

Rise of Lost Worlds

A Cultural History of the Dinosaur Park, Part 3: Walt Disney's Creatures at the 'Magic Skyway' Ride

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“That seemed to us a wonderful idea, it was a kind of time travel
—the only time travel in the world’.

Michael Crichton, *Jurassic Park* (1990)

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Introduction

Regarding the 'Magic Skyway' dark ride installed in Ford Motor's pavilion at the 1964–1965 New York World's Fair, Walt Disney (Walter Elias Disney, 1901–1966) stated, 'What we want to provide guests at the Ford Pavilion is an entirely original experience, something no one has seen or done before. It could never happen in real life, but we can achieve the *illusion* by creating an adventure so realistic that visitors will feel they have lived through a wonderful, once-in-a-lifetime experience'.¹⁾

Travelling through time into the past and future is the kind of experience

passengers would have. They will travel in Ford convertibles to the period when dinosaurs ruled, the Stone Age and the future city.

Disney was not alone in exhibiting prehistoric creatures at the fair: Sinclair Refining (the subsidiary of Sinclair Oil) also created the outdoor display 'Dinoland' featuring full-scale models of nine dinosaur genera in a natural setting—the *Brontosaurus*, *Struthiomimus*, *Trachodon*, *Tyrannosaurus*, *Triceratops*, *Ankylosaurus*, *Corythosaurus*, *Ornitholestes* and *Stegosaurus* (three of them were partially animated). The sculptor Louis Paul Jonas restored them under the direction of palaeontologists Barnum Brown and John H. Ostrom.²⁾ In addition, Travellers Insurance displayed 13 life-size dioramas showing man's historical events, such as early man's hunting of prehistoric mammals.³⁾

Nevertheless, Disney's ride was unique because it applied 'Audio-Animatronics', which enables synchronising figures' movements with sounds. The Magic Skyway's prehistoric scenery was livening, filled with full-scale and fully animated dinosaurs, mammoths and 'cavemen'.

This essay overviews the ride's development and examines how Walt Disney provided guests with a 'once-in-a-lifetime experience' by analysing the characteristics of his creative endeavours. Chapter 1 outlines the Magic Skyway's construction process and contents. Meanwhile, Chapters 2 and 3 focus on its relationship to preceding films and exhibits featuring animated dinosaurs. Chapter 4 discusses how Disney's insistence on storytelling led to the creation of audio-animatronic dinosaurs and cave dwellers that blurred the line between living and simulated creatures.

1. Making a 'Once-in-a-Lifetime Experience'

Disney's Shows at the 1964–1965 New York World's Fair

Under the direction of Robert Moses, the New York World's Fair was to commemorate the city's 300th anniversary. Moses, a city planner who constructed highways, bridges, parks and other facilities for New York, viewed the fair as the ideal opportunity to finally complete the Flushing Meadows Park (Figure 1): the previous fair (1939–1940), held in the same area, failed to generate sufficient revenue to realise his park plan.⁴⁾

Moses asked Disney if he could put up a children's exhibition to ensure the success of this year's fair, at the same time that Disney was seeking to create



Figure 1. The 'Unisphere', the famous icon of the 1964–1965 New York World's Fair (Photographed by the author, 2023)

shows for the fair, not of his own but of major corporations.⁵⁾ According to his biographer Bob Thomas, Disney gathered his planners in 1960 and made the following statement:

There's going to be a big fair in New York. All of the big corporations in the country are going to be spending a helluva lot of money building exhibits there. [...] Now They're going to want something that will stand out from the others, and that's the kind of service we can offer them. We've proved we can do it with Disneyland. This is a great opportunity for us to grow. We can use their financing to develop a lot of technology that will help us in the future. And we'll be getting new attractions for Disneyland, too.⁶⁾

Following his direction, the staff of WED Enterprises, a company specialising in attraction creation, contacted several companies and ultimately created four shows: 'Carousel of Progress' in General Electric's Progressland; 'It's a Small World' for the pavilion of UNICEF and Pepsi Cola; 'Great Moments with Mr. Lincoln' for the State of Illinois pavilion; and 'Magic Skyway' for Ford's pavilion.⁷⁾

Thanks to Paul F. Anderson, the editor of the magazine *Persistence of Vision*, we have a thorough understanding of the production process for these shows. According to him, the prototype for the Magic Skyway was the pavilion exhibited by the same motor company at the previous New York World's Fair: Fairgoers were able to ride Ford automobiles, first inside on a winding road and then outside while admiring the fairground panorama.⁸⁾ Andrew Kiste, who also wrote about the Magic Skyway, mentions the 'Ford Rotunda', built for the Century of Progress International Exposition (1933-1934) in Chicago as

another prototype of the new pavilion.⁹⁾

Ford desired to equip their chauffeurs with their convertibles, which would serve as the vehicle of Disney's show. However, Disney insisted that the cars on their ride be driven automatically: a series of motorised wheels embedded in the track could propel Ford convertibles forward and a plate beneath the car body would touch them. A bogie system installed in a parallel groove to the road could steer automobiles. In addition, the speed of vehicles could be altered by applying the booster brakes utilised at a Disneyland attraction. Following Disney's idea, the WED staff created the WEDway PeopleMover System, which passed testing on 6 November, 1961.¹⁰⁾

Important as the driving system was the ride's contents. Disney's art directors conceived the 'Symphony of America' concept: Ford automobiles would transport passengers through recreations of American landscape. However, the idea was changed to time travel into the past and future because Ford executives deemed it too similar to the General Motors' advertisement 'See the USA in a Chevrolet'.¹¹⁾ The new attraction, named 'Magic Skyway', would feature dinosaurs, cave dwellers and the future city.

In addition to the ride, the WED staff must design other displays in the Ford pavilion, including the 'Autoparts Harmonic (Orchestra)' and the 'International Gardens'. The former consisted of 13 musical instruments made from auto parts such as axles and pumps, whereas the latter displayed miniature villages of 11 nations relevant to Ford's market. Disney presented the show plan with WED designer John Hench and WED president Bill Cottrell to Ford executives led by Henry Ford II on 13 December, 1961 and received their approval.¹²⁾ The following year, when excavation for their pavilion started, Ford's plan and production process remained secret so as not to inform their competitor, General Motors, which was also constructing a fair exhibit.¹³⁾

Audio-Animatronic Dinosaurs

In late 1963, there was a rise in newspaper articles about Ford's exhibits. For example, a report by Kathie Norman, published on 1 September, 1963, described the shows in the pavilion called 'Ford Wonder Rotunda' or 'Ford Rotunda': it would be the starting point of the extraordinary journey and visitors would travel on 1964 convertibles running on the electric track through a 'time tunnel' to the prehistoric world, where 'The dinosaurs crane their necks and munch strange foliage. The reptiles bat about, screeching. The cavemen make fire with sticks, paint on rock walls, and talk in cavemen language'.¹⁴⁾

She also described how Disney's staff made the 'instant evolution' possible through 'a space-age Disney system of animation, called "Audio-Animatronics" —animation powered by sound'.¹⁵⁾ With a grotesque photo of engineers unzipping a caveman's vinyl skin and adjusting his internal machinery, Norman explained that the sound impulse of magnetic tapes not only generates the voices of figures but also 'triggers valves that shoot compressed air through plastic tubes'¹⁶⁾ attached to springs, which moved the caveman's body parts as if they were muscles (the detailed mechanism will be described in Chapter 4).

The process of creating dinosaur figures is also discussed in the article. Once Walt Disney and other executives determined the ride's narrative, artists illustrated prehistoric scenes. Based on the illustrations, sculptors produced one-quarter-inch-to-the-foot clay models first and one-inch-to-the-foot models next. These larger models were sliced to create scale readings for life-size clay figures that served as the basis for plaster moulds. Finally, plaster moulds were used to create the vinyl skin that covered the mechanical bones of dinosaurs. The *Tyrannosaurus rex* stood 22 ft. tall and weighed 4 tonnes.¹⁷⁾

The creation of dinosaurs was covered in a different newspaper article on 12 December, 1963. The accompanying photographs depicted sculptors

examining the life-size tyrannosaur statue, coating it with plaster and applying the skin to the fibreglass shell. Other photos showed technicians soldering wires to iron legs and testing brontosaurus' movements, and the article emphasised how dissimilar these mechanical animals were to their traditional counterparts. 'Before development of Audio-Animatronics, such figures were animated mechanically, and clumsily, by cams and levers. The new method, a combination of sound and electronic impulses, is the first major use of space-age technology in the entertainment field'.¹⁸⁾

Let us examine the construction process of the prehistoric figures and scenes using Anderson's work as a guide. After the storyboard meetings determined the ride's contents, Claude Coats, a background painter and WED employee since 1955 and Marc Davis, who joined the planning of Disneyland, completed artist renderings of cavemen and dinosaurs and gave them to Blaine Gibson, the WED's sculptor. Then, Gibson crafted sculptures and backgrounds. In addition, Disneyland's landscaper, Morgan 'Bill' Evans, was tasked with determining which ferns and conifers were suitable for the prehistoric landscape.¹⁹⁾

As described in the Chapter 2, numerous dinosaur scenes originated from *Fantasia* (1940), an animated film with classical music. Gibson recalled palaeontologists' criticisms of the film's depiction of the battle between the stegosaur and tyrannosaur, on the grounds that they must have lived during different periods. 'So on one scene that I composed, which was based on the *Fantasia* scene, I used an Allosaurus, which was a contemporary of the Stegosaurus'.²⁰⁾ However, as reported by Norman and other press personnel, the ride ultimately featured the tyrannosaur and not the allosaur. Anderson writes: 'Although the reason is unknown for reverting back to the Tyrannosaur, it can be assumed that it was due to the T-Rex's more notorious

reputation'.²¹⁾

Gibson also commented on how he designed dinosaurs:

We used information from museum analysis and from paleontologists. I also had a number of books that I was reading to be sure that what I did was true. [...] In the case of the Brontosaurus, paleontology had proved that the head we used, which was one from early reconstructions, was wrong. So I took something, being kind of a student of evolution, that was kind of in between what the general concept of a Brontosaurus was. [...] We had talked about bringing in some paleontology experts, but he [Disney] was not impressed with some of the reconstructions he had seen—he thought we could do it better.²²⁾

After receiving Ford's approval in 1961, WED staff began making a larger version of the presentation model. They incorporated every character into the model to examine every scene in the show in full detail. In addition, the sculpture of life-size dinosaurs and cave dwellers commenced.²³⁾ Gibson led the sculptor team and Davis researched the movements of audio-animatronic figures. 'Everything was studied carefully and then itemized on paper, all in an effort to provide the most realistic movements possible'.²⁴⁾ The sounds and roars provided by John James 'Jimmy' MacDonald accompanied the movements of dinosaurs and cavemen (he had famously voiced Mickey Mouse).²⁵⁾

Beginning in 1964, the general public already had a greater understanding of the Ford Wonder Rotunda's contents. For example, the *Bennington Banner* (20 February) provided a detailed account of the Magic Skyway and other exhibits. In addition, it stated, 'A cross-country caravan of cavemen and

prehistoric animals, as well as futuristic idea cars and artists' creations, is on its way to the Ford Rotunda in Flushing Meadow[s] Park'.²⁶⁾

After the fair's opening day on 22 April, 1964, the Ford and General Motors pavilions were the most popular among the public and the media (the fair ended on 18 October and was held again from 21 April to 17 October, 1965). In GM's pavilion, the 'Futurama' ride transported guests to a time when people would visit the moon and inhabit the Antarctic, deep sea, jungle and futuristic city.²⁷⁾ However—as Anderson notes—given that GM spent for the ride (55 million dollars), the less-expensive Ford pavilion (30 million) did well.²⁸⁾

The Time Tunnel to the Past and Future

The Ford Wonder Rotunda,²⁹⁾ designed by architect Welton Becket, consisted of a glass rotunda (235 ft. in diameter and 56 ft. high) surrounded by 64 pylons (100 ft. in height) and an enormous rectangular exhibition hall. From above, the structure resembled a keyhole. Upon entering the pavilion, fair visitors first saw the International Gardens and Ford automobiles produced in foreign countries. The moving ramp brought them to the upper level, where they were entertained by the Auto Parts Harmonic Orchestra while they waited for the ride.

Then, from the moving platform, visitors embarked on the 12-minute Magic Skyway ride in convertibles. After viewing a panorama of the fairground from the glass tube encircling the rotunda (Figure 2), passengers entered the prehistoric era via the strobing 'time tunnel'. From the darkness emerged a herd of *Edaphosaurus* (sailed-back reptile) and brontosaurus. Brontosaurus were bathing in a swamp and munching vegetables. In the following scene, a group of smaller dinosaurs, *Ornithomimus*, drank water from

a pool adjacent to the Pteranodons' perch on the high rocks. Additionally, a pair of triceratops observed their babies trying to hatch from eggs (Figure 3). However, the tranquil scene is interrupted when a monstrous tyrannosaur attacks a stegosaur.

After leaving the dinosaurs, the passengers witnessed the volcanic eruption that ushered in the age of man. New scenes depict how cave dwellers hunted and invented fire, language and cave art, with some humour. For instance, an upset caveman tries to warn his dull-witted fellow about an approaching bear by using his voice; this was the moment when language was born. Passengers also witnessed a caveman inventing the wheel and travelling to the 'outskirts' in a coach drawn by his wife. Then, they travelled through



Figure 2.

(From the Collections of The Henry Ford, THF67946)

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another time tunnel to the 'Space City' (or 'City of Tomorrow'), where 'glowing shapes suggestive of advanced architecture appear out of the inky darkness of outer space. Planets and meteors move in the heavens, while spaceships flash by on their way to distant galaxies'.³⁰⁾ After disembarking the ride, visitors proceeded to the exit, where they viewed exhibits about Ford's scientific research and 'idea cars'.

In summary, the Magic Skyway presented an account of evolution, beginning with dinosaurs and concluding with the city of the future. Thanks to Audio-Animatronics, visitors could 'witness' the birth, life and death of giant reptiles, as well as the beginnings of human culture. However, neither moving dinosaurs nor using them to represent evolution were world firsts. The



Figure 3.

(From the Collections of The Henry Ford, THF114507)

following chapter focuses on the ‘ancestors’ of Disney’s animated dinosaurs, both two- and three-dimensional.

2. Dawn of Animated Dinosaurs in American Culture

Extinct Monsters on the Screen

In the early twentieth century, hordes of ‘animated dinosaurs’ rampaged across the United States. Gertie, a cartoon *Brontosaurus* created by Winsor McCay, led them (*Gertie the Dinosaur*, 1914). McCay and his friends begin the film by visiting the American Museum of Natural History in New York. McCay bets a friend a meal that ‘he can make the Dinosaur live again by a series of hand-drawn cartoons’, while observing an enormous brontosaurus skeleton. After completing and photographing 10,000 cartoons, he introduces Gertie at a dinner party. The brontosaurus performs tricks as directed by the cartoonist; it also dances, interacts with other prehistoric monsters and drinks lake water before leaving the screen with McCay, who also appears as a cartoon character at the end, on her back.³¹⁾ Although extinct animals appeared in preceding films, ‘*Gertie* was the first time that a dinosaur served as a film’s primary character’.³²⁾

Willis O’Brien, an expert in stop-motion animation, also resurrected extinct animals. After making comedies featuring cave dwellers and dinosaurs, he animated more scientifically accurate extinct animals for *The Ghost of Slumber Mountain* (1918), which depicts a protagonist who visited a haunted mountain having a nightmare about the place. The brontosaurus, a large bird *Diatryma* and triceratopses appear and a carnosaur pursues him.³³⁾ The 1925 film *Evolution* by Max Fleischer, which I will describe in Chapter 3, recycles these dinosaur scenes.

O’Brien then contributed captivating scenes to *The Lost World* (1925).

Mark F. Berry, a technical writer, states that 'it is the only dino picture ever made to actually generate thoughts in its audience, however fleeting, that maybe, somehow, the dinosaurs were *real*'.³⁴⁾ Based on Conan Doyle's novel, the film contains many memorable scenes. The expedition of Professor Challenger encounters remnants of the prehistoric world, including the pterodactyl, *Brontosaurus*, *Trachodon*, *Allosaurus*, *Triceratops*, *Monoclonius*, *Stegosaurus* and *Tyrannosaurus*. In addition to breathing, moving their tails and necks, blinking their eyes and bearing fangs when snarling, they also naturally engage in herding, foraging and fighting. They are as real as the vicious ape-man played by Bull Montana.³⁵⁾ Berry also notes that the film featured recurring themes in subsequent dinosaur films, such as the volcanic eruption.³⁶⁾

O'Brien's extinct reptiles reappear in *King Kong* (1933), a tale of beauty and the beast between an American woman and a monstrous gorilla residing in another lost world near Sumatra. Dinosaurs, including the tyrannosaur and brontosaur, view humans as food or foes and attack them without a second thought.

The sculptor Marcel Delgado worked with O'Brien for *The Lost World* and *King Kong*, creating puppets of dinosaurs from steel armatures, bath sponges (or cotton) and rubber skin. The life-size mechanical body parts such as the neck and tail were also utilised for scenes of the brontosaur rampaging in London (*The Lost World*) and the same animal attacking sailors (*King Kong*).³⁷⁾

Encounters with Mechanical Dinosaurs

Americans could also view animated, three-dimensional dinosaurs and other antediluvian creatures at Chicago's A Century of Progress International Exposition in the same year as the release of *King Kong*. Sinclair Refining

reconstructed a prehistoric scene with seven life-size dinosaurs created by P. G. Alen, a movie dinosaur creator, to represent the geological period of oil formation: *The Indianapolis Star* mentioned a *Brontosaurus*, duck-billed dinosaur, *Stegosaurus* and *Tyrannosaurus* facing off against a *Triceratops* and two *Protoceratops* with their hatchlings. It was difficult for Alen to create dinosaurs that could withstand gales and 'make them move and give vent to such sounds as they are thought to have made a hundred million years ago'.³⁸⁾

In addition, another exhibit featured a collection of life-size animated extinct creatures at the same fair: 'The World A Million Years Ago' by Messmore & Damon, a company founded by George Harold Messmore and Joseph A. Damon.

According to the science historian Chris Manias, Messmore was a prop man with a talent for making mechanic figures, whereas Damon was a butcher's assistant before becoming a modelling artist. Initially, they made parade floats and storefront displays. After successfully constructing mechanical elephants, they built a monstrous *Brontosaurus* figure. Anecdotally, they were inspired to create this creature after observing a steam shovel. They then went to the American Museum of Natural History to examine the brontosaur's fossil and developed connections with the museum's staff, particularly Roy Chapman Andrews. Their new brontosaur could move its neck and tail, expand and contract its body while 'breathing', roll its eyes, open its mouth and give roars.³⁹⁾ Before conceiving a large-scale exhibition for the Chicago World's Fair, they toured the dinosaur throughout eastern North America and created other prehistoric animals.⁴⁰⁾

At the fair, a 68-ft-tall and 85-ft-diameter dome covered their exhibition, which featured 37 animated and roaring figures, and a 7-ft-wide moving sideways encircling the show allowed 50,000 people per day to view the show

in comfort.⁴¹⁾ Visitors first watched man's evolution before travelling back to the Permian and the Mesozoic to witness the struggles of the pterodactyl, stegosaur, triceratops, brontosaur and tyrannosaur. The prehistoric mammals then appeared, followed by a contemporary arctic scene.⁴²⁾

A newspaper article detailed some of Messmore & Damon's animals: the giant sloth, for example, had a steel and paper-mâché frame, covering fur and 'a half dozen motors that make the giant body weave, its mouth open and close in snarling hate, its eyes roll, its claws close convulsively'.⁴³⁾ According to another article, a mechanical mammoth was equipped with skin derived from 400 Mongolian goats and 15 motors. 'All, or any one separately, of the movements made by this colossal collection can be shut off. That means mechanisms at once huge and delicate'.⁴⁴⁾ Even the company's creatures produced sounds, based on the research of the fossilised thorax, through radio tubes. Foliages surrounding animals were also designed based on fossils.⁴⁵⁾

***Fantasia*—Walt Disney's Cartoon Dinosaurs**

In 1920s–1930s, just when people gazed up at movie dinosaurs and their counterparts in three-dimensional exhibits, Walt Disney continuously improved technologies to make his cartoon characters more life-like. Biographies of the legendary filmmaker have made his career well-known.⁴⁶⁾ He pioneered the evolution of the animated cartoon by incorporating sound and then colour. He also released the world's first animated feature film *Snow White and the Seven Dwarfs* (1937).

Disney's animated dinosaurs appear in *Fantasia* (1940), an experimental work combining classical music with cartoon film. Disney selected eight pieces of music for the film in collaboration with conductor Leopold Stokowski and music critic Deems Taylor: 'Toccata and Fugue in D Minor' (Johann Sebastian

Bach); 'The Nutcracker Suite' (Pyotr Ilyich Tchaikovsky); 'The Sorcerer's Apprentice' (Paul Dukas); 'Rite of Spring' (Igor Stravinsky); 'The Pastoral Symphony' (Ludwig van Beethoven); 'The Dance of the Hours' (Amilcare Ponchielli); 'Night on Bald Mountain' (Modest Petrovich Mussorgsky) and 'Ave Maria' (Franz Schubert).⁴⁷⁾

According to John Culhane, the Disney animation historian, Taylor suggested 'Rite of Spring' for the dinosaur scene that Disney wanted to create. Knowing that the Stravinsky's work originally accompanied the choreography representing primitive tribal dances and the maiden sacrifice ritual, Stokowski stated at the same story meeting:

Perhaps we could in some way retain the idea of a sacrifice. The jungle is full of sacrifice, animals preying upon each other, and being preyed upon—that is life. If we could put that on the screen and end with the most terrific and terrifying of the animals fighting and eating each other, people would gasp.⁴⁸⁾

Disney thought the concept was excellent and responded, 'We could base it on the 'dog eat dog' idea all the way through. We could have a battle and build it to a grand climax. It is the fight for life'.⁴⁹⁾

To accurately depict prehistoric fauna, Disney's staff portrayed specimens at the American Museum of Natural History and consulted scientists like Roy Chapman Andrews, Julian Huxley, Barnum Brown and Edwin P. Hubble.⁵⁰⁾ According to *Time*, they also referenced the movements of modern animals and scale models.

A herd of pet iguanas and a baby alligator wriggled over the Burbank lot,

while animators studied their lizardy movements. By the time a complete cast had been rounded up for the Rite, the Disney zoo contained eusthenopterons, brachiosaurs, brontosaurus, plesiosaurs, mesosaurs, diplodocuses, triceratopses, pterodactyls, trachodons, struthiomimuses, stegosaurs, archaeopteryxes, pteranodons, tyrannosaurs and enough plain run-of-the-Jurassic dinosaurs to people a planet.⁵¹⁾

By utilising the viewing angle, Disney's team was remarkably able to convey the immense size of dinosaurs. Bill Roberts, who co-directed *Rite of Spring* with Paul Satterfield, 'decided that the most effective way of suggesting the immensity of a beast [tyrannosaur] that measured forty-seven feet long and eighteen feet high would be to have the audience gaze up at it from below. So the camera level was kept low, which was particularly effective in the battle at the end'.⁵²⁾

Disney's 'Rite of Spring' ultimately themed the earth's history from its beginning to the extinction of the dinosaurs. It consisted eight sections: 'Trip Through Space' guiding viewers from outside the galaxy through nebulae to the young earth still hot and red; 'Volcanoes' demonstrating eruptions and flowing lava; 'Undersea Life and Growth' focusing on the emergence of living forms in the sea and their adaptation to terrestrial life; 'Pterodactyls' and 'Family Life' featuring the herd life of flying reptiles, marine reptiles and dinosaurs struggling for life; 'Fight', the climax featuring the battle between a tyrannosaur and a stegosaur, ending with the latter's death; and 'Trek' and 'Earthquake' showing dinosaurs roam on dry land (which implies climate change) in search of water, die out and turn into bones.⁵³⁾

Culhane notes that the stegosaur became the tyrannosaur's counterpart because of its terrifying tail spikes, despite the suggestion of using the

triceratops, which coexisted with the mighty carnosaur during the same period.⁵⁴⁾ Moreover, Disney abandoned the idea of including the emersion of prehistoric mammals and the early man inventing fire in *Rite of Spring* because 'the fundamentalists [...] threatened to make trouble for *Fantasia* if Walt connected evolution with human beings'.⁵⁵⁾ The Magic Skyway would eventually realise his idea.

3. Evolution as a Motion Picture

The American Museum of Natural History: A Centre of the Dinosaur-Visualising Culture

Since the early 1900s, animated prehistoric monsters have increasingly appeared on screen and in exhibits, frequently in relation to the theory of evolution. Moreover, tracing back these ancestors of the Magic Skyway's creatures, we inevitably reach the American Museum of Natural History in New York because the museum's displays, developed by palaeontologist Henry Fairfield Osborn (1857–1935), continually inspired film and exhibition producers. *Gertie the Dinosaur* begins with fossil displays in the museum. Delgado referenced Charles R. Knight's paintings at the same building when he sculpted dinosaurs for *The Lost World*,⁵⁶⁾ and Messmore and Damon visited the American Museum to view the brontosaur skeleton. Disney's employees would later create portraits of extinct animals there for *Fantasia*.

Osborn was the curator of the museum's Department of Vertebrate Paleontology and later its president (since 1908), and he possessed a unique ability to visualise dinosaurs vividly through fossil mountings, restorations and paintings.⁵⁷⁾ Recognising the popularity of dinosaurs, he sent out expeditions to fossil sites in the Western United States, including the Hell Creek Formation, where Barnum Brown discovered the *Tyrannosaurus rex* in the early 1900s

(Osborn was the man who gave this name to the giant carnosaur)⁵⁸⁾.

After successfully gaining an army of dinosaur fossils, including *Brontosaurus*, *Allosaurus*, *Stegosaurus*, *Ornitholestes* and *Tyrannosaurus*, he let his staff mount their skeletons in a life-like pose. The brontosaurus's skeleton (mounted in 1904–1905) was the result of extensive research into the anatomy of recent reptiles and experiments to determine the correct position of muscles and bones.⁵⁹⁾ The other allosaur skeleton (1907) assumed a crouching position over the bones of another brontosaurus and the imposing mounting of a tyrannosaurus (1910) opened its mouth to emphasise its predatory nature. Historian Ronald Rainger notes, '[S]uch displays meshed with Osborn's interest in glorifying the struggle for existence'.⁶⁰⁾

Charles R. Knight (1874–1953), a freelance animal artist, was equally important because, under Osborn's direction, he illustrated the museum's dinosaurs in an authentic prehistoric setting. The famous painting depicting a herd of brontosaurs living in a wetland (Figure 4) and a tyrannosaurus confronting a family of triceratops are only two of the Knight's works that influenced later representations, such as scenes from *Fantasia* and the Magic Skyway.⁶¹⁾

Regarding cave dwellers, Osborn also contributed to visualising their image through the 'Hall of the Age of Man' in the museum. According to Osborn's guidebook of the hall (1921), it displayed casts of skulls and jaws, stone implements and life-like restorations relating to the *Propliopithecus* as 'a possible prehuman link',⁶²⁾ the 'Trinil ape-man' (the *Pithecanthropus*) and more recent groups, including the Neanderthal and Cro-Magnon. In addition, mammal skeletons surrounded these exhibits to demonstrate man's relationships with prehistoric fauna.⁶³⁾ Knight's murals did not lack there, too: one mural represented Osborn's view of Neanderthals as primitive cave

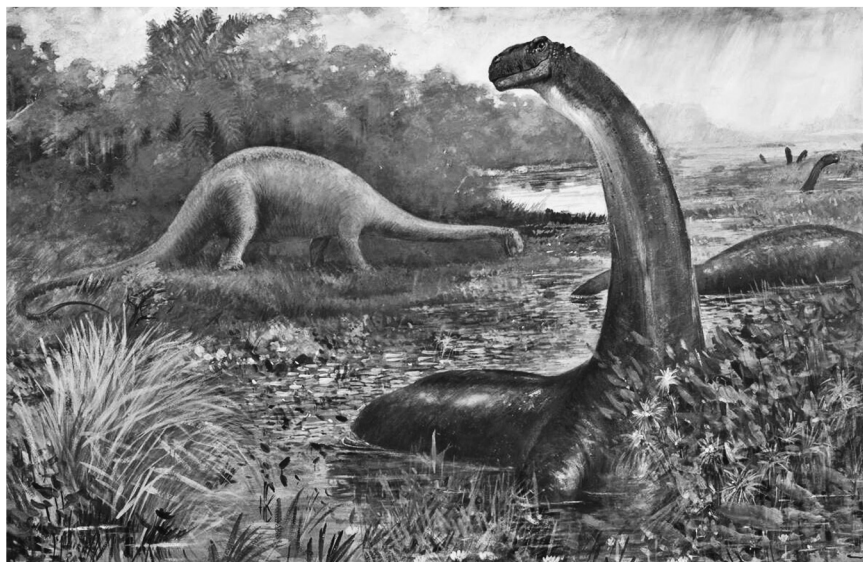


Figure 4. Charles R. Knight's painting of brontosaurus (right) and a diplodocus (left) living in a wetland (1897) (Image # b10007775. American Museum of Natural History Library)

dwellers producing flint weapons and preparing for a hunt, whereas another mural depicted Cro-Magnons as talented artists painting the cave wall.⁶⁴⁾

The Evolutionary Process as a Motion Picture

Originally, Osborn intended for these exhibits to convey his view of evolution as a progressive, predetermined process. Being faithful to Christianity, Osborn felt natural selection, asserted by Charles Darwin as the main factor of evolution, was challenging to accept. According to Darwin's theory, nature selects animal variations that were fortuitously suited to the local environment, allowing them to survive. Furthermore, such form variations would accumulate in their descendants, causing the new species to

diverge from the old. In this process, there appears to be no room for divine intervention. In contrast, Osborn believed that the natural environment only stimulates certain groups of individuals to develop as the creator intended. Moreover, once divergence has occurred, each animal group continues to develop its form in a predetermined manner.⁶⁵⁾

Moreover, Osborn emphasised the gaps between early human species or races. Using Knight's murals, he illustrated the distinction between the Neanderthal and the Cro-Magnon, portraying the former as 'brutish guys' with lower intelligence and the latter as 'smart guys' with an artistic sensibility. Furthermore, by promoting immigrant restriction and eugenics, Osborn attempted to maintain the dominance of his 'race' (descended from northwestern Europe) in modern society, in accordance with his view of racial differences.⁶⁶⁾

However, the issue was how well museum visitors understood his message. According to Rainger, for the majority of visitors, the museum was merely 'a form of theater, a pleasure palace filled with dinosaurs, titanotheres, and other entertaining features'.⁶⁷⁾ In the minds of the general public, Knight's depictions of Neanderthals and Cro-Magnons may merge into a composite image of 'cavemen'. According to historian Constance Areson Clark, the caveman image emerged in the late nineteenth century and early twentieth century as a result of the discoveries of the Neanderthal (1857), *Pithecanthropus erectus* (1891), Piltdown man (1912; the specimen later turned out to be a hoax) and cave art of the Cro-Magnon. By 1920s, when the famous 'Scopes trial' on whether teachers should educate the evolutionary theory at schools took place, 'Cavemen, ape-men, and other variations on the theme of the "missing link" appeared in novels, movies, and cartoons as well as in museums'.⁶⁸⁾

It must have been easier for museum visitors to comprehend the evolutionary process when depicted as a series of still images of each period's living forms, similar to a film. Notably, Clark notes that movies, such as *Evolution* (1925) by Max Fleischer, provided the foundation for understanding the process of evolution.⁶⁹⁾

Oliver Gaycken also describes how films, especially non-fictional ones, were 'promulgators of evolutionary ideas and tools for the visualization of evolutionary processes'.⁷⁰⁾ To demonstrate the close relationship between apes and humans, films frequently featured primates' performances and emotional expressions. The Palaeolithic man inventing weapons to eliminate brutish rivals also appeared in *Man's Genesis* (1912) and its sequel (1913). Other favourite themes included the struggle for survival and animals' ability to adapt to new environments.⁷¹⁾ *Evolution*, directed by Max Fleischer, was more significant. Fleischer, who devoted his life to animation films like Disney, reworked *Evolution: From the Birth of the Planets to the Age of Man* (released by Charles Urban, 1923), adding dinosaur scenes from O'Brien's *The Ghost of Slumber Mountain*.⁷²⁾

The film begins by displaying the most advanced human industrial and transportation technologies and then asks, 'Was man *always* man? Or, Was he once a lower form of animal?' The film then transports viewers back in time to the beginning of earth's existence and displays representative invertebrates, fish, amphibians, reptiles, birds and mammals to illustrate each stage of evolution (all these animals, however, are modern specimens). The film concludes with the appearance of ancient man and modern races.⁷³⁾

In this way, *Evolution* describes the transformation of animals in a progressive and linear manner. 'Here, editing creates the argument, employing the power of piecing together, of juxtaposition, telling a synthetic story that

bridges vast amounts of time [...]'.⁷⁴⁾ The film thus allowed viewers to follow the evolutionary process from a 'God's-eye view'.⁷⁵⁾

In summary, Disney's Magic Skyway was an extension of efforts to visualise the evolutionary process through mounted skeletons, restorations and paintings at museums and to animate them on screen or in exhibits. As in *Evolution* and *Fantasia* or Messmore & Damon's exhibit, the Disney's ride show featured popular images of dinosaurs struggling for survival and cave dwellers inventing tools and art.

4. The Perfect Story Performed by the Artificial Creatures

The Progressive Story of the Magic Skyway

According to biographies of Walt Disney, his creative endeavours possessed two features. First, based on his filmmaking experience, he insisted that each show must have a plot. Second, he consistently attempted to manipulate 'boundaries' to tell the stories he envisioned—boundaries between the inside and outside of the world he created, as well as between various perceptual elements, genres and technologies.

During his struggles in the 1920s, he realised that a cartoon film requires an appealing character and a well-developed plot. Moreover, it became customary for his staff to prepare storyboards so he could immediately comprehend the plot of the animated and live-action films.⁷⁶⁾ Stories were also essential in three-dimensional shows: Disneyland has only one entrance to offer each visitor a complete experience with the same beginning and end. Bob Thomas writes:

He [Disney] saw the need for Disneyland to flow, as did a movie, from scene to scene. The transitions should be gentle, he realized, with

architecture and colors complementing each other in the area of change. Thus the visitor would be led from one attraction to the next without the jolt of adjustment, and he would remember everything he saw.⁷⁷⁾

Regarding the Magic Skyway, *Fantasia* provided the basic story—particularly the scenes of sailed-back reptiles, brontosaurus living in lakes, pteranodons perching rocks, a group of *Ornithomimus* drinking water and the battle between the tyrannosaur and stegosaur. However, the ride also highlighted cave dwellers and the Space City (City of Tomorrow), the two other features. As described in the previous chapter, Disney intended to include the early history of man in *Fantasia* but abandoned the idea out of fear of protests from fundamentalists. Twenty-four years later, the Magic Skyway displayed cave dwellers inventing fire, art and wheels, but avoided depicting the origin of man. Combining them with preceding dinosaurs and subsequent Space City, the show ‘animates the story of life on earth and man’s search for knowledge and progress’.⁷⁸⁾

The Space City, which was filled with lights, glasses and towers, represented the objective of early man’s inventions. Anderson claims that the city’s design was influenced by the pulp magazine art of Alex Schomburg and Virgil Finlay; however, it also reflected Disney’s forward-thinking outlook on the future.⁷⁹⁾ Filmmaker Christian Moran writes, ‘Walt believed that with the proper use of planning, design, and execution, we could fix the problems of today and build a better world’.⁸⁰⁾ While Tomorrowland at Disneyland embodied his concept, Disney television programmes, such as the *Man in Space* series (1955–1957) and *Eyes in Outer Space* (1959), emphasised space travel and the possibility of weather control.⁸¹⁾ In addition, his other three shows at the New York World’s Fair—the ‘Carousel of Progress’, which is accompanied

by the Sherman Brothers' song 'There's a Great, Big, Beautiful Tomorrow'; 'It's a Small World' show, featuring children figures singing the same song in different languages; and the audio-animatronic Abraham Lincoln's speech in the State of Illinois pavilion—and his final plan of the future city The Experimental Prototype Community Of Tomorrow (EPCOT) reflected his desire to create a bright and peaceful future through the use of technology.⁸²⁾

How about the atomic energy available to nuclear missiles? Disney believed that it also provides immeasurable benefits when utilised properly.⁸³⁾ Whatever he convinces, during the Cold War, people were always aware that the potential for violence in their lives could suddenly manifest and result in irreversible destruction, as the Cuban Missile Crisis (1962) demonstrated and Stanley Kubrick's film *Dr. Strangelove, Or: How I Learned to Stop Worrying and Love the Bomb* (1964) satirised.

Did the Magic Skyway's dinosaurs, fighting 'their battle to extinction'⁸⁴⁾ and followed by the volcano's eruption, represent such unbridled aggression leading to calamity? Of course, we should remember that representing battles of extinct monsters has a long history: John Martin (1789–1854) had already depicted ancient reptiles engaged in combat, Benjamin Waterhouse Hawkins (1807–1894) planned to sculpt them struggling for life for a planned museum in New York and Josef Pallenberg (1882–1946) produced cement dinosaurs in the same manner, as I have written in previous essays. Arts and displays in museums, Fair exhibits and films, including *Fantasia*, repeatedly highlighted battling dinosaurs. The traditional image 'nature, red in tooth and claw' was combined with Darwin's term 'struggle for existence' and must have been familiar to Disney and his staff.

Nevertheless, it is worthwhile to interpret their dinosaurs in light of the Cold War. Alexis Dworsky, a cultural historian, argues that the Cold War was

not simply a conflict between capitalist (Western) and communist (Eastern) camps. The image of a divided world also affected our technological, scientific and sociocultural thinking and daily lives. 'Following the binary logic of the East-and-West conflicts, it seemed reasonable that the ancient world too would be divided'.⁸⁵⁾ In his analysis of the 1966 film *One Million Years B.C.*, he proposes that the Saurischia, represented by aggressive bipedal carnosaurus, could symbolise the Eastern camp, whereas the Ornithischia, represented by peaceful quadruped herbivores, could symbolise the Western camp.⁸⁶⁾ The battle between the tyrannosaur and stegosaur on the Magic Skyway can be interpreted similarly.

In any case, the Magic Skyway's story combines the evolutionary process or at least a version of it as the progressive and linear one already featured in Fleischer's *Evolution*, with Disney's optimistic futurism. In other words, although Fleischer provided viewers with a 'God's-eye view' by tracing the past to today, Disney even revealed—or was going to *create*—the future.

Beyond the Boundary Between Living Creatures and Simulated Ones

Disney managed the boundaries surrounding his show deftly in order to tell his story flawlessly. In the case of Disneyland, a berm surrounded the entire park so as to conceal the outside landscape.⁸⁷⁾ Moreover, Disney instructed his staff to conceal the water tower and power line so as not to remind guests of everyday life and to design trash cans to complement themed areas. He 'wanted no intrusion on the illusions he was conjuring'.⁸⁸⁾

At the Magic Skyway, WED staff created the illusion of time travel by combining all available materials and techniques: at the time tunnel, rainbow-hued lights flashed on both sides and above the ride vehicles to give the impression that the four-mile-per-hour-moving vehicles sped up and

transported visitors back to the distant past.⁸⁹⁾ Audio-animatronic dinosaurs emerged 'thru misty vapors and half-shadowy light'⁹⁰⁾ in the prehistoric landscape of rocks, plants and swamps. In addition, a 200-ft-across mural 'with dramatic mountain and sky effects'⁹¹⁾ formed their backdrop.

Disney has never allowed disilluioning elements, including Ford's chauffeurs for ride cars. The primary reason was the capacity issue: automated vehicles moving at the same speed as human-driven cars could transport more visitors.⁹²⁾ However, he likely also feared that they would distract visitors from the exhibits.⁹³⁾

Moreover, barriers between exhibits and visitors were present, although they were not easily perceivable. Media historian Jonathan Lillie and the artist Michelle Jones-Lillie note that, unlike other installation arts (a genre of art installed in a specific space to create original experiences), the Magic Skyway did not allow for interaction.⁹⁴⁾ Instead of allowing visitors to freely move between exhibits to develop their experiences or thoughts, the ride directed viewers to adhere to the prepared script. It resembled 'the classic cinematic experience of being shunted to a dark seat to observe with an omniscient narrator to guide you through the story'.⁹⁵⁾

However, Disney was not a lover of all-kind boundaries. As opposed to erecting barriers to maintain the illusion, Disney sought to overcome the limitations of his imagined creations. People praised his 1928 film *Steamboat Willie* because it perfectly synchronised animation with music and eliminated the boundaries between visual and aural elements, despite not being the first cartoon film to incorporate sounds.⁹⁶⁾ Furthermore, he combined cartoon film with Technicolor's technique of combining three colour negatives (*Flowers and Trees*, 1932) and classical music (*Fantasia*). Meanwhile, *Song of the South* (1946) may be more remarkable because the live-action actor James Baskett

interacted with animated characters as if they shared the same space.⁹⁷⁾

In addition, Disneyland's hybrid or boundary-defying nature was evident in an explanation written on its design drawing, which stated that the park would be 'something of a fair, an exhibition, a playground, a community center, a museum of living facts, and a showplace of beauty and magic'.⁹⁸⁾ In fact, the filmmaker conceived of the park by combining ideas gleaned from activities, such as building a miniature railway at his home and visiting fairs like the Chicago Railroad Fair (1948-1949), amusement parks, zoological gardens, circuses, carnivals and national parks.⁹⁹⁾

However, Disney's ultimate objective was not to overcome barriers between technologies or genres; he attempted to eliminate the distinction between living and artificial creatures by simulating the former. That may have been an inevitable result of his devotion to animated films. 'The process of animation was a process of giving life', his biographer Neal Gabler writes, 'of literally taking the inanimate and making it animate'.¹⁰⁰⁾

Disney's mechanical animals were first installed in Disneyland's Jungle Cruise, a boat ride depicting wild animals and people living in 'uncivilised' areas. Following the advice of zoo staff that animals are unpredictable and would not behave as he desired, he did not use real animals.¹⁰¹⁾ Masako Notoji, a historian, writes, 'The fact that mechanical animals replaced the first planned living wild animals in the jungle [at Disneyland] and that attractions in the park gradually turned into electronic spaces featuring robots reflected Disney's inclination to perfect performance and precise repetition'.¹⁰²⁾

Eventually, Disney needed a 'fantasy device'¹⁰³⁾ to simulate life in three dimensions to the furthest extent possible. He had Bob Matthey, the creator of the giant squid in *20,000 Leagues under the Sea* (1954), develop electrically operated figures,¹⁰⁴⁾ and 'The Enchanted Tiki Room' (1963) at Disneyland was

the first attraction to feature 156 singing and moving audio-animatronic birds, orchids and other characters.¹⁰⁵⁾ Disney remarked that the figures in Room were designed to 'sing, talk, move, and practically think for themselves', calling them the 'creature of the Space Age'.¹⁰⁶⁾

According to Anderson, there were two systems for programming the movements of audio-animatronic figures. The first 'digital' system used air pressure: Tones recorded on magnetic tapes could generate electricity that activated air pressure valves, thereby permitting the movement of figures' body parts. This air pressure on/off system was suitable for simple and light actions, such as opening a bird's beak. In contrast, the 'analogue' system could cause complex movement of heavier body parts, such as arms, by utilising powerful hydraulics. At the latter method, signals of voltage, which were altered by controllers resembling joysticks or knobs or by the 'harness' attached to an operator, were sent to the 'black box' (electronic equipment), which operated hydraulic valves. Thanks to NASA technology, a single track that was later incorporated into a 32-track one-inch master tape could contain a maximum of ten distinct tones, which corresponds to the same number of actions. Additionally, lighting, music and dialogue were recordable.¹⁰⁷⁾

Bob Gurr, who contributed significantly to the development of the Magic Skyway ride system and Audio-Animatronics, claims that Disney's animated characters were devoted to his storytelling:

Walt was always into the next, new thing. He was very aware of the tools to tell stories with, and quite obviously the jump from, say, 2D animation from something like *Snow White* up to the fact that we're going to have a Disneyland. We're going to have a few rudimentary animals. He saw that we're going to do more and more as these tools became available.

Remember, the Space Age came along. We had servo valves, we had hydraulic and pneumatic cylinders that were all space developed. So all of a sudden came these wonderful tools that were part of trying to go to the moon within the decade. Those parts were available to us, and Walt saw them as additional ways to tell stories.¹⁰⁸⁾

In his efforts to tell a perfect story, Disney ultimately created new, 'rudimentary animals' by applying the latest technologies. With the invention of Audio-Animatronics, the distinction between real and artificial creatures became increasingly blurred. In this sense, the statement made by WED president Bill Cottrell, 'We designed the first Jurassic Park',¹⁰⁹⁾ was more than accurate.

Of course, the tyrannosaur at the Magic Skyway would never come close to viewers and turn over their convertibles—it was perfectly under the control of Mr Walt Disney.

Subsequent Events and Conclusion

After the 1964 fair season ended, Disney employees began updating the driving system, enhancing the movements of audio-animatronic figures and replacing Ford convertibles with the new 1965 model. Despite a 10% decline in fair attendees the following year, Magic Skyway riders increased from 6.8 million in 1964 to 8.1 million in 1965.¹¹⁰⁾ After the fair, the Ford Rotunda was demolished and Ford lost interest in establishing further shows at Disneyland. In 1966, Disney transferred dinosaurs to the 'Grand Canyon Diorama' along the Disneyland Railroad that surrounded the park. In contrast, cave dwellers were excluded from the new exhibit due to their crude movements.¹¹¹⁾ 'Dinosaurs invade Disneyland' was the headline of an article published on 8 July, five

months before Walt Disney's death.¹¹²⁾

The reconstruction of the animated lost world began in the first half of the twentieth century. Based on fossil mountings and the paintings of Charles Knight, filmmakers and exhibitors accurately portrayed the movements of prehistoric creatures. Disney contributed to the trend by releasing *Fantasia*. The distinctiveness of the Magic Skyway lies in its narrative, which combines evolution as a linear and progressive process with Disney's vision of the future. Although passengers felt as if they were participating in a time travel adventure into the past and future, the invisible barrier between the exhibit and viewers was there solely to prevent Disney's story from being interrupted. However, his insistence on storytelling led him to simulate living forms, thereby blurring the boundary between living and artificial creatures—or overcoming it.

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Rise of Lost Worlds

A Cultural History of the Dinosaur Park, Part 3: Walt Disney's Creatures at the 'Magic Skyway' Ride (MIZOI)

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