

# BETWEEN IMMERSION AND MEDIA REFLEXIVITY: VIRTUAL TRAVEL MEDIA IN THE 19TH CENTURY

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## Abstract:

Deviating from Oliver Grau's notion of the panorama's immersive features, this article will discuss the receptive impact of virtual travel media of the 19<sup>th</sup> century in a more ambivalent and nuanced manner by employing two theoretical texts by Walter Benjamin, Clemens Brentano and Heinrich von Kleist. In *Berlin Childhood around 1900* Benjamin draws on and reflects his childhood experience of the Kaiserpanorama in Berlin. Brentano and Kleist's text elucidates the authors' 'strange feeling' towards Caspar David Friedrich's painting *Monk by the Sea*. What both texts share is a fundamental experience of ambivalence regarding the topographies depicted in both media. Other than merely being 'enchanted' and taken into a far distant land, it is precisely the mediality of the Kaiserpanorama and the Friedrich painting that provides a more complex experience, oscillating between distance and familiar terrain, between immersion and media reflexivity, between past, present and future. After introducing and discussing both theoretical accounts, I will apply their receptive principles to the analysis of the virtual travel media panorama and early cinema.

**Keywords:** *immersion, virtual travel, panorama, early cinema, Walter Benjamin, Heinrich von Kleist, Clemens Brentano, Caspar David Friedrich*

One of the key concepts applied within recent analyses of various media devices, art and media historical investigations in general is *immersion*. In a broader sense, this concept encompasses aesthetic experiences of being surrounded and absorbed by a technologically created illusion, or of being entirely drawn into a piece of art, whether by its narrative, its means of interaction, its affects or its technological setup. A more narrow definition of immersion is offered by Oliver Grau. In his highly influential monograph *Virtual Art. From Illusion to Immersion* he describes immersive experiences as aesthetic situations in which the spectator is sealed off from reality and located within an enclosed and total image space (Grau & Custance, 2003). The spectator's emotional involvement and the suspension of critical distance are secondary immersive qualities (resulting from the primary ones).

Grau then identifies and analyses a number of media that he finds to be particularly immersive, ranging from ancient fresco paintings and Baroque church ceilings to digitally created experiences of virtual reality. Among these various cases he also discusses the immersive qualities of the nineteenth century virtual travel media panorama and cinema. The panorama in particular is portrayed by Grau as a case in point of humankind's eternal attempt to achieve a perfect illusionism, a virtual reality *avant la lettre*. Media characteristics which deviate

from the notion of immersion are identified as flaws in the apparatus of the medium.<sup>1</sup>

In order to develop a more nuanced account of the nineteenth century art and media history of immersion, I will revisit and reevaluate some of its virtual travel media (such as the panorama) and see if their flaws and defects are more than a chink in the otherwise impeccable armour of immersion. I think it is worth investigating the question of whether there is a particular aesthetic surplus to be derived from these technological errors, an aesthetic pleasure which does not feed solely on people's apparently natural need to be perfectly immersed in and deceived by illusionistic media. In terms of virtual travel media, it is perhaps not merely the joy of experiencing the other location in isolation and cut off from home that drives the modern nineteenth century spectator into the various types of panoramas, dioramas, *laterna magicas*, *phantasmagorias* and cinemas. Maybe the experience of virtual travel in the nineteenth century is actually a hybrid one, oscillating between here and there, home and the faraway place, immersion and media reflexivity.

I will employ two theoretical texts, which problematise the receptive notion of virtual travel as a one-dimensional experience of immersion: *Feelings Before Friedrich's Seascope* by Clemens Brentano and Heinrich von Kleist and Walter Ben-

jamin's chapter on the Kaiserpanorama from *Berlin Childhood around 1900*. Being written in 1810 and 1932-38, the texts frame nineteenth century media history, with Kleist and Brentano viewing the future and Benjamin nostalgically looking back.

Kleist and Brentano's article was published in the newspaper *Berliner Abendblätter* on October 13th, 1810. Officially, Kleist was named as the sole author of the article, although in fact he incorporated and rephrased parts of a handwritten version by Brentano. The article's topic of discussion is Caspar David Friedrich's painting *Monk by the Sea*, which was shown for the first time in 1810 at the Berlin academy exhibition (Fig. 1). The text consists of two connected segments; the first based on Brentano's handwritten manuscript; the second was almost entirely written by Kleist.<sup>2</sup>

Brentano's segment opens with a description of the experience of the picture's dune landscape, as if the painted coastal scenery was real. The narrator's impression of the landscape is very ambivalent and is further characterised by mixed emotions in the tradition of the aesthetic category of the sublime.<sup>3</sup> He finds himself facing the "watery waste [...], yearning to cross over, finding one cannot". The terrible visual perception of the ocean's deadly emptiness is mysteriously accompanied and enchanted by the (actually absent) acoustic percep-



Figure 1: Caspar David Friedrich: *Monk by the Sea*; 1808-10; Alte Nationalgalerie, Berlin; 110 × 171.5 cm; oil on canvas; © b p k - Photo Agency / Nationalgalerie, Staatliche Museen zu Berlin / Jörg P. Anders.

tion of the "voice of life in the roar of the surf, the rush of the wind, the drift of the clouds, the lonely crying of birds". This mixed emotion is further described as a rupture between "an appeal from the heart and a rejection [...] from nature", however, the sublime experience of the boundless ocean is impossible "in front of the picture". This is where the mediality of the painting is brought into focus. Brentano replaces the ambivalent experience of nature with the ambivalent and mediated experience of the picture. A shifting of perspectives takes place: "and that which I should have found within the picture I found instead between the picture and myself". How this discovery is to be imagined is explained immediately after: "and so I myself became the Capuchin monk, the picture became the dune, but that across which I should have

looked with longing, the sea, was absent completely". What at first appears to be a miraculous act of immersion, the narrator's teleportation into the picture, is in fact an unfulfilled expectation, since the object of the narrator's longing, that is the sea, is lacking. And yet, this is generally not an unsatisfying experience; it is the absence of landscape and the spectator's increasing awareness of the picture's mediality which nurtures their fascination for the painting.

The second text segment moves on to rephrase the spectator's immersive identification with the picture's monk figure, as he becomes "the single spark of life in the vast realms of death, the lonely center in the lonely circle". With this, Kleist gives us a first hint of what kind of view he will establish next, namely a pan-

oramic and terribly boundless view. Associations of pain, violence and terror are provoked by the famous description: "the viewer feels as though his eyelids had been cut off". This dramatic metaphor for the spectator's immediate experience of the painting is derived from the picture's sublime uniformity and boundlessness. The image of the cut off eyelids implies a completely limitless view, which Christian Begemann strikingly identifies as panoramic (cf. Begemann, 1990, pp. 89-90). On the one hand, this is not a divine panoramic vision, for the subject is violently forced to see everything at the same time. On the other hand, Kleist's description also refers to the immersive lure of the work. As if under hypnosis, it is impossible for the spectator to close their eyes or look the other way (cf. *ibid.*). The causes of this receptive effect are the painting's specific formal characteristics, its content and, presumably, the scale of its canvas (110 × 171.5 cm).

After this graphic description of the picture's receptive aspects, Kleist concludes the article by evoking art's ancient dream of creating immaculate experiences of illusion and immersion in the tradition of mythological figures such as Pygmalion, Zeuxis or Orpheus.<sup>4</sup> He speculates, "[y]es, were such a painting made with its own chalk and water, the foxes and wolves, I believe, would be set howling by it". In this scenario the painting's mediality is suspended in the matching of material conditions (the chalk and the water),

yet at the same time, Kleist reveals the futility of this dream by locating it in the utopian sphere of the imaginary.

In a similar manner, Benjamin also blends different states of time, space and mind in his text on the Kaiserpanorama. This was published as a chapter in *Berlin Childhood around 1900*, a collection of nostalgic childhood memories.

The tone of nostalgia that permeates the text is also based on the extinction of the Kaiserpanorama and its replacement by cinema. Benjamin reminisces over his Berlin childhood from his Parisian exile where he took refuge after the installation of the Nazi regime in 1933 (cf. Combes, 2004). We are thus dealing with a narrator who is fragmented again and again into different times, spaces and identities.<sup>5</sup>

The Kaiserpanorama was invented as a medium by August Fuhrmann and publically presented for the first time in 1880 (Fig. 2) (Cf. Oettermann, 1980). It was then exported to more than 200 cities. Fuhrmann's archive of stereoscopic photographs encompassed some 125 000 images. The Kaiserpanorama provided space for 25 spectators to be seated around the apparatus. The visitors looked at illuminated stereoscopic images through holes, which rotated around the circular auditorium. The images were mainly exotic topographies and distant places of touristic interest. Pub-

lic interest in Fuhrmann's stereoscopic device eventually faded after decades of international success. In 1939 the company's main branch in Berlin closed down, although other Kaiserpanoramas in areas such as Bavaria or Sudetenland were able to stay in business longer. When young Walter Benjamin visited the Kaiserpanorama for the first time, it was thus already on its way to becoming a relic of media history.

How does Benjamin depict his childhood experience of "taking the tour" (Benjamin strikingly uses the term "rundzureisen") at the Kaiserpanorama?<sup>6</sup> The view into the distance is described as "faintly tinted", implying a certain spatio-temporal distance between spectator and presented topography. Benjamin also points out two distinct moments that cause a disruption in the "false enchant-

ment, which interweaves the pastoral with oases or funeral marches with wall remains".<sup>7</sup> The first moment is the "disturbing effect" of a bell ringing, signalling the imminent shifting of pictures, which fills the perceived scenery with "the ache of departure". Again we are dealing with a mixed emotion, this time with an elegiac and nostalgic delight, a farewell to the disappearing image until the next one arrives and the void of loss is filled again for a while.

The second moment is a purely coincidental defect in the lighting system of the apparatus, which "suddenly caused this rare twilight, making the landscape lose its colour. But there it lay, quite silent under its ashen sky. It was as though I could have heard even wind and church bells if only I had been more attentive". As in the case of Brentano and Kleist's

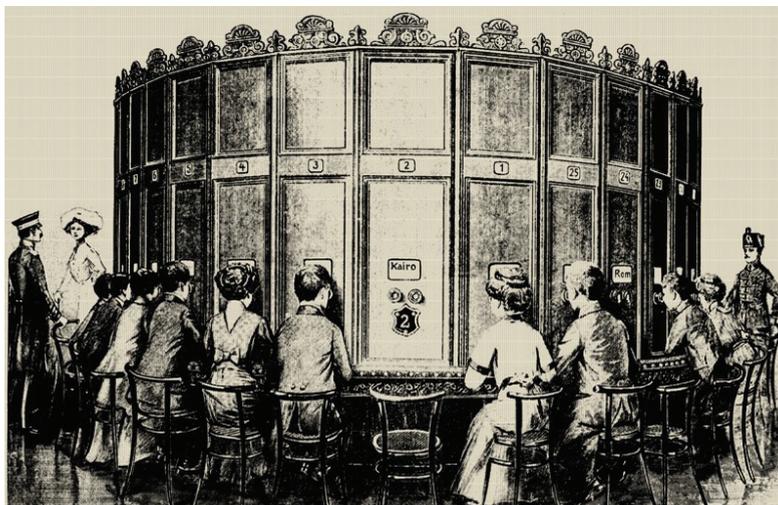


Figure 2: August Fuhrmann's Kaiserpanorama (advertisement); first public presentation ca. 1880.

reception of Friedrich's painting, the narrator *almost* experiences the perceived image in a multi-sensory manner. The merely imagined sensation of sound at-tests to the immersive impact of the medium. On the other hand, this immersive experience, which also represents an apocalyptic vision of both the previous and the upcoming world war, is only caused by accident, more precisely, by a dysfunction of the Kaiserpanorama's technological means. There is also a certain ambiguity in the failing gaslight itself. Benjamin emphasises that it represents "the same light that illuminated my desk in the evening when I did my schoolwork". It is this coincidence that causes the narrator's ambivalent experience of the Kaiserpanorama: "[t]his was peculiar about those travels: their far distant world was not always strange to me, and the longing which it evoked in me was not always luring me towards the unknown, rather, at times, it was a more gentle longing to return home"<sup>8</sup>.

Despite the temporal gap of more than a century between their publication, and despite apparent differences between their respective media experiences, we can see three central themes that are shared by Kleist, Brentano and Benjamin's texts: first, the virtual travel media are experienced as mixed emotions. Pleasure and terror, intimacy and strangeness, as well as the experience of presence and absence, are intertwined in the reception of Friedrich's painting

and the Kaiserpanorama. Second, these mixed emotions result from tensional reception of immersive and non-immersive, illusionistic and media reflexive features. Third, the experience of virtual travel oscillates between a variety of times, spaces, states of minds and identities. In the following, I will apply these three key themes to an analysis of the virtual travel media panorama and early cinema.

The panorama was perhaps invented, and definitely patented, by Robert Barker in 1787.<sup>9</sup> It was, arguably, the dominant mass medium of visual spectacle in the nineteenth century, until panorama rotunda buildings were replaced by cinemas. In its most common and best-known form<sup>10</sup>, a panorama represents

a monumental, frameless and fully circular painting providing a view of 360° (Fig. 3). The spectator views it from a central platform. The only source of light is installed in the ceiling close to the bordering canvas and hidden from the audience. This creates the effect that the topography in the picture appears to be glowing by itself, thereby increasing the impression of looking at a landscape from a balcony. Among the various subjects presented in panoramas were topographies of all kinds, historical and catastrophic events and battles of war, which successfully nurtured nationalistic tendencies in society.

In terms of the panorama's contemporary reception and advertising, the effect

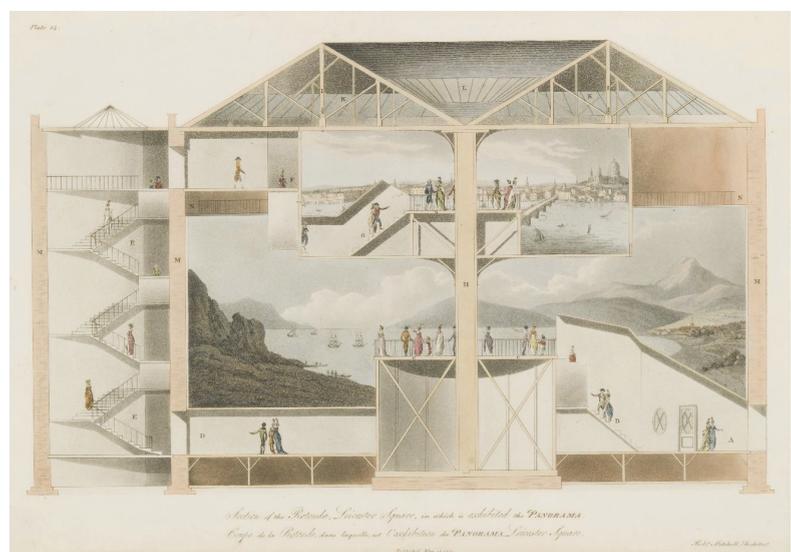


Figure 3: Robert Barker's panorama at Leicester Square, London; ca. 1798 (from Mitchell, R. (1801). *Plans and Views in Perspective, with Descriptions of Buildings Erected in England and Scotland*. London: Wilson & Co.); © The University of Edinburgh (reproduction).

of immersion achieved through the medium's enhanced illusionistic means does indeed seem to be its signature feature. The report of the first panoramas in Paris, commissioned by the Institut de France, praises their "perfect deception" of the eye (Cf. Oettermann, 1980, pp. 114-116). Throughout Europe, both spectators and press applauded the hitherto unparalleled illusionism. Rumour has it that Queen Charlotte even became seasick when the British Royal court visited Barker's navy panorama of Spithead in 1794 (Ibid., p. 81). Worth mentioning in this context are also the several legends about dogs and other animals trying to take a bath in the waters of the paintings, as if the panorama artists (or craftsmen) had finally managed to

paint Friedrich's dune in its own chalk and water (Cf. Huhtamo, 2013, p. 8). To a certain degree, this type of application of the depicted subjects' real materials was actually realised, since the panorama producers made use of *faux terrain* in order to smoothen the transition between viewer-space and screen-space and make their landscapes appear even more natural. They installed bushes and other plants, rocks, dirt, soil, fences and furniture in front of the canvas. Even Benjamin's imagined acoustic sensations of wind and church bells were physically included in some of the panorama rotundas. The aim was to enable a multi-sensory experience of immersion, and this is why the viewing platforms of seascape panoramas were occasionally made to

look like a ship's deck and even set in motion to create the illusion of heavy swell (Cf. Oettermann, 1980, pp. 81-82, 125, 168-170, 213-214). To complete the illusion, the assistants employed on deck were dressed in the costumes of navy officers. At first glance, it thus appears that the panorama achieved for its spectators what Kleist and Brentano could only long for, that is to take over the position of Friedrich's monk figure and transcend the boundaries of the painted landscape.

This first impression does not, however, provide a complete account of the panorama's receptive appeal. Contemporary critics, for instance, were not entirely convinced by the medium's immersive lure. They often noted and occasionally mocked and criticised its immobility (Cf. Ibid., p. 57). The French panorama artist Pierre Prévost was criticised for the lack of motion in his cityscapes (Cf. Ibid., p. 122). There are also textual accounts, however, in which the flaw of immobility is considered to provide a particular aesthetic surplus, as for instance within Alfred Polgar's description of the panorama *The Battle at the Isel Mountain in 1809* (Fig. 4). The Austrian author claims that,

...there is a certain appeal to panoramas. It is rooted in the mixture of stillness and indicated movement, of illusionistic vastness and actual narrowness. The silent noise of battle panoramas in particular has something



Figure 4: Michael Zeno Diemer: *Panorama of the Battle at the Isel Mountain in 1809* (partial view); Tirol Panorama, Kaiserjägermuseum, Innsbruck, Austria; © Alexander Haiden.

fairytale-like about it. People talk in hushed voices, as if they are afraid to wake a life which has been paralysed by a magic spell (Oettermann, 1980, p. 239).<sup>11</sup>

Similarly, in his *Handbuch der Aesthetik*, Johann August Eberhard describes the panorama's aesthetic appeal as a reciprocal movement between illusionism and media reflexive distance:

The exactitude of perspective, the accuracy of outline, the truth of chiaroscuro and posture take me into true nature by means of their unified enchantment. Yet, the desolate deathly silence and the dead motionlessness push me out of it again. I sway between reality and unreality, between nature and non-nature, between truth and appearance. My thoughts and my spirits are set in motion, forced to swing from side to side, like going round in circles or being rocked in a boat.<sup>12</sup>

This oscillation between illusionistic immersion and media-reflexive "truth" perhaps explains why so many panorama rotundas showed the towns in which they were built. How can Paris' *Paris Panorama* attract an audience if it merely simulates the city's everyday life experience?<sup>13</sup> Kleist's metaphor of the cut off eyelids suggests a panoramic

view that confronts us with everything at the same time. Not being able to close the eyes means not being able to edit and thus organise perceived scenery. While our visual perception organises topography by focusing on single parts and by decreasing colour and acuity towards distant elements<sup>14</sup>, panorama images present topographies in their visual totality. Every individual element is presented with equal attention to detail and distinctness. This boundless view would certainly cause the overpowering of our sensory faculties if the depicted scenery was not frozen in a specific moment. The frozen moment is the cut through time and space that was initially taken from us by dissolving the boundaries of our view (by "cutting off our eyelids"). The re-

sult, as described by Polgar, is a strange encounter with the depicted topography, perhaps even more so if someone's own home town is represented.

Similarly to the spatio-temporal ambiguity triggered by the Kaiserpanorama's gaslight in Benjamin's text, we find that the lighting system of the panorama blends different levels of reality in an equally complex manner. As noted, panoramas use natural light to illuminate their painted canvases. The threshold where the light enters the rotunda is hidden from the audience. Since panorama pictures often present distinct meteorological conditions and phenomena, their producers sought to achieve a preferably neutral impact from the outside world.

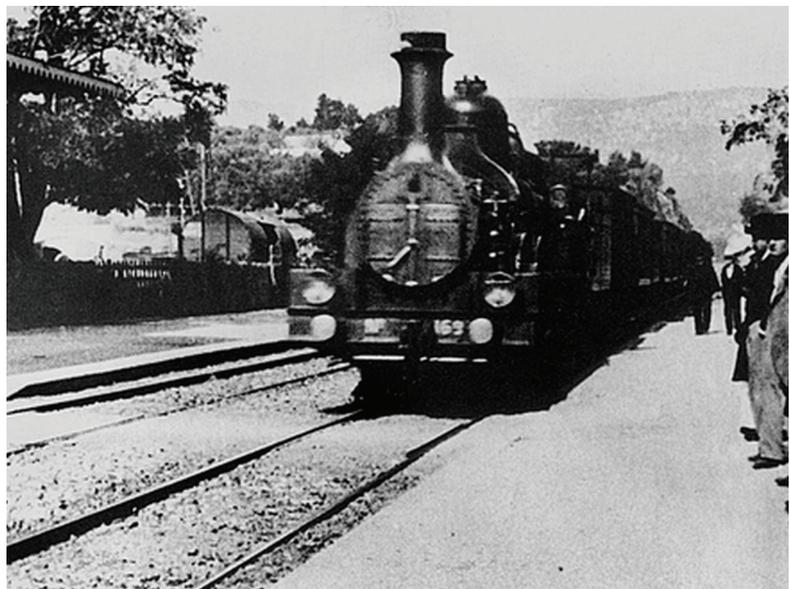


Figure 5: Louis & Auguste Lumière: *The Arrival of a Train at La Ciotat Station* (film still); 50 sec.; ca. 1897.

That means that the location of a rotunda and the alignment of a painting were coefficients of crucial importance, however, as the course of the sun and the general weather conditions vary with the seasons, it was not possible to gain control over the elements entirely. The sunlight that illuminated the virtual Egyptian pyramids also shone on the real boulevards of Europe's capitals. Even though the producers had the intention of transforming 'real' light into virtual light, the success of this plan depended on nature's will. One dark cloud could make the fires of Vesuvius in eruption, and the light reflections on the Pacific Ocean, faint. The appearance of "ashen skies" in a panorama, as described by Benjamin, is thus not restricted to rare technological dysfunctions; instead, it represents a potential scenario within every act of reception, for this spatio-temporal ambiguity is inscribed in the panorama's aesthetic repertoire and the organisation of the media technology. Even less sensitive souls than Benjamin were perhaps aesthetically moved by this hybrid intertwining of different times and spaces.

A continuously applied and popular topos within the public discourse on immersive media and their receptive effects is the formation of legends and miraculous events that attest to the media's illusionistic and immersive qualities. Within our discussion of the panorama we have already described a few narratives in this way, but discourse on

the medium that brought the panorama to an end, cinema, is also rich with these kinds of myths and legends.<sup>15</sup>

Cinema's best-known legend is about the screenings of Auguste and Louis Lumière's film *L'arrivée d'un train en gare de La Ciotat* in 1895 (Fig. 5). In the course of its reception, this event has become the "founding myth of cinema" (Loiperdinger, 2004). According to this myth, the film caused a panic among the spectators, because they mistook the approaching train on the screen for a real one. There have been several attempts since the 1990s to deconstruct this event and reveal its fictional status. As film scholars like Tom Gunning, Martin Loiperdinger or Stephen Bottomore convincingly demonstrate, a real panic at one of the film screenings seems rather unlikely (cf. *ibid*; Gunning, 1999; Bottomore, 1999), but if it was not sheer fear that made people flee the scene, how can the audience's cinematic experience of this early film be described? Loiperdinger argues against the panic legend by pointing out the anti-illusionistic features of the Lumière screenings (Loiperdinger, 2004). He notes that the film was shown on a rather small screen in black and white with flickering images and without sound. On top of that, the train does not rush straight towards the camera but passes it sideways. The camera captures the event from the place where passengers are waiting, and thus, the au-

dience was most likely familiar with this perspective.

What speaks against Loiperdinger's plausible argument is the fact that there are documented voices that describe the screening of the film as thrilling and exciting. But what caused this excitement if it was not the fear of being hit by a real train? A hint is given to us by Maxim Gorky when he describes his experience of the Lumière film in an article:

[A] train appears on the screen. It speeds right at you—watch out! It seems as though it will plunge into the darkness in which you sit, turning you into a ripped sack full of lacerated flesh and splintered bones, and crushing into dust and into broken fragments this hall and this building, so full of women, wine, music and vice. But this, too, is but a train of shadows. Noiselessly, the locomotive disappears beyond the edge of the screen. The train comes to a stop, and grey figures silently emerge from the cars, soundlessly greet their friends, laugh, walk, run, bustle, and ... are gone (Gorky & Swan, 1960, pp. 407-408).

The first affective reaction of the narrator is gradually undermined by his increasing awareness of the film's mediality. Existential fear is turned into a

media-reflexive encounter with an estranged "kingdom of shadows" (ibid. 407) whose inhabitants appear and disappear in silence. An English critic cited by Loiperdinger finds similar words for his cinematic experience:

It is the frightening impact of life—but of a very different life. This life is deprived of sound and colours. Although you notice the sunlight, the image is dominated by a drab and unfathomable grey. And although the waves, as one may assume, crash against the coast, they do so in a silence that makes you shiver all

the more (Loiperdinger, 2004, p. 100).

In this case, the aesthetic appeal of the viewed film is increased due to the partial loss of the illusion, but once again it is not a feeling of pure pleasure but a mixed emotion that leads to the aesthetic surplus of this experience. Similar to Brentano's reception of Friedrich's painting, a shift of perspective takes place. The spectator finds something between themselves and the cinema screen; and this 'something' deviates from a purely immersive experience in which an artificially produced topography or event is perceived as real.

In terms of the Lumière film, we can also reverse the perspective and ask how viewing an everyday life situation like a train arrival can be exciting in the first place. It is exciting exactly because the film does not simulate this experience in a purely illusionistic manner. Rather, as the cinematic experience oscillates between immersive appeal and media reflexivity, the spectator re-encounters a technologically enchanted world, a world which reveals itself as an estranged shadow of reality.

As the film's main 'protagonist', the train also represents one of the iconic ciphers of modernity. More than any other mode of transportation, it embodies modernity's acceleration of time and space, as noted by so many in its early decades (Rosa & Scheuerman, 2009). The same acceleration of time and space is at work within the medium of cinematography. The film camera not only captures objects and bodies in motion, but the camera is itself a moving body, a body that penetrates, explores, accelerates, cuts through and scales up and down space.<sup>16</sup> With this, cinematography – especially as it is cinematically performed – becomes a privileged medium for visualising the accelerated perception and dynamics of modernity. In accordance with the modern experience of train travel, the virtual travel medium of cinematography does not primarily teleport the spectator to another place. Instead, it embodies, presents and reflects the movements of



Figure 6: George C. Hale: *Hale's Tours and Scenes of the World* (interior view); *The Kinematograph and Lantern Weekly*, 1 October 1908.

travel, the constant mobility of modernity and its dynamic exploration of space.

It is therefore not surprising that the two 'travel media', cinematography and train rides, were combined in the early 20<sup>th</sup> century in order to enhance the immersive experience of virtual travel. George C. Hale's *Hale's Tours and Scenes of the World* exhibited topographies of touristic interest such as Tokyo, Vesuvius, Lourdes or Niagara Falls (Fielding, 1983). During the show the spectator was seated inside a train wagon with an open front through which they perceived the projected motion pictures of a train ride (Fig. 6), however in light of our analysis, we can assume that even this rather elaborate virtual travel apparatus did not simply achieve an illusionistic teleportation into exotic worlds. Rather, this aesthetic experience has to be imagined, first as a mixed emotion of familiarity and strangeness, affective agitation and distance, secondly, as an intertwining of multiple times, spaces and states of minds, and thirdly, as an oscillation within the tension field of immersion and media reflexivity.

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## Endnotes

- 1 Even though Grau remarks that "there is not a simple relationship of 'either-or' between critical distance and immersion" (Grau, 2003, p. 13), the media history that he traces predominantly follows the narrative 'from Illusion to Immersion', heading towards the successive refinement and perfection of the immersive experience.
- 2 The following deliberations are based on the German original text as well as on its English translation (Schultz, 2004; Miller, 1947).
- 3 Kleist and Brentano's text has been contextualised within the aesthetic tradition of the sublime by Christian Begemann (1990). For a general introduction to the sublime's history of theory, see Costello (2012) and Pries (1989).
- 4 Pygmalion sculpts a statue so true to nature that he falls in love with it, a love that ultimately animates the sculptor's work. Zeuxis paints wine drapes that trick birds into attempting to eat them. Orpheus' singing mesmerises animals, trees and rocks, and even conquers death.
- 5 This observation pays tribute to an analysis of German exile literature by Elisabeth Bronfen (1993) in which she employs Freud's concept of the *uncanny* in order to identify and describe the exiled narrator's multiple fragmentations.
- 6 The following text, analytical measures, and citations refer to both the original German version and its (incomplete) translation into English (Benjamin, 1972, 2002).
- 7 As there is no English translation, this text section is translated by the author.
- 8 Translated by the author.
- 9 For extensive information on the panorama and its history, see Oettermann (1980), Hyde & Wilcox (1988), Comment (1999) and Koller (2010).

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- 10 There was in fact a whole range of media named or associated with panoramas, as for instance various types of moving and miniature panoramas, the Myriorama, the Diorama, the Stereopticon and the Cyclo-rama, however, some of these devices differed significantly from the pictorial technology that is described above.
- 11 Translated from German by the author.
- 12 This section is partly translated from the German original text by the author, and other parts of it quote Grau (2003, pp. 63f.). German original to be found in Eberhard (1803, pp. 168f.). Indeed, it should be mentioned that Eberhard was a firm opponent of the panorama. On the other hand, his description also seems to reveal a subliminal pleasure, which he would never explicitly verbalise.
- 13 An alternative response to this question is offered by Bernard Comment and Heinz Buddemeier. Accordingly, the aesthetic surplus of Paris' *Paris Panorama* would be based on the commanding vantage point that the medium provides. The spectator is given an overview of the city and visual access to every little detail of its appearance (Comment, 1999, pp. 136-137; Buddemeier, 1970).
- 14 Indeed, these are effects that painters have sought to imitate since the Renaissance; one only need to think of Leonardo's use of sfumato and aerial perspective.
- 15 Even though cinema does usually not feature a fully circular screen, Grau nonetheless addresses its immersive qualities. He is especially interested in specific attempts to increase cinema's immersive appeal such as Cinéorama, Futurama, Cinerama and Imax, which employ monumental screens for their projected moving images (cf. Grau, 2003, pp. 146-161).
- 16 Erwin Panofsky strikingly described this intertwining as a "dynamization of space and, accordingly, [a] spatialization of time" (Panofsky, 2004 [1974], p. 291).