term for a movie theater.

continuous motion *n.* an illusion of motion created by running film at high speed through a movie projector.

matte painting *n.* a two-dimensional painting that serves as background for a three-dimensional stage or studio set.

optical illusion *n.* something that looks different from what it really is; a visual trick.

sensors *n.* devices that react to heat, light, pressure, or other stimulation, and send signals to a computer or some other electronic device.

technology *n.* the equipment, objects, or methods used to carry out a process.

Reader Response

1. Pretend that you are trying to describe a Kinetoscope machine to a friend. What kinds of graphic sources could you use to help in your description?
2. What did you know about George Lucas before you read this book? What do you know about him now? What do you still want to know about him? Use a graphic organizer like the one below to write your answers.

What I knew about Lucas	What I want to know about Lucas

3. The word *optical* contains the word *optic*. Find out what the word *optic* means. How does this help you understand what *optical illusion* means?
4. Which of this book's photos helped you the most in understanding how special effects work? Explain your answer.