DARK RIDES: THE DAWN OF VIRTUAL REALITY

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This paper introduces the importance of dark rides and amusement parks as a technical and conceptual influence on virtual reality. It defines five criteria for immersive experiences and the driving concepts that have been evident since the first electric rides appeared at amusement parks in the 1900s. This paper defines the ride format known as the dark ride, its relationship to virtual reality and what the format can teach us about building immersive spaces today. This well-known experience takes the form of indoor scenic railway, spook house, walkthrough haunted and ghost train ride at parks around the world. Taking early advantage of electricity, the dark ride became the earliest example of a fully programmed multimedia experience. First experienced in the 1900s, it featured elements like triggered sound, lighting and a moving point-of-view that would not be seen in the cinema until the 1930s and 1940s. With the growth of the cinematic medium throughout the 20th century, the early achievements of the dark ride became relegated to a position of nostalgic oddity. Despite the advancements in entertainment technology, the dark ride format still offers the most complete immersive 360-degree experience in the entertainment industry. At the turn of the 20th century, the amusement park offered experiences (including the dark ride) that gave access to technological experiences like never before.

KEYWORDS: Dark rides, virtual reality, immersive, horror, cinema, halloween

INTRODUCTION

In the early 1900s, a new entertainment medium evolved that would have a profound impact on the way that we build immersive media experiences. With the advent of electricity, darkened amusement rides, or 'Dark Rides', came to prominence, allowing park owners of all abilities to develop automated attractions that thousands of people could enjoy. Rides like the *Laffland* at Sylvan Beach or the *Spookhouse* at Keansburg were purpose built for the available spaces at very small parks. Amusement park dark rides normally evokes images of ghosts, witches, even zombies, as visual elements contained within, but this has not always been the case. In the 1900s, the thematic elements of the amusement park related more to classical ideas, with the popular zeitgeist full of an assortment of myth, fantasy and early science fiction. The earliest ride to be considered a dark ride was *A Trip to the Moon* (1901). It was an experience which featured none of the haunt thematics that are often associated with being in a dark ride and few shocks, spills, frights or surprises of any matter. It is the contention of this paper that the first dark rides were extensions of the traditional *Tunnel of Love* and *River Cave* rides. Both rides transported the rider in different ways. The *Tunnel of Love* ride transported its passengers on an emotional journey, whilst the *River Cave* ride did so on a more literal level. A few examples of *River Cave* rides still exist today, the most

famous being the *River Caves* ride at Blackpool, United Kingdom. Built in 1905, it takes audiences on a journey through the dramatic vignettes of the far reaches of the British empire. The earliest examples of these intimate and quiet rides like the river caves relied on a pulley and chain system, or often the application of simple gravity (Toulmin, p32 2011). Another example of this early gravity fed format was the *Old Mill* ride at Kennywood Amusement Park in Pittsburgh. Like the *River Cave, The Old Mill* used gravity to move floating carts through the ride in a similar way that the rides namesake would have funnelled wood through its milling machinery. Before electricity could control the events that went on in the dark, the journey was less physiological and allowed couples to have private experiences. In his thesis on the dark ride, Brandon Kwaitek explains the strange relationship between audience and ride in the *Tunnel of Love*:

> 'In all manifestations, the dark ride delivers its passengers back in to summer skies with their faces flushed and pulses quickened in a dramatic enactment of rebirth. Indeed, the dark ride does not transform the riders, but the riders transform the dark ride, turning it into whatever they choose' (Kwaitek, p.128, 1995).

Kwaitek also writes about the power of the ride with young people, 'A young couple would submit themselves to the journey through a darkened cavern on a rickety boat with the reward of a moment of intimacy' (Kwaitek, p.100, 1995).

When *A Trip to the Moon* was built in 1901, new electric motors, projectors and other devices were utilized in creating the immersive experience. The quieter nature of the electric motors and lights meant that more complex experiences could be placed indoors. In this case, it was an enormous ship that could now be constructed in controlled lighting with simulated movement carrying 20-40 people (Baranowski, 2000). This combination of technological evolution and popular storytelling brought thousands of people to visit and experience the ride. Rather than the unique intimacy of the sideshow experiences led by conductors, etc, *A Trip to the Moon* was both an automated and shared interaction. The ride was not scary, but it was uneasy, participants having to trust the infrastructure that saw them hopping upon a vessel suspended many feet above the ground. Giant wings flapped whilst projections gave the impression that the vessel was lifting up into the night sky. The ride took the public's appetite to explore new lands and used it to take them on journey to the most exotic of all destinations the moon (Register, 2001).

This paper will explore the technology and the experiences of rides like *A Trip to the Moon* and reflect on how non-cinematic immersive media today has been influenced by early experiences of this type. *A Trip to the Moon* was important because -as the earliest example of a dark ride- it combined a range of immersive techniques together for the first time. The six elements utilised in *A Trip to the Moon* are still evident in new immersive works today, through formats including Virtual Reality and location based entertainment (such as theme parks and hybrid cinema). The six elements are; a reproducible thematic journey, haptic simulations, perspectival visual illusions, controlled lighting, 360-degree immersion and triggered audio. Some of these elements are easier to recognize than others, but at the core of all these immersive effects is the lighting, creating spaces of complete darkness that allows for physical, sonic and aesthetic effects to have maximum impact. Outdoor rides utilize landscape and the horizon to apply physiological effects, while dark rides create mediated

immersive spaces using controlled access to the senses. A reproducible thematic journey offers some point of commonality in each experience, a theme continued from the facade through to the end of the experience. This is something that evolved further with the advent of electric carts, as experiences became more mechanical, automated and repeatable. Haptic simulations require a tactile engagement with the audience, which could be a bump or turn that relates to what is happening aesthetically, or as simple as a brush from some hanging string to evoke entrance into a spiders lair. Whether it is due to darkness in a dark ride or obscured vision when wearing a VR headset, the effect of being touched when senses are reduced is a crucial part of bodily immersion. Perspectival illusions have always been part of immersive entertainment, articulated in Norman Klein's *The Vatican To Vegas (Klein, 2004)* and Angela Ndalianis's *Neo-Baroque Aesthetics and Contemporary Entertainment (*Ndalianis*, 2005)*. Traditional dark rides used carefully painted dioramas to give the impression of depth in a small space, techniques first seen in the fresco paintings of the 1400s (Klein, P.79, 2005). In rides like the 1964 *Whacky Shack* in Erie, Pennsylvania, corridors of archways are painted onto doors, creating a false perspective, which is then shattered as carts careen through the middle of them. Triggered audio can be complex or rudimentary, in addition to the design of a sound score to the experience (music played in sequence throughout), there would also be sound effects that were triggered at specific points of action. In the case of a cart-based ride, it might include anything from a rudimentary sound recording device to a mechanical trigger dropping a heavy hammer or box of nails to create a distant crashing sound. Triggered horns, sirens and whistles were all utilized in rides through the 20th century.

This combination of technical and conceptual effects is common in all modern dark rides (Kwaitek,1995). Despite the dwindling existence of the classic dark ride, there is still evidence of all of these components in rides built today (Baker 2013). Thompson's dark ride was one of the first media examples to use all these techniques combined, and, to this day, the components of his ride create an immersive space that rivals any contemporary simulation (VR/AR etc). Other elements of the dark ride that evolved in the 1930s included some of the earliest experimentation with moving point-of-view, fright and modular storytelling. Tom Gunning's landmark paper, *The Cinema of Attractions* (1986), brought attention to the period of cinema before 1906 which he believes was more influential on contemporary cinema than previously thought. Gunning discusses many aspects of contemporary film components that originated in that early period before feature length films became the norm. He points out the use of space, atmosphere and the hybridity of its construction as crucial aspects of the cinematic experience (Gunning, 1986). This paper calls for a similar examination of early immersive media, an examination which not only looks at different media from last century, but which acknowledges and celebrates trajectories such as the dark ride. The dark ride format offers a packaged and contained experience that foreshadows many of the techniques cinema applies in the 1940s and 1950s.

The approach of early immersive technology users of the 1900s can be seen today in experimental approaches of Halloween haunts across the world. This industry -which is attended by millions of people each year- sees small time creators building immersive spaces out of modular technologies (rather than bespoke and expensive investments) (Haunters, 2017). Despite this inheritance of the ideals of the dark ride, history seldom mentions it as an important media format. This paper will explore the ways in which the original invention of

the dark ride is still relevant and how the aspirations of contemporary immersive media are still aligned with the goals of this classic format.

THE DAWN OF VIRTUAL REALITY

Frederick Thompson was the designer responsible for the revolutionary new entertainment experience entitled *A Trip to the Moon*. In 1901, it entertained thousands of people, toured the country before becoming the namesake and centrepiece of Coney Island's *Luna Park* (Abel, p.135 2011). The most notable point about Thompson's invention in broader media theory is that it was conceived a year before a far more famous cinematic work of the same name (Méliès, 1902). Directed by George Méliès, the French title was *Le Voyage Dans La Lune.* (1902). Méliès' film is one of the most iconic works of early cinema, and has been influential in our contemporary understanding of cinematic space (Paci, 2011). Although academics such as Tom Gunning and Thierry Lefebvre have pointed out the similarity in the two works, there is no interrogation of Thompson's work and its specific importance to contemporary media landscape. Thompson's *A Trip to the Moon* made its debut at the *Buffalo Pan American Exposition* of 1901. One of the most innovative aspects of the fair was the prevalence of electricity, in particular, electric light. It was the purpose of fairs like this to exhibit the most cutting edge examples of American technology and Buffalo was no exception. Enormous light towers, promenade, streetlights and roving spotlights illuminated every inch of the fair (Grant, p.18, 2001). This type of technology and opulence had only just begun to appear in entertainment zones and was not commonplace in suburban areas. The establishment and success of expositions and world's fairs across the United States helped build huge infrastructure and lured people from the country areas into the major centres (Mattie, 1998). Thompson's attraction was the first to utilize electric light indoors and in a sequential fashion. This meant that he could adapt and expand on one of the most popular formats of the 19th century entertainment; the Panorama. From the 18th to the late 19th century, panorama painting was a widespread form of popular entertainment. Enormous wrap around images were installed into spaces as a way of placing the viewer into that environment. The works would attract paying visitors and were a unique extension of amusement and cultural spectacle. It was a way of experiencing images that would later be co-opted by the early picture palaces in the way that large projections were viewed. In the book, *The panorama: history of a mass medium*, author, Stephan Oettermann, talks about this idea, as he outlines the medium's importance as not merely pre-cinematic, but as critical in the evolution of modern entertainment; 'The television of today is a direct descendant of the Panorama... an injection of vicarious adventure and excitement… while keeping the body immobilized.' (p.44, 1997). Cycloramas were a type of panorama that where the image content continued onto the roof and floor and often contained props. The cyclorama was a static form of image presentation, exemplary of the preindustrial, pre-electricity era. These immersive entertainments took their cues from illusionistic forms of popular culture from past centuries, particularly the visual marvels of 17th century tromp l'oeil paintings, which were used in churches to create a false sense of depth for those viewing the ceilings from below. The large format historical images used in popular panoramas and cycloramas featured situated viewers in the centre of the room and the surrounding painting used forced perspective to create the illusion of depth. One of the most famous cycloramas, *The Battle of Gettysburg*, by Paul Philippoteaux, measures over one hundred metres in length when rolled

out flat. This image –a hybrid of traditional historic landscape painting and illusionistic spectacle– was housed at a specially built facility in Boston from 1883 (Brenneman and Boardman, 2015). As Oettermann noted, the level of engagement was akin to relaxing in front of the television. In 1907, one of the newest and most touted attractions to feature at Coney Island's *Luna Park* was a gigantic panorama of a sea wreck (New York Times, 1907). Subtle, passive installations like this co-existed with the roller coasters and Ferris wheels that typified the amusement park skyline. In Buffalo in 1901, Frederick Thompson's *A Trip to the Moon* ride would utilise aspects of the panorama in combination with other technology to create a unique, narrative journey. Thompson's *A Trip to the Moon* positioned the audience –not as casually immersed onlookers– but participants in a journey. Thompson's new creation did not depict a scene from history, but rather, a famous tale, a narrative experience. The ride that Thompson created took clear influence from two great works of science fiction literature; Jules Verne's *From the Earth to the Moon* (1865) and HG Well's *The First Men in the Moon* (1901). Many carnival attractions linked to science fiction themes through their desire to entertain through fantasies of technical innovation.

Thompson's ride at the fair was far more than a cyclorama. The ride begins before any mechanics or special effects have been triggered, with the audience entering the large building, climbing a set of stairs and being forced to walk across a precarious ramp on to a small boat (Leary and Sholes, 1998, p.86). The entire ride is best illustrated in the sketches for the patent which were filed in 1903 by Thompson, a large boat was suspended in a room, touching the landing via two bridges, but appearing otherwise to be suspended in mid-air. Around the vessel were painted images. The ride integrated a moving cyclorama that operated in a similar manner to a gigantic scroll (Thompson, 1903). This apparatus cycled through imagery whilst the vessel heaved and creaked, giving the impression that the boat was exiting the earth and approaching the moon (Leary and Sholes, 1998, p.86).

In an article for *The Century Magazine*, esteemed writer of the period, Albert Bigelow Paine, wrote of his experience on the ride, 'Suddenly there was a darkening, followed by complete blackness. Lightning flashed across the sky' (qtd in. Rabinowitz, 2012, p.9). This is a crucial difference in the form that the ride took to other thrill rides of the day. Comparing Thompson's ride to the Ferris wheel or countless spinning, twirling and twisting rides at other amusement parks, none could conjure up an atmospheric illusion strong enough to emulate the a lightning storm. It showed a mediated and controlled way to conjure up atmosphere in a specific temporal sequence. Images were unveiled in stages using sets of lights attached to the rim of the boat, which turned on and off revealing the painted murals. Small Stereopticons were installed underneath and above the boat (Thompson, 1903). These devices —unlike the stereoscope— were little more than small sets of slide projectors. The main role of the stereopticon was its ability to fade seamlessly between two projected still images. In Thompson's *A Trip to the Moon*, this technique was used to create light effects that gave the appearance of moving clouds on top of the printed cyclorama. With two of these devices positioned atop the boat and two below, out of sight, we see an early example of a 360-degree immersive environment (Thompson, 1903). As the ride progresses, the cyclorama reveals itself as an image of Buffalo from above. This specific geographical image decorates the area at the base of the installation below the participants in the boat. Either side of the participant, layers of cloud are painted on screens. Then, the giant wings of the ship begin to flap and cycloramic images of the ground morph into more distant solitary lights (Barry, 1901). Four

layers of cloud images are scrolled vertically in perfect sync with the movement of the boat. The layers are semi-transparent and move at different speeds to give the impression of depth to the surrounds (Barry, 1901). Woody Register's *The Kid of Coney Island* (Register, 2001) and Matthew Solomon's *A Trip to the Fair* (Solomon, 2011) both quote an article by Julian Hawthorne, titled, *Some Novelties at Buffalo Fair*. Hawthorne talks more specifically about the very real feeling of flight as the boat or vessel rocks and shakes in the wind:

> 'We find ourselves passing through a thunder-cloud, and the lightning flashes round us, and the thunder rolls, the wind howls, and the ship sways in it. But our speed is immense, and anon we have risen above the clouds, and now before us, beneath us, is revealed another planet—actually the moon herself!' (Hawthorne, 1901).

This early precursor to the amusement park ride is an incredible hybrid of many styles of entertainment made possible with the advent of electricity. The technology involved in the presentation of *A Trip to the Moon* can be found in many of the fairground inventions of the late 19th century. For example, effects like the undulating and rocking of the ship can be found in the switchback and scenic railroad made popular in British fairground amusements (Kane, 2016). Some level of sequencing and light play was evident in the *Tunnel of Love* rides or *Swan* rides popular in the United States at sites such as *Sea Lion Park* at Coney Island (Stanton, 1998). In those cases, participants had to rely on gravity or a rudimentary pulley system propelling them through a water based track (Stanton, 1998). What is new about *A Trip to the Moon* is its ability to control light, space and sound synchronously. With the use of electricity, the boat could be moved around without the need for loud motors, wind could be conjured up and sets illuminated.

Angela Ndalianis describes aspects *A Trip to the Moon* as an early example of a 'dark ride' in her paper, "Dark Rides, Hybrid Machines and the Horror Experience" (2010). Ndalianis's research spans the fields of computer games, pop culture and robotics and she is one of the few researchers to acknowledge the position of dark rides in media history. She explains that its influence can be seen in contemporary entertainments such as Universal's *Revenge of the Mummy* ride (Universal, 2004). *A Trip to the Moon* has all of the defining features of what would come to be known as a dark ride (Mangels, 1952). These are the type of rides that would become popular in the mid20th century for their simple use of electrified tracks and spooky installations. Thompson's invention shows a hybrid use of visual effects that would later be popularised by cinema, a fact exemplified by the premiere only nine months later of Méliès' famous film, *Un Voyage Dans la Lune*. A direct influence of Thompson's ride on Méliès cannot be proven categorically, as the texts were undoubtedly part of the popular zeitgeist (Lefebvre, 2002). Nonetheless, it shows that whilst the evolution of storytelling in the cinema evolved, so too did the evolution of this type of hybrid media practice. In the case of Thomson's ride, we see the 'dark ride' translation of a text preceding cinema. Again, Solomon's 2011 essay gives great insight into the parallels of Méliès and Thompson's works. Solomon classifies Thompson's work as of equal importance to Méliès in the way it blended spatial design and hybrid narrativity. He also directly addresses the comparisons between the two works:

> 'Apart from serving as a possible inspiration, whether direct or indirect, it is worth pointing out that the film, like the ride, involves a journey to the moon in which

passengers begin as passive spectators of a two-dimensional display, but then become more active parts of a three-dimensional experience.' (2011).

Méliès' film achieved far more notoriety in popular culture and historic analysis than Thompson's work. With countless books, essays and re-imaginings of the cinematic appearing throughout culture since the 1980s, including Martin Scorsese's film, *Hugo* (2011), and the HBO series, *From the Earth to The Moon (1998)*. A majority of the interest both popular and academic in Méliès' work came after Gunning's re-evaluation in the latter part of the 20th century that re-evaluated the importance of Méliès' work and the period it was made. Gunning's many papers have engendered a new understanding of the importance and interpretation of early cinema. In his article, *Shooting into Outer Space: Reframing Modern Vision,*(1997), Gunning speaks specifically to Méliès' *A Trip to the Moon:*

> 'A Trip to the Moon reflects the intermedial palimpsest that typified early cinema (and I would argue cinema for most of its history) and all these sources contributed to the film's use of space. One could claim that Méliès's film explores the new composite space of cinema as imaginatively as its astronomers did outer space.'

Here we see Gunning make reference not only to the lineage of these early films, but the specific influence that it had on cinema's sense of space. Thierry Lefebvre adds more pointedly to the discussion in "A Trip to the Moon: A Composite Film" (2002). Here, Lefebvre seeks to understand if Méliès might have first seen Thompson's ride before producing his film. He also examines some of the similarities between the two works:

> 'Several similarities are found between Méliès's film and the Buffalo attraction. In each case, the story unfolds in three distinct parts: the preparations for the journey, the journey itself, and the moon landing are believable enough; the encounter with the Selenites is pure fantasy; and the return to earth mystification pure and simple.' (p.52)

Too often, the history of immersive entertainment and interactive media is linked to either early cinema or sometimes more adventurously; to the theatre. In Thompson's *A Trip to the Moon,* we see a literary text adapted into a hybrid form where there is no cinematic precedent. The ride format had evolved into its own medium and *A Trip to the Moon* was the first example of an electric incarnation of such an experience. Recognizing *A Trip to the Moon* as a 'dark ride' helps define the other media that it has influenced since this early example. Dark rides are known today as a type of entertainment that holds both nostalgic and some historic relevance, however, they are cited predominantly inside cinematic works. Films such as *The Machinist* (2005), Amelie (2001) and *Miss Peregrine's Home for Peculiar Children* (2017) all feature traditional dark rides as a narrative element, but with little context to the influence they might have had on the cinematic form. In the 1950s and 1960s, a growing youth population saw a resurgence in interest in amusement park culture, which resulted in *Universal Studios* reimagining classic horror figures and re-interpreting them in ride form. (Phillips, 2012, p.120). Today, the connection between ride culture and cinema is stronger than ever, with rides even influencing the production of the cinema content, with the most common example being the *Pirates of the Caribbean* movie franchise (2003). Defining the work of the earliest dark rides and other pre-cinematic rides is crucial in trying to define a history of spatial storytelling that runs parallel to readings of cinema.

By the time the exposition closed in late 1901, Thompson's *A Trip to the Moon* was a massive success. Thompson would go on to become one of the most successful ride developers at Coney Island, continuing to develop works of hybrid content. Thompson's ride was duplicated and toured around many fairs, even after a version was moved to Coney Island. In his paper, 'A Trip to the Moon as an American Phenomenon' (2011), historian, Richard Abel, describes in detail the cultural response to Thompson's work. Noting how it was copied and even imitated not only at fairs but within other art forms:

> 'In one form or another, the story of A Trip to the Moon remained so popular that now amateur groups even took up producing stage versions… In the summer of 1906, even the 4-Paw-Sells Circus came up with a "most daring and dreadful feat" called Salvo's Trip to the Moon, in which riders plunged down a "precipitous roadway," past a "delicately poised and frail shaped imitation of the moon.' (2011, p.134)

Perhaps it is because of this precipitation into other media forms that Thompson's ride does not live on in the popular consciousness. There is no doubt that *A Trip to the Moon* triggered a new and accessible way of experiencing a narrative text. The patent for the ride can be accessed easily and seems as relevant a plan for any modern theme park or computer game level as anything of the modern era. The patent acts a blueprint, detailing the technology used and how the components work together (Thompson, 1903). Thompson blended popular and proven experiential devices to create the ultimate technological ride of its day, and whilst it may have been co-opted into cinema history, its traces are clear and present.

After the First World War, during the Great Depression, the market for shared amusements had changed, as   the renaissance in access to technology and ideas in the United States came crashing down in the 1920s. The enlightenment of the 20th century quickly became a darkening. The uptake in popularity of the motor car changed cities and added to a reduction in the numbers attending amusement parks. *The Pretzel Company* built rides in this time and were the first to develop a ride design that reflects the archetypal ghost train/cart ride that has defined its popular image today. *Pretzel Company* founders, Leon Cassidy and Marvin Rempfer, developed and patented the first dark ride design (Cassidy, 1929). Described as an 'Amusement Railway', the patent specifically states that the design of carts and trigger points is ideal for use in an enclosed or darked building (Cassidy, 1929). The *Pretzel Company* design was simple enough to custom build and deliver designs to suit the spaces available to amusement parks. Their design would revive the intimate passenger boat of the *Tunnel of Love* ride from the *Old Mill* rides of the 1900s, combining it with a single electrified track (Cassidy, 1929). This melding of concepts to create a flexible system for manoeuvring passengers around a given space was one of the most creative times for the format and saw the rise of the dark ride as a force for creating fear inducing narratives and utilizing available spaces. *Pretzel Rides* were modular and could be built or 'programmed' in ways to fit vastly different spaces. For example, to compare the *Spookarama* dark ride in Coney Island and the *Laffland* in Sylvan Beach (both in New York State, USA); The *Spookarama* was built in 1955 and installed into a space with no walls, while the *Laffland* was ordered in 1954 to fit in to a larger space with hallways to encase the track (Malone, 2000). Even though many of the props in the two rides were the same, the trigger points and pacing of the carts were built and programmed to fit entirely different architectures. The Sylvan beach space was developed to

make use of an old bathing house that was no longer necessary (Butko and Butko, 2007). Carts move through the darkened space, occasionally hitting barn doors called 'crash doors' that are used to keep sections of the ride dark and offer punctuated thrills in low visibility when they are hit (Dark Ride Project, 2016). The *Laffland* ride is generally an uneasy but forward moving experience, whereas the *Spookarama* is frenetic with spills of light everywhere and much closer proximity to props Due to the *Spookarama*'s lack of walls, the track design needed to draw the viewers eyes quickly from one prop to the next, creating a very different experience.

This tailored approach to designing rides was particularly important as amusement parks scaled down operations across their properties, leaving a variety of odd, disused spaces (Kwaitek, 1995). Over 1,700 ride kits were dispersed across the United States and the world with common components and similar modular turns, tricks, triggers, lights and sound effect machines (Boggs, p10, 2016). Built from 1929 onwards, *Pretzel rides* evolved in parallel with contemporary cinema. Cinematic technology was developing and, in 1929, silent films like Chaplin's *Gold Rush* (1925) or Metropolis (1927) were still the most common form of cinema. In fact, whilst cinema had grown in popularity, it was predominantly experienced in local impromptu theatres (Koszarski, p1, 1994). With the elements of the early dark rides (for example, haptics, 360 degree) melded with a traditional *Pretzel's* two person cart, the intimate experience became fearful, as the cart no longer floated in water, but careered up and down a track. Sparks, creaks, crashing doors, spring-loaded ghouls, sirens, horns, and blinding lights all combined to create a world of fearful surprises in 360 degrees. This was an immersive experience that would not be replicated until the first wave of virtual reality in the 1980s. The *Pretzel company* made rides up until 1979, but they are most famous for designs in the 1930s, 1940s and 1950s. One operator could now run a single venue that might have been home to a bowling alley, concert or dance hall. Creating spooky attractions was not a new pastime in the United States, but the availability of the *Pretzel* ride allowed people to experiment with their own designs and create complex spatial narratives and adapt them over the years. The use of darkened space meant that minimal engineering was required to build an experience and the ageing facades of the pre-World War Two parks would add to the feeling further. This modern form of expression mirrored the world around it, as abandoned buildings became more common, so too did abandoned-themed rides. (Baker, p.24, 2013)

Cinematic experiences of the 1920s and 1930s were not nearly as visceral in nature in comparison to the dark ride. Cameras were not able to capture easily in low light, or even shoot at certain close distances (O'Brien, p.41, 2014). In the 1920s, despite advancements in film production, the logistics of attending the cinema were fraught with problems. Projectors would vibrate and images could distort, causing patrons to sit long distances from the screen (Koszarski, p10, 1994). Early 20th century amusement parks were typified by an exploration and distillation of the uncanny that was first experienced by those catching motorised transport for the first time. In places like Coney Island, United States and Blackpool, United Kingdom, the park served as a destination in what was a rare opportunity to catch the train or subway. The most iconic section of early parks was the *Scenic Railway*, which later evolved into the *Roller Coaster*. This rail-based apparatus became an extension of the very infrastructure that brought people to the park.

Most amusement parks that had thrived in the 1900s had done so because electric tramlines brought people to them and were a captive audience. With the popularisation of the car in the 1920s, small parks found it harder to survive, and their tram or 'trolley' (Rabinovitz, 2012, p.63) lines were shut and lay abandoned. The iconic and often fetishized idea of the abandoned amusement park was first an abandoned train line.

Throughout the 1950s and 1960s, people began to return to the amusement park. The dark rides of old were less relevant and the concept of fright and intimacy was quickly becoming part of the cinematic experience. Between 1950 and 1970, Bill Tracy rose to prominence as the most prolific dark ride designer of his era. He created 57 rides, at first working for the *Pretzel company* before becoming an independent ride designer (Bahur and Seidl, 2018). His rides used the five key components of the dark ride (haptics, 360 degree), intertwining more cinematic elements that were prevalent in the 1960s, from gothic revival to elements of psychedelia. His *Whacky Shack* design melded aesthetics from hippy pop culture with traditional dark ride elements of the 1920s and 1930s (Bahur and Seidl, 2018). Tracy built this particular ride for parks in Wichita, Georgia, New Jersey and one which still operates at *Waldameer* Park, Pennsylvania. . In the 1960s, the dark ride had begun to be subsumed into the language of cinema. Directors like William Castle began to produce films with actual physical audience engagement, films had their own props that needed to be installed into the cinema. Films like *The Tingler* (1959), *13 Ghosts* (1960) and *Homicidal* (1961) attracted audiences to the cinema who twenty years earlier would have spent the evening at the amusement park. Castle's films reflect three things: a shift by popular cinema to involve the audience in a more physical way, an attempt by cinema to expand its experience in competition with burgeoning television audiences, and an acceptance that cinema and the spectacle of the amusement park had fused. Catherine Clepper has studied the phenomenology of Castle's approach to filmmaking. In her paper, *Death by Fright* (2016), she identifies the earliest themes that Castle perpetuates and notes the emergence of embodied spectatorship in Castle's work. This concept which defines the corporeal relationship between the audience and the film is something which had existed with fairgoers for half a century.

> 'Castle revived the innate quality of the original dark ride that the audience must routinely entrust their bodies to the cinematic experience to the confines of the theater, to the reflexes and reactions evoked by films, and to the sensory conditions of the crowd, space, and atmosphere… evident in all of Castle's earliest independent productions were themes of risk, individuality, and consent related to the perils faced by both Castle's onscreen characters and offscreen audiences.' (Clepper p.24, 2016)

Castle was an outlier when it came to this level of audience embodiment in cinema, with few other directors blending so much of the dark ride with the cinematic experience. In the theatrical presentations of *House on Haunted Hill* (1959), a skeleton was hoisted above the audience and released at crucial times during the picture to create a fright and give a visceral interaction with the audience.

The death of Bill Tracy and the closing of the *Pretzel* factory in 1971 signalled the slowing for the evolution of the classic dark ride and the beginning of the indoor multimedia amusement. Disneyland theme parks had been building audiences since opening in 1955,

with concepts from the cinema being re-interpreted into dark rides. It would be forty years before the *Pirates of the Caribbean* ride would reverse the trend and influence a cinematic creation. In the contemporary landscape occupied by automated, robotic, augmented, projected, and virtual elements, the five facets of the first electric dark ride are still evident in these experiences. With the wider distribution of cinematic content, class divides and disputes over land, the amusement parks struggled to draw audiences in the 1970s. By the 1980s, hundreds of parks had closed (Lost Amusement Parks, 2017) and the attention of the consumer audience had shifted to home entertainment, the game arcade, and to major 'theme parks'. Theme parks like Disney's were able to capture new markets by cross promoting and developing content that had recognition across the entire USA through their television and film initiatives.

The amusement park was a commercial monetized space, but still served as an important public for access to technologies that would otherwise be out of reach. In the early 1900s, amusement parks had been built in new and expanding areas of cities or at newly developing waterside locations like *Santa Cruz Beach Boardwalk* in California and *Wildwoods* in New Jersey. Their unique location in the community meant that the amusement park was always under threat from those who saw value its commercial value as real estate (Cross 2005, p. 4). Aristocrats felt that the new popular entertainment was primarily about fun (Gabler, 1998, p. 16) rather than community, and was ultimately a foolish indulgence with little value. Today's Virtual Reality marketplace is becoming the amusement park of its time, a place where people can connect with experiences that transport in experimental and evolving ways. The link between simulations used in science, engineering and the military and entertainment rides has always been there. Popular entertainment has given people access to new technologies, new experiences and new points of view. Whether embodied in the shared spaces of virtual reality today, the home made haunts of the 1920s or a multimillion dollar experience, the nature of the experience has stayed the same through time and budget.

CONCLUSION

Throughout the 20th century, we have seen the consistent presence of the dark ride format in the entertainment media landscape. For over a century, it has been used to create unique experiences that engage people using a range of immersive media techniques that used together are unsurpassed today. Five elements define the uniqueness of a dark ride; a directed journey, triggered sound, optical illusion, haptic feedback and darkness. All of these elements have origins in other industries and artistic disciplines, but they were brought together in the early 20th century in the form of the dark ride.

Dark rides featured heavily in the makeup of parks throughout last century with handful of original examples still in existence (Dark Ride Project, 2016). At times, they offered the ability to reuse old spaces in new ways, whilst at other times, experiences were built from scratch, in both cases with a link to history, myth, or memory. In the 1930s, rides were developed pragmatically, with carts taking spaces and turning them into experiences. In the 1950s and 1960s, as cinema competed with television, the dark ride offered a new perspective on popular archetypes and a new private space for a youthful populace (Cross 2005, p. 9).

In Universal's *Harry Potter's Forbidden Journey Ride (2016),* for example, the ride holds to the six key elements of a dark ride, differing only in complexity. In most contemporary dark rides, the five elements of immersion are far superior to those found in wholly digital experiences with the clarity of real world elements over digital, the speed of haptic response and the emotional aspects of risk and trust associated with getting on a cart being superior to wholly digital experiences. All these factors are elements that digital simulation is still trying to master and making strong inroads to emulate. Even in the gaming sector, the combination of 360 imagery and haptics is not an industry standard. This paper shows the current supremacy of this established format over evolving media such as Virtual Reality. Whilst comparing real world to digital experiences is fraught, acknowledging the most potent parts of a traditional experiences helps set the goals for digital simulation. Haptic feedback and sound in the dark ride are both a programmed and phenomenological occurrence. The rattling cart, the vibration of the electric motor, the creaking floorboards and the presence of other riders are part of the trust and submission that this public entertainment entails.

Digital technologies have followed in the trajectory of amusement phenomenon like the dark ride. With the advent of new technologies and distribution methods for immersive media -such as Virtual Reality and Augmented Reality- understanding the historic context is paramount. However, a disconnect exists between the presence of the dark ride throughout the 20th century and the rise of new technologies such as Virtual Reality. Virtual reality is not a new form of embodied cinema, in some respects it is an example of the form of embodiment that the dark ride has always offered audiences. The amusement park ushered in a more complex media environment that changed remarkably throughout the century but the academic engagement afforded to cinema does not exist when it comes to the dark ride.

The downturn in amusement parks in the 1910s to 1930s was not a boom for investment, but was fruitful in the creativity that happened on a local level at amusement parks. Concepts of interaction and engagement with space were explored and utilised by thousands across the USA and the world. In the 1950s and 1960s, the technology of dark rides evolved far less, but the investment returned to parks with more exposure being given to the fairground experienc. (Phillips, 2012, p.202) Whilst links between today's new media entertainment and amusements is evident through an examination of the history the medium, it is seldom discussed in theory. The phrase, 'amusement park', is part of the zeitgeist, but is often used frivolously or nostalgically. There are even facilities opening which describe themselves as "*Virtual Amusement Parks*" with little explanation as to why this definition is apt or appropriate. (Rogers, 2018), (Picht, 2018), (Griffith, 2018) Early ride-based entertainment is underrepresented in academia, despite its regular use in the vernacular of new media, especially virtual reality. Gunning proposed a theory for the re-evaluation of early cinema, which primarily focuses on the entertainment at the fairground rather than in the cinema. Gunning cites this history as having an incredible and under examined influence on contemporary cinema. His theory of the 'cinema of attractions' is one of the few examples of academic writing that discusses dark rides as part of the early influence of amusements on cinema. The recognition of the dark ride format allows us to guide our decision making both conceptually and technically in the development of new media. In the case of Virtual Reality, defining the five key elements that make up the dark ride format gives us a checklist not only for replicating its strengths, but also for adding to them. Scent generation (Krumins, 2018), neuro-controllers (Houser, 2018) and advanced augmentation (Statt, 2018) are new areas that

are being examined, pushing immersion beyond the six elements of immersion discussed in this paper. Without a framework and a format to structure the implementation of new technologies, we run the risk of obsessing about the features of new technology rather than contextualising them within a century of electric media. The dark ride is a broad format that can easily encompass new and evolving technologies and further defining and utilising it will help to create a framework that ties the past to the future.

The dark ride defined a new approach to electric immersion in the way that it utilized and explored space in the form of a ride. Spaces have evolved and technology is looking for ways to fill, engage and interact with real and virtual space. The culture of rides is something that most Americans grew up with, but it is seldom cited as an influence in art, design, film or architecture. As the earliest example of electric immersion, it needs to be one of the first points of reference when developing creative work in space. Hopefully, with greater understanding of this important part of media history, there will also come a greater push to restore, rebuild and protect the small number of dark rides from across last century that still exist today.

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