

## A TIMELESS MEDIUM IN THE HISTORY OF ANIMATION: FLIPBOOK

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### ABSTRACT

The history of animation, predating both photography and cinema, remains a captivating area of research. Since ancient times, humans have aimed to create the illusion of motion by fixing light on a surface and reproducing sequential images. This study, grounded in an interpretive paradigm, examines the role of flipbooks in the evolution of animation. As one of the earliest forms of visual storytelling, flipbooks generate motion through the rapid flipping of sequential images and continue to exist today. The findings, presented in the conclusion, indicate that flipbooks laid the groundwork for modern animation and cinematic experiences. Today, flipbooks serve various purposes in fields such as education, marketing, and entertainment. This research traces their origins from 19th-century mechanical devices—often referred to as “philosophical toys”—to their presence in the digital media age. By exploring their historical development, the study highlights the lasting influence of the flipbook technique. Despite the rapid advancements in animation technology, the core principles of flipbook design remain relevant. They continue to inspire creativity and support storytelling across multiple disciplines. It would be correct to describe flipbooks not only as an important part of animation history, but also as an animation form that continues to evolve and adapt to current media and learning contexts.

**Keywords:** Animation, Animation History, Flipbook, Visual Storytelling.

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## ANİMASYON TARİHİNDE ZAMANSIZ BİR ORTAM: FLIPBOOK

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### ÖZET

Fotoğraf ve sinemanın tarihinden daha eskilere uzanan animasyon tarihi, bu yönü ile ilgi çeken araştırma alanlarından birisi olarak karşımızda durmaktadır. Sapiens'in ışığı bir yüzey üzerinde sabit tutarak görüntülere hareket izlenimi verme çabası sürekli var olmuştur. Araştırma yönteminde, yorumlayıcı paradigma yöntemi benimsenmiş ve bu yöntem sonucunda ulaşılan veriler sonuç kısmında betimlenmiştir. Bu araştırma, Flipbookların animasyonun evrimsel sürecinde bir medyum olarak konumunu araştırmaktadır. İzleyiciye görsel bir öykü anlatımının en eski formlarından biri olarak, varlığını günümüzde halen sürdüren Flipbooklar, eklektik görüntülerin hızla çevrilmesi sayesinde hareket illüzyonu yaratmaktadır. Flipbookların animasyonun modern zamanları ve sinematik deneyimler için temel oluşturduğu gözlemlenmiştir. Flipbooklar günümüzde eğitim-öğretim, pazarlama ve eğlence gibi farklı alanlarda, farklı amaçlara cevap verebilen bir animasyon formudur. Bu araştırma, Flipbookların kökenlerini 19. yüzyılda üretilen erken mekanik cihazlardan (felsefi oyuncaklardan) çağdaş dijital medya dönemine olan entegrasyonuna kadar izleyerek, tekniğin tarihsel perspektiflerini ele alır ve medyuma ilişkin kalıcı etkileri sergilemeye çalışır. Sonuç olarak (animasyon disiplininin yanı sıra, her alanda gerçekleşen) teknolojik ilerlemelere karşın, Flipbook tasarımının temel ilkelerinin eskimediği gözlemlenmiştir. Flipbooklar modern animasyonların yanında, farklı disiplinlerde de yaratıcılığı ve hikâye anlatımını destekleyerek fayda sağlamaktadır. Flipbookları yalnızca animasyon tarihinin önemli bir parçası olarak değil, aynı zamanda evrimleşmeye ve güncel medya ve öğrenme bağlamlarına uyum sağlamaya devam eden bir animasyon formu olarak tanımlamak doğru olacaktır.

**Anahtar Kelimeler:** Animasyon, Animasyon Tarihi, Flipbook, Görsel Hikâye Anlatımı.

**Tür:** Araştırma Makalesi

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## 1. INTRODUCTION

The dream of animating the phenomenon of motion on a light-sensitive surface has existed throughout history. Of course, it would not be accurate to consider the drawings made on cave walls tens of thousands of years ago as an effort in animation. However, beyond this knowledge, the main purpose of animation is to narrate a phenomenon. Animation structurally aims to convey a message, and the idea of connecting these cave drawings with this very characteristic of animation could be a logical approach.

In short, the drawings and traces made by Neanderthals on cave walls align perfectly with the narrative aspect of cartoons and animation. The effort to tell a story through sequential visuals has continued in modern human history as well. Evidence of this can be observed on a cup found in Burnt City, Iran, dating back to the 2nd century BC. A drawing of a deer is depicted running along the circumference of the cup and reaching the Tree of Life, ultimately eating its leaves. All these depictions were made through a sequence of eclectic images. In Rome, Italy, the Trajan's Column, created in AD 113, showcases such efforts. The visuals used on this marble column aim to narrate the emperor Trajan's campaign and war in Romania within a specific storytelling cycle. A similar attempt can be observed in the Bayeux Tapestry, which depicts the Battle of Hastings in 1066 between the Normans and Anglo-Saxon English. This textile artifact, 50 cm in height and 70 meters long, conveys all information about the battle through sequential embroideries.

Moreover, when one travels to a different geography, Japan, one encounters Emakimono drawings from the 8th to 14th centuries. Like the Bayeux Tapestry, Emakimonos tell the story of societal events, legends, and myths within a specific narrative cycle. These drawings were made on paper or silk textiles. These archaeological and cultural remnants, stretching from the Paleolithic era to written history, show that the effort to animate images was constantly present throughout human history, regardless of geography or time. This evidence strongly supports the notion that the history of cartoons and animation dates back much further than previously assumed, with individuals across the world and at different times trying to create motion in images.

## 2. METHODOLOGY

This study examines Flipbooks—an animation form that has not lost its popularity since its invention—within a historical context. Although it is not possible to cite a specific academic source regarding their popularity, several factors have been accepted as data supporting this claim: the continued production and sale of Flipbooks today, the existence of interdisciplinary academic research on this animation form, and its inclusion as a course subject in departments where animation is taught academically. For the scientific dimension of the research, a literature review was conducted. A document pool of collected academic sources was created, and the required sources were finalized through the document analysis method. An alternative methodological approach, the interpretive paradigm, was employed to guide the research. In the social sciences, the interpretive paradigm seeks to reduce events arising from interpersonal relationships in social life into the practical realm of everyday experience, aiming to interpret and describe these events from the perspective of individuals interacting within

microstructures—by focusing on their thoughts, emotions, and perceptions. To achieve this goal, it puts forward appropriate concepts, principles, rules, theories, methods, and techniques that reflect its understanding of how to approach the subject matter (Yakut, 2014, p. 18).

It can be argued that the interpretive paradigm is an effective scientific research method for managing the process in historical studies concerning phenomena such as film, cartoons, and animation, allowing the researcher to maintain coherent control throughout. Within the framework of the interpretive paradigm, this study reached its conclusions by describing the processes involved in the creation of moving images and the results of successful experiments in the context of history, art, and popular culture, particularly in relation to the history of cartoons and animation. Additionally, it is common for researches on animation and cartoons to be filled with various visuals and illustrations. However, the researcher is sensitive to international copyright agreements and local regulations such as Law No. 5846 on Intellectual and Artistic Works in Turkey, as well as agreements with organizations like the WIPO of United Nations. Given these considerations, there was no necessity felt to include visuals in this study. This decision reflects the author's personal preference. The visuals related to the concepts discussed in this research are easily accessible; however, the choice was made to avoid using visuals, even with proper attribution, in this research.

## 2.1. Limitations

The history of cartoons and animation can be traced back to the Paleolithic era, with examples of early works still visible in modern works. However, alternative animation devices produced during the same period as the flipbook also exist. As a result, the scope of this research extends beyond the specific focus of flipbooks. While the research primarily concentrates on flipbooks, it also briefly touches upon other animation devices developed during the same period. These philosophical animation tools can be listed as Kaleidoscope, Thaumatrope, The Stroboscopic Disk, Phenakistoscope and Zoetrope. Another limitation of this study is the mention of John Barnes Linnett, the inventor of the flipbook, as well as other related devices such as the Kineograph, Kinetoscope, and Mutoscope, which are closely associated with flipbook technology.

## 2.2. Research Questions

There is a limited number of academic studies on flipbooks within the context of animation history in Turkey. This research begins with philosophical toys in animation history, starting with the Kaleidoscope (1817) and ending with the Flipbook (1868). In an attempt to create a description for this historical period, the research seeks answers to the following questions:

1. What are the philosophical (optical) toys dating from the 19th century?
2. What factors might have influenced the design of the Flipbook?
3. Who is credited with designing the Flipbook?
4. What is the working principle of the Flipbook?
5. What other mechanical animation devices were designed around the same period as the Flipbook?

### 2.3. Purpose and Objectives

Unfortunately, there is a notable lack of academic sources concerning the history of cartoons and animation in our country. While the number of publications on animation is steadily increasing, signaling a positive trend for the future, it remains true that more academic research is needed in this field.

In this context, the main objective of this study is to provide an interdisciplinary source about flipbook applications and their historical development. These applications hold an alternative position in the history of animation, and the research aims to explore them within the domain of Fine Arts.

## 3. PHILOSOPHICAL TOYS

As previously mentioned, the foundations for animation date back to a time before photography and cinema. These foundations are found in archaeological and cultural findings, as well as in the development of cartoons and animation during the Industrial Revolution in the United States and Europe.

The optical toys, particularly prevalent in 19th-century Europe, can be categorized as philosophical toys within the broader context of animation history. These mechanical devices, often referred to as optical or philosophical toys, aimed to create the illusion of motion on the retina. While painting has been a continuous art form since the Paleolithic era, the desire to animate these painted images in a creative manner has also persisted throughout history, as evidenced by various cultural and archaeological artifacts. Interestingly, these philosophical toys of the 19th century were invented not by artists, but by scientists working in the field of positive sciences. In summary, while artists sought to move images, the first mechanical instances of animation were recorded by scientists.

### 3.1. A Brief Look at Philosophical Toys

Among philosophical toys, the first example to be considered is the kaleidoscope. The inventor of this toy is the Scottish scientist David Brewster. Brewster describes the invention process in his book published in 1819 as follows:

"On February 7, 1815, when I discovered the complementary colors created by the successive reflections of polarized light between two sheets of gold and silver, the effects of the kaleidoscope — although crudely exhibited — once again caught my attention; the multiplying images were colored in magnificent tones, and although the overall effect, when compared to the creations of the kaleidoscope, was unimaginably weak, it was far beyond what I had previously witnessed." (Brewster, 1819, p. 2).

From these statements, it is understood that Brewster had no direct connection to art; rather, he was a scientist working in the field of optics. The light incidence angle theory, known as the "Brewster Angle" in the literature, is also an important physical principle underlying the kaleidoscope. Kaleidoscopes are devices similar to binoculars. In addition to the mirror system inside, when colored glass pieces or stones placed in the tube are rotated, a moving image consisting of geometrical patterns that systematically change and disappear is produced. According to Groth (2007, p. 218), the kaleidoscope has always carried the idea of interaction: it establishes a dialogue between the hand and the eye, between the inside and

the outside. The fact that the observer, by rotating the tube, transforms the light patterns created by ordinary objects into countless new and temporary configurations with glass fragments, lies at the heart of the lasting appeal of the kaleidoscopic vision. The concept of kaleidoscopic vision is still used in film and media studies today. The continued influence of this philosophical toy, invented by David Brewster 200 years ago, clearly highlights the importance of interdisciplinary approaches in the history of cartoons and animation. Another important philosophical toy is the thaumatrope. Developed in 1825 by John Ayrton Paris, this toy creates the illusion of motion by spinning a disk with different but complementary images drawn on both sides. According to Azema and Rivere (2012, p. 322), this device was initially designed by astronomer John Hershel and later commercialized by physicist Paris. Thaumatrope literally means "miracle wheel." The twisting and releasing motion of the string passed through holes in the disk results in the images on the two surfaces merging to be perceived as a single moving image. An important study conducted in 2012 revealed that a prehistoric bone disk found in the Laugerie-Basse cave in the Dordogne region of France, featuring deer figures on both sides, operates in the same system as the thaumatrope. Azema and Rivere tested a replica of this disk by tying it with tendon and observed the creation of a motion illusion after spinning it. According to Langey (2017, p. 16), although this object was previously identified only as a button or ornament, its similarity to the thaumatrope offers an important clue regarding the history of animation.

The stroboscopic disk and phenakistoscope are other philosophical toys that emerged during the same period and operate similarly. Developed in 1833 by Joseph Plateau and Simon Stampfer, Plateau was a physicist working in the field of optics. According to Verriest (1990, p. 13), Plateau made a significant step toward cinema by observing the persistence of visual impressions. In 1828, independently of Faraday, he noticed that when looking at the images reflected from the slits in a rotating disk, a fixed image was perceived. Plateau's ingenious contribution was to add sequential drawings representing motion onto the disk, thereby enabling the viewer to perceive a moving image. This device was commercialized as the phenakistoscope and quickly gained popularity. The phenakistoscope is a rotating disk with evenly spaced holes. Looking through these holes, the sequential drawings on the back can be observed. Rotating the disk at 7-8 revolutions per second is ideal for the viewer to perceive the drawings as motion. Thus, the viewer experiences the combination of sequential visuals on the retina, creating the sensation of motion. Another important device among philosophical toys is the zoetrope. According to Turquety (2015, p. 278), the zoetrope was invented independently by William George Horner (England) and Simon von Stampfer (Austria) in 1834. However, it was commercialized only in 1867. The zoetrope is a rotating cylinder with evenly spaced slits around its circumference.

Sequential drawings representing motion are placed on the inside of the cylinder. As the cylinder spins, the viewer looks through the slits and perceives motion. The zoetrope differs from previous toys in that its mechanical structure is more advanced. Therefore, it can be considered as an evolutionary result of earlier philosophical toys. According to Veras et al. (2017, p. 2), these devices were developed both for entertainment and to study human vision. Numerous contributions, ranging from Michael Faraday's mathematical analyses to Joseph Plateau's scientific and artistic research, paved the way for the development of optical illusions. In conclusion, philosophical toys are not only objects that entertain children; they are also significant milestones in the development of animation, cinema, and optical

science. These tools, which emerged at the intersection of science and art, continue to have an impact today in education, media, and design.

### 3.2. From Kineograph to Flipbook

The term "Kineograph" derives from the Greek words "kinesis" (motion) and "graph" (to write, to draw). This term, still used today in film studies, communication, and media, is also used to describe visuals that change based on the flow of data. However, in a historical context, Kineograph refers to a mechanical device invented in 1868 by John Barnes Linnett, which used sequential drawings to create the illusion of motion.

As Herbert points out: "In 1868 Linnett was granted a British patent for the Kineograph, which made use of drawings produced in a sequence of varying positions so as to simulate motion when flicked, the effect being similar to that of the then current phenakistoscope and zoetrope toys" (1989, p. 65). While the Kineograph created similar effects to optical toys like the Phenakistoscope and Zoetrope, it presented a different system in which motion illusions were created by manually flipping the drawings. The device eventually became known as the "Flipbook," a name chosen during the branding process for its easier recall and marketing. This transformation serves as a noteworthy example of how early animation devices evolved within industrial society. The term "Kineograph" derives from the Greek words "kinesis" (motion) and "graph" (to write, to draw). This term, still used today in film studies, communication, and media, is also used to describe visuals that change based on the flow of data. However, in a historical context, Kineograph refers to a mechanical device invented in 1868 by John Barnes Linnett, which used sequential drawings to create the illusion of motion. This philosophical toy took the name Flipbook after its industrial production. After all, the name of the product also plays an important role in potential customers' purchase of a product. In short, the reason for the transformation of the name "Kineograph" into the name "Flipbook" can be shown as purely commercial concerns.

## 4. JOHN BARNES LINNETT and FLIPBOOK

As a matter of fact, the academic literature on John Barnes Linnett is extremely limited. Born in England in 1831, Linnett passed away at the age of 39 in 1870 from pneumonia. However, Linnett is considered an important figure in the early history of film and animation in the 19th century. He is the inventor of the Kineograph, a device that creates the illusion of movement through fast, sequential images. According to Eyre and Spottiswoode, Linnett patented the device in 1868, but after his death a few years later, the patent was sold by his widow to an American entrepreneur (1869, p. 65).

### 4.1. Flipbook, Its Variants, and Applications

Flipbooks, which have maintained their popularity since their invention and continue to be produced in various forms, are optical toys. As Bandrova and colleagues (2023, pp. 1-2) note, these initial steps in animation have developed over time into various derivatives. The Flipbook creates the illusion of motion by quickly flipping through sequential drawings, making it one of the earliest examples of interactive media forms. The origins of the Flipbook trace back to the Folioscope idea developed by Pierre-Hubert

Desvignes in 1860, but the first patented version was developed by John Barnes Linnett in 1868. In the 1890s, Max Skladanowsky displayed photographic images in Flipbook format, while Herman Casler invented the Mutoscope, a mechanical system with pages mounted on a central cylinder that rotated. In 1897, Henry Short developed the Filoscope, a device with a mechanism that flipped the pages using an iron lever (Hurdato, 2016, p. 4). All of these examples can be seen as optical devices developed based on Linnett's system.

Flipbooks are devices with the potential to convey an original narrative to the viewer. The illusion of movement created by rapidly flipping through sequential images ensures the continuity of the narrative. Therefore, the Flipbook is not only visually engaging but also noteworthy as a narrative tool. This aspect of visual storytelling has made Flipbooks suitable for use as an alternative narrative tool in academic disciplines.

The use of Flipbooks as educational materials has also been the subject of various studies. Rezeki and Aw (2023), Masrifah et al. (2023), and Abror et al. (2019) have demonstrated that Flipbooks, prepared using both traditional and digital methods, are frequently used as teaching materials in educational institutions. The studies observed that Flipbooks are commonly preferred by teachers in subjects like history, science, and mathematics. This trend stems from the engaging, entertaining, and easily understandable nature of Flipbooks, which are particularly appealing to children.

## 5. CONCLUSION

The philosophical toys developed throughout the 19th century can be considered early attempts by humanity to fix moving images on light-sensitive surfaces. Devices such as the Thaumatrope, Phenakistoscope, and Zoetrope, which emerged during this period, are often regarded as precursors to animation and cartoons. However, it is important to note that the inventors of these devices were largely not artists but individuals with interests in the positive sciences. As a result, it may be more accurate to define these individuals as “inventors” with experimental approaches rather than as “scientists.” The Flipbook, initially developed by John Barnes Linnett under the name Kineograph, gradually became known by the name Flipbook due to its commercial potential. This name change indicates that philosophical toys were not only experimental or recreational tools but also seen as marketing materials. Linnett’s background as a lithographer plays a crucial role in understanding his interest in visual communication and why he developed a device like the Flipbook. The advancements in printing technology during the 19th century led to the emergence of more accessible, reproducible, and visually striking publications. In this context, it can be argued that Linnett, influenced by these developments, embraced the idea of transforming static images into dynamic narratives through a system of sequential drawings. The operational principle of the Flipbook is based on the assembly of sequential visuals representing a moment of motion or a specific scene in the narrative.

These visuals are typically arranged in a manner that preserves the integrity of the narrative and are drawn onto pages. Although these visuals were reproduced through printing in industrial production, the most crucial aspect of the Flipbook’s foundation lies in the fact that the drawings were hand-created by the animator. Each drawing on a page contains subtle differences from the preceding one; although these

differences are imperceptible when the images are still, they create the illusion of movement when the pages are quickly flipped. This phenomenon can be explained by the principle of retinal persistence. Flipbooks achieve their success through the combination of eclectic drawing techniques, drawing continuity, user interaction, and strategic design processes. The experience they offer to the viewer has made Flipbooks a versatile, interdisciplinary narrative tool in both educational and entertainment contexts. The unique experience provided by the Flipbook has evolved in tandem with digital technologies and continues to thrive in modern adaptations, reinterpreted through smartphone applications and digital animation tools. In light of these data, a prediction can be made about the future of flipbooks. The ageless and non-outdated structure of the flipbook is a serious prediction that it will continue to be used in the future. The flipbook production process is in a digital form. This process will continue in the future. However, it is also envisaged that the production of paper flipbooks will continue as an educational material.

## THANKS TO

The history of cartoons and animation dates back to earlier times than the visual arts and cinema. I would like to express my gratitude to all the people (including Neanderthals from thousands of years ago) who supported the emergence of this research and who, even if they were not aware of it, initiated the process of the existence of a discipline such as cartoons and animation.

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