COLOR
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in cinema

comparative cinema

Comparative Cinema is a scientific journal that addresses film studies from a comparative perspective. It is published by the Center for Aesthetic Research on Audiovisual Media (CINEMA) at the Universitat Pompeu Fabra (UPF), in Barcelona. Since its inception in 2012, it has investigated the conceptual and formal relations between films, material processes and production and exhibition practices, as well as the history of ideas and film criticism in different social and political contexts.

Comparative Cinema tackles an original area of research by developing a series of methodologies for a comparative study of cinema. With this aim, it also explores the relations between cinema and comparative literature, as well as other contemporary arts such as painting, photography, music and dance, and audiovisual media. The journal is structured into monographic issues featuring articles and interviews, which are sometimes complemented by audiovisual essays, either as part of a written article or as an autonomous work. Each issue also includes a book review section, which analyses some of the most important works in film studies published in Spain and abroad, and a miscellaneous section, called "Rear Window," which gathers articles that also follow a comparative methodology but fall outside of the scope of each monographic number.

Comparative Cinema is published biannually in English, though it may include original versions of the texts in other languages. It is an open access, peer-reviewed publication which uses internal and external evaluation committees. As such, it is recognized by international indexes such as DOAJ (Directory of Open Access Journals), ERIHPLUS (European Reference Index for the Humanities and Social Sciences) and Latindex (Regional Information System for Online Scientific Journals of Latin America, the Caribbean, Spain and Portugal).

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When George Miller set out to film *Mad Max: Fury Road* (2015), the long-awaited fourth installment in his post-apocalyptic franchise, the plan was to return to the location that had become synonymous with the second film about the titular "road warrior": Broken Hill in far west New South Wales, Australia. Indeed, such had been the success of the earlier Mad Max films, that a museum dedicated especially to *Mad Max 2* (Miller, 1981) was opened in 2010 in nearby Silverton, and today remains a mecca for fans of the series. Broken Hill as depicted in Miller's earlier film appears as one might expect of an isolated mining outpost in a remote desert landscape—hot and arid, with dazzling sunlight beating down on highways that vanish over distant horizons—and was now set to make its return to the screen.

But it wasn't to be. While filming was slated to commence in 2011, an unseasonal rainfall for the region and across central Australia meant that the dry and forbidding plains had been transformed into a vastly different landscape. "What was meant to be flat, red earth is now a flower garden," Miller reported at the time. "And the great salt lakes which you can drive across are now full of pelicans and fish." Given the sudden greening of the desert environment, production on the film—which thematizes explicitly resource shortages, especially of water—was forced to shift to Namibia where, as Miller noted, "the desert is desert" (Hassan 2011). The particular problem for the shoot was posed by the unexpected appearance of native flora and fauna—the blossoming wildflowers, the bird and marine life—but was also one of color; while the blue sky and desert light might have remained the same, the backdrop changed from red to green, a bridge too far perhaps even for the post-production wizardry of the color grading team.

These concerns for the accuracy of the color palette, and the contrasts in landscape between Australia and Namibia, must also be considered against the original intentions for the film. Upon its release, Miller revealed that he had wanted to shoot the film in black-and-white, which would have given us "the best version of this movie," and perhaps obviated the need to relocate production in the first place. However, Miller informed his audience at a Q&A, such were the vagaries of the market that he had been forced to wait for the home entertainment release to realize his dream; a desaturated "Black & Chrome" edition of *Fury Road* that provides "an illuminating counterpoint" to the work as exhibited theatrically. In this version, the director informs us, "some scenes in particular play a lot better, and some, there's information we got from the colour that's missing" (Lyne [Shackleton] 2016). Whatever the preferred version of the work, the differences are instructive: green, red, black and white (and "chrome") all become points of comparison on the color spectrum that organized the production, and continue to inform the exhibition and interpretation of Miller's film.

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Beyond this single case study, color (and its absence) in cinema might be explored fruitfully as a means of understanding a wide array of films, and approaches to filmmaking. The six contributors to this issue of *Comparative Cinema* consider in particular how attention to the comparative dimensions of color might provide us with a structuring principle for interpreting work across more than a century of film history. In her opening article, Sarah Street develops a sustained reading of two iterations of *Black Narcissus*: the mid-century Powell and Pressburger classic, and the recent, striking BBC/FX adaptation from Charlotte Bruus Christensen. In "The Exaggerated Colors of *Black Narcissus* (1947 and 2020)," Street explores the "figural" elements involved in these two realizations of Rumer Godden's popular novel, analyzing how color in excess works as an "in-between" technology that gestures towards, among other things, "the waning of empire and dawn of the postcolonial era."

From this exploration of works featuring quite vibrant color palettes, we turn to an article focused on the veritable absence of color in the shadows and dark spaces of two recent films. Although, as Edson Costa Júnior argues in his "Memories from the Darkness in the Films of Pedro Costa and Affonso Ûchoa," black might actually be considered a color given the way it is deployed quite deliberately in Costa's *In Vanda's Room* (*No quarto da Vanda*, 2000) and *Horse Money* (*Cavalo dinheiro*, 2014) and in Ûchoa's *Seven Years in May*

(*Sete Anos em Maio*, 2019). More particularly, Costa demonstrates how the color black—especially in nighttime sequences—coincides with the sudden resurfacing of traumatic memories, and in doing so converts the otherwise realist world of the film "into a place that welcomes the coexistence of multiple temporalities."

Outer space is often conceived of as a vast black expanse, but it is consistently represented in an array of vivid colors. In "The True Colors of 'False' Color: Representing Data Chromatically in NASA Films," C.E. Harris explores how scientific visualizations have employed particular color schemes in an attempt to convey the "reality" of a range of celestial objects. Considering the suspicion in which images of the galaxy have been held since the 1960s, and analyzing a number of recent films made by NASA, Harris explores the tensions between the indexical status of such images and the digital application of color which is often criticized as a merely "decorative" element in their composition. How might color "deploy the powers of the false to reveal otherwise invisible truths" about our solar system?

A fascination with the stakes of realism also animates Andrew Philip, in his article "True Colors: Chromaticity, Realism and Technological Honesty." As a filmmaker, Philip takes as his point of departure his own film, *We Tattooed Your Mother* (2021), and explores some of his decisions as a practitioner in the color grading of the work. Through

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the lens of Karen Barad's concept of "agential realism," Philip understands the technological apparatus as forming an integral part in the production of cinematic realism, and proposes that a certain shift between color and black-and-white in the post-production of his documentary can help to focalize this theory.

While either color or monochrome are often chosen to the exclusion of the other in shooting a film, there are a great number of examples that incorporate both. While in evidence in the past few decades in films like *Schindler's List* (Steven Spielberg, 1993) or *Pleasantville* (Gary Ross, 1998), and in the new waves of the 1950s and 1960s as for example in *Cléo from 5 to 7* (*Cléo de 5 à 7*, Agnès Varda, 1962), this is in fact a tradition that has its roots in silent cinema, as Olivia Kristina Stutz elaborates in her article "The Hybrid Color Film: Multiplicity of Space, Time, and Matter." With a focus on hybrid color films of the 1920s, and in particular on *The King of Kings* (Cecil B. DeMille, 1927), Stutz reads this phenomenon as an example of the "simultaneity of the non-simultaneous," whereby the co-presence of black-and-white with various applied color processes in a film presents "a vivid challenge to the linear model of classical color film historiography."

Finally, in "The Politics of Nostalgia: Colorization, Spectatorship and the Archive," Liz Watkins examines the associated trend—not completely new but today very much in vogue—of colorizing black and white film images from bygone eras. Focusing on the most prominent recent example of this phenomenon, Peter Jackson's *They Shall Not Grow Old* (2018), Watkins explores the contentious nature of colorization, especially where its value as a commemorative tool appears to gloss over the specificities of older film technologies and exhibition practices. While the resurgence in colorization—and in "upscaling" and "speed correction"—often seems to run roughshod over the past in the name of greater accessibility, the distinct chromatic scheme in Jackson's film in particular raises important questions about the ethics of reconstructing the history of Empire in "natural color."

Across the various approaches to color from the silent cinema of Hollywood, right through to the colorization of century-old images today, this issue of *Comparative Cinema* spans the breadth of film history in an effort to understand the comparative value of color on screen.

Stefan Solomon

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Sarah Street

The "Exaggerated" Colors of *Black Narcissus* (1947 and 2020)

This article explores the correspondences and differences in terms of color design between two screen versions of *Black Narcissus*, a popular novel by Rumer Godden published in 1939. Conceptual approaches drawn upon include ideas of "the figural," intertextuality and hybridity as central to understanding how *Black Narcissus* operates on many complex levels, arguing that color is a key expressive mode in their articulation. Powell and Pressburger's 1947 film and a 2020 television mini-series directed by Charlotte Bruus Christensen are for the first time compared in relation to landscape and the natural environment; interior spaces; costume; race. The texts' experimentation with color, lighting and diffusion enables boundaries between exterior and interior spaces, as well as between characters' memories and repressed desires, to be problematized. As "end of empire" texts, the literary and screen iterations of *Black Narcissus* are related to postcolonial theories in which a series of hybrid, "in-between" spaces and cultural attitudes are explored.

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In *Black Narcissus* (Michael Powell and Emeric Pressburger, 1947) the character Mr Dean (David Farrar) remarks of its mountainous Himalayan location that there is "something in the air that makes everything seem exaggerated." The film was indeed noted for bringing out this quality, made possible through the ingenuity of production designer Alfred Junge, matte artist and special effects technician W. Percy Day, cinematographer Jack Cardiff and costume designer Hein Heckroth, in a film that despite its Himalayan setting was shot at Pinewood Studios, UK and at Leonardslee sub-tropical gardens, West Sussex, UK (Street 2005). The release of a new screen interpretation of *Black Narcissus* (Charlotte Bruus Christensen, DNA Films, 2020), shot at Pinewood but also on location in the district of Mustang in Nepal, naturally invites comparison with Powell and Pressburger's celebrated film. This article is an exploration of the correspondences and differences in terms of color design between the 1947 film and 2020 television mini-series, with emphasis on the use of diffusion, expressivity and conveying the impact of an awesome and unsettling landscape. The two screen versions are compared in relation to the following themes: landscape and the natural environment; interior spaces; costume; color and race. They share many features that confirm the compelling, "exaggerated" visual legacy of Technicolor as well as of Rumer Godden's popular novel on which both are based (Godden [1939] 1994). I argue that the figural, intertextual and intermedial depiction of space, place and color reveals a web of spatial and chromatic interconnections between the novel, film and mini-series that transcend media boundaries.

The article draws on conceptual approaches relating to ideas of "the figural," intertextuality and notions of hybridity as central to understanding how *Black Narcissus* operates on many complex levels. Foregrounding a dialogic relationship between the texts allows their aesthetic approaches, particularly in relation to color design and the depiction of the physical environment, to be understood as dynamic, iterative processes. The two screen versions of Rumer Godden's novel can usefully be placed within a conceptual understanding that draws on ideas of the figural based on the work of Jean-François Lyotard ([1971] 2011) and as developed by David Rodowick (2001) and Ágnes Pethő (2018). For Lyotard "the figural" refers to the excessive, heterogeneous aspects of discourse to be found in beautiful, sublime images. As Bamford explains, this realm brings together "a valorization of the plastic, the spatial and thus the bodily realm of gestures, movement and matter" (2012, 18). Rodowick argues that words should not be seen as distinct from images, and that it is in such "in-between" relations that the figural can be sensed. These approaches thus emphasize connections between texts and the creation of hybrid spaces that delimit media boundaries, revealing their "deep imbrication" and "as an ever-changing aesthetic configuration, and a sensuously perceivable excess" (Pethő 2018, 169). This idea of "a sensuously perceivable excess" is a perfect description of the "exaggerated" aspects of *Black Narcissus* as expressed through Godden's central positioning of the impact of place, space and culture on the nuns in their mission of establishing a school and dispensary in a palace at Mopu, a fictional location north of Darjeeling in the Himalayas. Both screen versions use this as a key platform for visualizing Mopu and in this enterprise color is central. Jack Cardiff's Academy Award-winning use of Technicolor and Bruus Christensen's digital cinematography exploited creative possibilities which in turn bring out color's own multivalence and transformative power. The meanings

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associated with particular colors such as red are elaborated, gain momentum and dramatize key moods, events, spatial relations and temporalities.

As such the novel, film and mini-series "speak" to each other, and can indeed be thought of as interconnected iterations of Godden's novel that was published in 1939, a few years before the Indian Independence Act of 1947. The critical literature on Powell and Pressburger's *Black Narcissus* has foregrounded its "end of empire" resonances, particularly how the film's rich *mise en scène* expresses a western imagining of India invested with an "imperial gaze" (Kaplan 1997). This relates to an Orientalist vision of India as "other" which posits the East as distinct from the West in terms of culture, identity and race (Said 1978). Davidson and Hill argue that although the film's construction of "aesthetic virtuosity" might draw attention to its artificiality as a western vision of the east, its overall verisimilitude and plausible diegesis nevertheless "embodies, more than it subverts, a socially conservative vision" (2005, 11). Other scholars however accentuate the text's potential for ideological critique in that "for every Western scheme of perception or social, sexual, and power relationship, an Indian counterpart shows up the former as a cultural construct" (Stone 2004, 266). Jaikumar describes the film as a "modernist" imperial text in which the colonial backdrop is constructed as problematic and fraught with "excess." This is exemplified by the presentation of place as profoundly unsettling compared with the certainties exuded in previous British films with imperial settings (2001, 60). As I have argued elsewhere, the film's use of formal devices such as flashback complicate its depiction of place as "other" in problematizing the binary notions of east and west typically delivered in imperial fictions (Street 2005). No other scholars have

compared Powell and Pressburger's film with the 2020 mini-series, so this article attempts for the first time to consider the extent to which all these years later (no other versions have been produced) it projects similar themes, particularly how homage to the film's "aesthetic virtuosity" melds with a desire to reflect more contemporary perspectives on the representation of character, place, space, color and race. Although many reviewers of the mini-series praised its debt to the 1947 film, a few considered this held back the emergence of something genuinely distinctive (Fienberg 2020; Baron 2020; Framke 2020; Tallerico 2020). I argue however that while the mini-series celebrates the novel and re-works aspects of the film, it simultaneously adopts a more contemporary approach to several themes and exploits digital technology to articulate its own aesthetic sensibility.

In terms of color design, there are several very clear references in the mini-series that recall the film, while inviting comparisons between the look of Technicolor and today's digital capabilities. The mini-series is very much in visual dialogue with the film, demonstrating in some shots a very close approximation of similar colors, lighting and composition, in capturing the "exaggerated" atmosphere that unsettles the nuns. Bruus Christensen studied Jack Cardiff's cinematography in *Black Narcissus* when she trained at the National Film and Television School in 2002. Her admiration for it convinced her that rather than embark on a radical departure any new interpretation of Godden's novel must respect Cardiff's work because it was so "truthful to the story" (Bruus Christensen 2021). She picked a few classic frames from the film and re-worked them into the mini-series as an expression of this homage. It was not a case of simply copying the frames but incorporating an iconic image, such as Ruth opening the palace doors,

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and inserting it in a slightly different context. In the film's dramatic climax, the rebellious Sister Ruth (Kathleen Byron) storms through the doors to confront Sister Clodagh (Deborah Kerr) at the bell tower. In the mini-series the doors are the same design but do not lead directly to the bell or feature in the climactic scene. But they are associated with Ruth who opens and closes them, a gesture which emphasizes their function as a symbolic gateway between the palace and the outside world. A significant difference in the recent version was that Bruus Christensen shot on location in Nepal and took advantage of the place by including extended scenes such as the nuns' arrival, depicted as an arduous journey on foot through the mountains to the palace. This leads to some interesting contrasts as the landscape is showcased in spectacular ways to underscore the "exaggerated" sensibility that is central to both screen versions.

Godden's novel is the foundational urtext from which the chain of figural interconnections emanate. As Pethő explains this approach involves foregrounding the texts' self-reflexive elements: "The repetition or the re-inscription of a medium as a form in the form of another medium, where the procedure of intermediality itself is also figurated, that is: it becomes observable and it refers reflexively to itself" (2011, 40). This notion of intermediality emphasizes "intricate interactions of different media" and how "the moving pictures can initiate fusions and 'dialogues' between the distinct arts" (Pethő 2011, 1). Screenwriter Amanda Coe stated that her 2020 adaptation of *Black Narcissus* was very much grounded in the novel as "part ghost story, part romance, it's full of atmospheric detail about the landscape and its people, as well as psychological acuity about the failures of understanding, both cultural and personal, that lead to tragedy." She aimed to "bring the story to life for a new audience" and as I go on to demonstrate,

although we can observe differences in approach in terms of dialogue, characters and style, at the same time some recurring features that would be recognized by spectators familiar with the film are retained (Coe 2021, 18).

The plot in both versions is broadly similar to Godden's novel and will be briefly outlined to inform the underpinning concepts and detailed thematic analyses below. Sister Clodagh is charged with leading an Order of nuns to establish a school and dispensary at Mopu, in a deserted palace which had formerly been a harem built by the Rajput ruler of a princely state. Once there, Clodagh comes to rely on the local knowledge of the area and customs provided by a British man called Mr Dean, the Agent of General Toda Rai, who invited the nuns to reside in his palace. The nuns are forced to make compromises as they adapt to their new environment. Clodagh agrees to allow the General's nephew Dilip Rai to attend the school, even though he turns out to be a distracting presence, reminding Clodagh of her own past in Ireland and a love affair before she became a nun. The narrative explores how Mopu affects the nuns in different ways, leading to a series of tumultuous events that eventually force them to leave. One of the most dramatic is the rebellion of Sister Ruth, a nun who is particularly disturbed by the vibrant locale and the presence of Mr Dean, with whom she becomes infatuated. As her mental health deteriorates, she escapes from the palace in search of Mr Dean but returns after he rejects her affections. She stalks Clodagh, culminating in a dramatic struggle at the bell tower that ends with Ruth falling to her death. The nuns then decide to leave Mopu, their mission defeated after ending in tragedy.

Exploring "the figural"

David Rodowick suggests that: "The figural […] is not primarily a montage

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or chiasmus between the said and the seen; it is force of unbound energy, not simply unseen (the letter missed, an image not visible) but radically unconscious. It is a third dimension, neither sayable nor showable" (2001, 12). This idea of a "third dimension" can profitably be applied to *Black Narcissus* on several levels as a result of working through Godden's descriptions of Mopu and the impact of its ineffable qualities. The problematizing of dichotomous ideas is one of the perhaps surprising tendencies to be found in the film which depicts the nuns' attempt to inscribe a "westernizing" presence on Mopu and its peoples. While ostensibly about the differences between east and west, *Black Narcissus* however complicates the idea that these are distinct, in particular suggesting that the locale's "exoticism" engenders uncanny affective affinities that can be both pleasurable and disturbing. Sister Clodagh's flashbacks to her life in Ireland, for example, can be read as an attempt to collapse, or at least complicate, strict divisions between east and west since they are occasioned by recognition of familiar, remembered sensations which the environment appears to unlock. In a fiction that can be linked with Orientalism, the film of *Black Narcissus* presents Mopu as "a remarkable, topographic structure that is alien to the nuns' experience but at the same time strangely familiar in terms of its capacity to re-engage them with memories of the past and sexuality" (Street 2005, 30). The unsettling presentation of place is expressed in a particularly vivid example as a dissolve (overlap of two shots) of Mopu's vivid blue skies and blossoms (Fig. 1) occasions and melds into Clodagh's memory in flashback of a visually stunning, shimmering lake in Ireland where she is seen fishing with Con (Shaun Noble), her fiancé (Fig. 2). There are other examples of this slippage as Clodagh experiences, as Godden put it, feeling as if she was "looking at

herself from the outside [...] she seemed to be altogether outside of herself" as the "in-between" space which invades her consciousness suggests an uncanny experience of the figural (Godden [1939] 1994, 33–34).

In a selection of themes which demonstrate this form of intertextuality, it is clear that both screen versions display a heightened appreciation of the power of color to dramatize a narrative. Many of the effects created in 1947 have been celebrated, convincing some—although not Rumer Godden, who thought the film lacked authenticity, particularly in terms of costume—that the film was shot on location in the Himalayas (Chrisholm 1998, 201). Bruus Christensen and production designer Kave Quinn similarly exploited color effects in design, shooting and post-production. They knew the 1947 film well but wanted to "re-interpret" the novel with "a 2020 mindset." This involved working closely with actors in focusing on narrative and performance to establish the priorities of each scene's visualization (Bruus Christensen 2020, 103). The use of Nepal, as well as the mini-series' longer screen time, allowed them to extend Jack Cardiff's expressive approach to color while also exploring a "third" dimension of sensuous aesthetic experience which is expressive of the figural as a force for reinvention. As a text the mini-series is thus profoundly self-reflexive and reinterpretative.

The idea of a third dimension can also be seen to relate to how each iteration of *Black Narcissus*—novel, film and mini-series—highlights the contradictions of colonialism as the nuns embark on a "civilizing mission" that was typical of missionaries and religious orders sent to spread Christianity associated with British imperialism. Yet they are unable to maintain their distance from the local population as they are charmed by the seductive presence of Dilip Rai in his splendid silks, and Kanchi, a beautiful

Fig 1: *Black Narcissus* (Powell and Pressburger, 1947); Clodagh (Deborah Kerr) dreams of the past.

Fig 2: *Black Narcissus* (Powell and Pressburger, 1947). Clodagh's past in Ireland.

girl who also attends the school. The novel makes clear that the British do not rule Mopu directly: the land was leased to the General's father for "experimental development" by the British government (Godden [1939] 1994, 15). Mr Dean occupies an intermediary role in the colonialist context, but at the same time he accords the local people with a degree of autonomy and respect. His rejection of the missionary work invited by the General therefore acts as a critique of this type of British presence in India, proposing an interesting counter to a key element of colonialist activity. In 1939, when the novel was published, this anticipates the final years of colonial rule, with the British being "in" India but not "of it."

This transitional phase has been referred to by postcolonial theorist Homi Bhabha as the "third space" between colonizer and colonized, within which hybrid identifications are possible (Bhabha 1994). As Bagchi argues, this scenario allows Mopu to become "reinscribed as a site of hybridity" in the sense that its position as "both inside and outside colonial and princely rule" frustrates and ultimately defeats the nuns' ability to enforce western notions of superiority, civilization and knowledge: "The non-colonial/not-princely space is transformed into a site that is fraught with multivalences. On this site we witness a strange reversal, instead of the nuns resignifying the site of the 'House of Women' and the lives of the natives, the site and the people resignify not only the nuns' subjectivities but also their faith in the White Man's Burden" (Bagchi 1995, 57, 64). For many of the nuns this is an unsettling yet learning process as they recall past memories and open up to new experiences which cast doubt on their Order's approach as represented by Sister Adela, a nun who visits and notices how they have slipped into ways of which she does not approve, including reliance on Mr

Dean. The following sections focus on how color expresses these complex and fraught multivalences in relation to some key spaces, characters and themes.

Mopu at "the edge of the world"

As described in Godden's novel, the palace was situated high up "on a ledge cut like a lip from the face of the hill and it seemed to be perpetually riding into the north" (Godden [1939] 1994, 21). When the palace is first described to Clodagh by Father Roberts, a priest based in Darjeeling, he refers to it as "like the edge of the world; far more remote than it actually is, perhaps because it looks at such immensity" (Godden [1939] 1994, 27). Both screen versions aimed to convey something of this awesome, sublime sensibility. Pinewood's studios were used in 1947 and 2020, but location shooting in Nepal enabled director and cinematographer Charlotte Bruus Christensen to use the natural environment to best advantage to capture something of the locale's "immensity" (Bruus Christensen 2021). Two opening shots show how the 1947 film (Fig. 3) and the mini-series used the skyline as a signature feature, firmly establishing the significance of the visually stunning topography that unsettles the nuns as they begin their work. Whereas the film's pre-title features a painted backdrop effect with an emphasis on blue, the mini-series begins with a skyline shot in Nepal that creates a similarly visually stunning but more photorealistic impact that highlights blue sky, snow-capped mountains with grey and brown accents lower down (Fig. 4). This natural setting permitted a greater degree of visual extrapolation from the novel's description of the nuns' long, tiring journey to Mopu. A long shot from the mini-series of the nuns on a narrow walkway crossing, for example, shows them as precariously

Fig 3: *Black Narcissus* (Powell and Pressburger, 1947), pre-title painted view shot.

Fig 4: *Black Narcissus* (Charlotte Bruus Christensen, 2020), skyline shot.

Fig 5. *Black Narcissus* (Charlotte Bruus Christensen, 2020), the nuns arrive in Mopu.

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placed and dwarfed by the clear blue sky and magnificent mountains jutting skyward; their glistening whiteness contrasts with the silhouetted figures as they slowly move across what looks like a far from sturdy platform (Fig. 5).

In both screen versions the palace and bell tower are used to highlight the difference between the nuns' former lives in Darjeeling that were characterized by order and calm, and the loss of control they feel the longer they stay at Mopu. Although both are presented as if solid structures, their elevated position and exposure to the incessant wind are used to indicate their imbrication with, and vulnerability to, the elements. This tension is played out through the symbolic and physical presence of the bell tower, a set that features prominently in both screen versions. The ringing of the bell is part of the nuns' attempts to retain a sense of order; its placement on the edge of a vertiginous location gestures towards this aim's futility as its sounds waft into the void of the deep chasm below. Godden wrote of how "the bell did not command, it sounded doubtful against the gulf; the wind took the notes away and yet it brought the sound of the bells at Goontu very strongly; pagan temple bells," and that Sister Ruth found it "thrilling to ring the bell, standing on the edge of the cloud and sky, with the tea and the valley and the River far below" (Godden [1939] 1994, 57, 38–39). The tower is thus symbolic of the failure to control time, a reminder of how Mopu's customs cannot be reinscribed into a western mindset. In the film, as Ruth rings the bell her thrilled expression indicates her actions are not about keeping time; she seems to gain strength from it to challenge conformity and unleash her desires.

Both screen versions emphasize its precarious position, with the mini-series particularly highlighting the mountains and sky as a dramatic backdrop. Alfred Junge's designs for St. Faith created

an iconic precedent that inspired the mini-series (Fig. 6). The bell tower set built at Pinewood was actually only a few feet above the ground, as shown in stills of the filming of *Black Narcissus* which document the ingenuity of Pinewood's studio techniques (Fig. 7). Junge's drawings and their realization in the film create the impression that St. Faith is located high in the mountains, on a terrifying precipice. They used models for shots of the palace exterior, whereas in the mini-series this was a set built on an airfield in Bovingdon, UK. The bell tower was built in the studio and CGI was an additional technical means of creating a model of the palace. Particular shots were replicated in the mini-series (Fig. 8 from the film and Fig. 9 from the mini-series). The left side of each frame contrasts the bell tower's solidity with the cloudy mist and terrain on the right, far below in the valley. These shots are expressive of both texts' visualization of the narratives' central concerns with the nuns' loss of control as they experience a new, challenging environment.

The tower's location and symbolic resonances provided a perfect opportunity to showcase spectacular background color effects. Powell and Pressburger showed the bell tower's location early on in the film, but reserved the addition of dramatic, red-tinged skies until later, to accompany the escalating crisis with Sister Ruth. The mini-series however foregrounds the bell tower as a site of danger from the very beginning when an incident is briefly shown of a woman ending her life by jumping off the tower. This tragic event which prefigures Ruth's own fate, becomes indirectly associated with her mental instability when she appears to be haunted by the spirits of former occupants of the palace. At the beginning of the first episode a

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Fig 6: Alfred Junge's sketch for bell tower set, *Black Narcissus* (Powell and Pressburger, 1947).

Fig 7: *Black Narcissus* (Powell and Pressburger, 1947). The bell tower set at Pinewood.
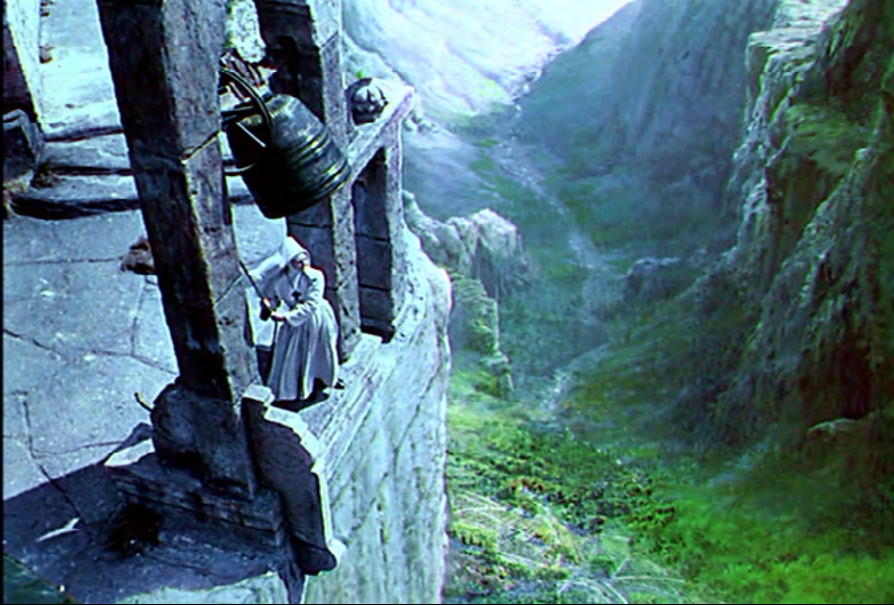
Fig 8: *Black Narcissus* (Powell and Pressburger, 1947). Sister Ruth (Kathleen Byron) ringing the bell.

Fig 9: *Black Narcissus* (Charlotte Bruus Christensen, 2020), sheer drop shot.

visually striking establishing shot shows a pink accented sky with the tower in silhouette (Fig. 10). This color design is returned to towards the end, when Ruth struggles with Clodagh. A long shot taken from an apparently aerial constructed perspective, develops an expressionistic connection between their physical conflict and the natural environment, as dawn breaks and with the pink and red heightened in an exaggerated manner (Fig. 11). Bruus Christensen used lighting and effects to create the vivid colors which accentuated the scene's dramatic style. Although she did not want the hard, high contrast look associated with digital cinematography, the technology was nevertheless key to constructing the effect. Special lenses were made in Hollywood to create a soft, diffused style which kept the colors rich and accentuated as the reds and pinks become more vivid (Bruus Christensen 2021). As noted in Baron's review of the mini-series, Bruus Christensen's color grading, aerial location shots, in-camera-effects and image manipulation "harnessed" Cardiff's vision while extending its sublime qualities with digital technology (Baron 2020).

This approach was highly appropriate for achieving the figural sensibility that links both screen versions while also keying in Godden's emphasis on the erosion of boundaries between past and present, place and space, exteriors and interiors. This figural erosion of differences between media exemplifies Rodowick's ideas about the easy reconstitution of images in the digital age that open them up even more to Lyotard's idea of the sensory "interworld" of the figural (Rodowick 2001, 39; Lyotard [1971] 2011, 4). As Pethő notes, such forms of intermedial dialogue allow us to appreciate how film as a medium is "in continuous change and interchange" as new forms of visual expression evolve while acknowledging the historical development of cinema and its technologies (2011, 1–2). Cardiff's use of pink skies as dawn breaks, combined with low-light levels and silhouetted figures, is perfectly expressive of this liminal sensibility as seen in a shot of Clodagh as she keeps watch (Fig. 12). The red-tinged sky is used evocatively to exploit the color's dynamism. As Bucklow points out, the redness of the sky at dawn and dusk emphasizes the horizon as "a mythical and elusive place" and "an entirely porous and regularly crossed red line between night and day" (2016, 201–02). How it is used in both screen versions of *Black Narcissus* reflects the in-between, figural expression of the physical environment that is symbolic of both the waning of empire and dawn of the postcolonial era.

Designing the palace

The palace the nuns occupy was a former harem known as "The House of Women." Even though they re-name it "The Convent of St. Faith" the surviving interior wall paintings (which do not feature in the novel) show the women who lived there, and these function as a disturbing reminder to the nuns of their enduring influence; although physically absent they seem to haunt the building, affecting Sister Ruth (Aisling Franciosi) in particular in the mini-series. The opening shots of the first episode also include some warm-accented frames that show brief shots from the past of the women who lived there. These follow some colder, blue-accented shots that are used throughout as a contrast to earthier tones associated with interiors and in scenes such as when Mother Dorothea (Diana Rigg) writes to Clodagh from the safety of the Mother House in Darjeeling (Fig. 13). We see Clodagh (Gemma Arterton) reading the letter in much cooler tones which reflect Mopu's very different atmosphere in the winter (Fig. 14). This emphasis picks up the

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Fig 10: *Black Narcissus* (Charlotte Bruus Christensen, 2020), pink and mauve accents.

Fig 11: *Black Narcissus* (Charlotte Bruus Christensen, 2020), struggle at the bell tower, pink accents.

Fig 12: *Black Narcissus* (Powell and Pressburger, 1947). Pink and dark accents.

Fig 13: *Black Narcissus* (Charlotte Bruus Christensen, 2020), Mother Dorothea (Diana Rigg) writing a letter.
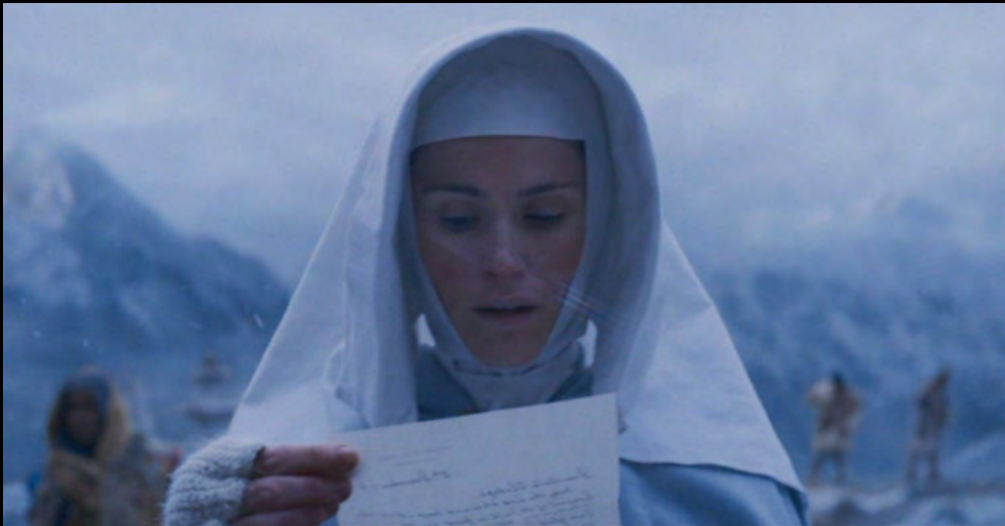
Fig 14: *Black Narcissus* (Charlotte Bruus Christensen, 2020), Clodagh (Jemma Arterton) reading Mother Dorothea's letter.

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novel's description of the site of the palace as "full of wind" and very cold, even to the extent that the icy wind penetrated through the floorboards (Godden [1939] 1994, 21). The palace is very much a hybrid space as the nuns attempt to reinscribe its purpose. As Stone observes, the nuns try to "erase the palace's original aesthetic charge" but "neither the building's provenance nor its iconography – clearly centered on the life of the body, celebrated by the religions of India – is ever fully masked" (2004, 277). A sense of the past lingers, as seen in the wall paintings that the nuns attempt to cover but can still be seen when the wind seeps through the windows, doors and floorboards, causing the drapes over the paintings to part. This collapsing of external forces and interior spaces symbolizes the erosion of boundaries as the wind forces its way into the rooms as if to emphasize the futility of trying to create a convent in an environment steeped in a history that could not have been more different. The incessant wind is both an aural and visual sensation, not literally seen but its impact on people and objects expresses the "excess" associated with the "unbound energy" with which the figural is associated (Rodowick 2001, 12).

Jack Cardiff used a non-naturalistic, expressive palette for *Black Narcissus*, created by chiaroscuro lighting, fog and color filters, and diffusing techniques. As a premier Technicolor cinematographer Cardiff used the opportunities the film presented to explore using color in reduced light conditions and thereby investing it with heightened expressive functions (Fig. 12). This is particularly evident in the "stalking" sequence towards the end of the film when Sister Ruth watches Sister Clodagh from afar. Jack Cardiff used a slight fog filter on the camera which produced a soft look. Pink/mauve and grey tones are highlighted as red/pink light shines

through the chapel's windows (Fig. 15). In the mini-series production designer Kave Quinn replicated the shape of the windows in the chapel in another example of homage to Powell and Pressburger's film when red light is similarly seen cascading through the chapel's windows (Fig. 16). This effect provides a stunning visual representation of how in spite of the nuns' attempt to replicate a western chapel in the palace they cannot keep out the extremities of the physical environment. Here color quite literally marks this in-between, invasive sensibility while advancing red's association with Sister Ruth's rebellion.

In both screen versions the wall paintings are key production design features. In Powell and Pressburger's film these are a little more highly colored and bold in design (Fig. 17). In the mini-series Kave Quinn was keen to show the paintings as a little faded, giving the impression that they had been there for a long time and were very much part of the building's fabric (Quinn 2021). The paintings are used to dramatize Sister Ruth's disturbing thoughts as she grows increasingly unsettled by Mopu's atmosphere. She appears fascinated by the erotic paintings she glimpses beneath the drapes the nuns have used to cover them (Fig. 18). As she goes towards the rooms formerly occupied by the women at the palace, she is faced by a large red curtain whose vivid appearance gestures to dangers ahead and the House of Women's enduring legacy (Fig. 19). It is as if the red curtain serves as a gateway to her psyche, while establishing an associative link with red. The curtain functions as a gestural transformation of the image, as it is swept away to access another dimension. The excess this produces functions as another example of the figural as it indicates a new space of temporal becoming.
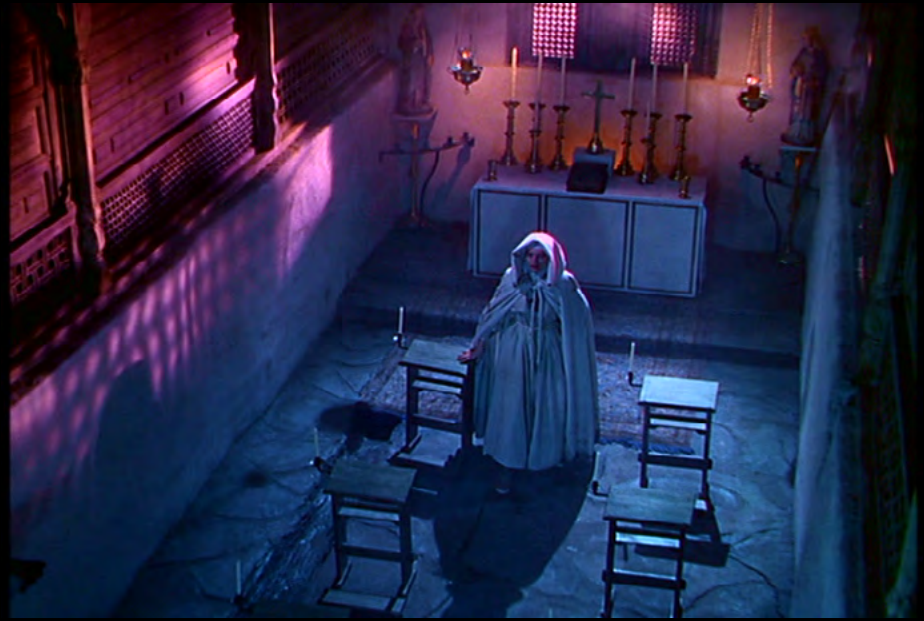
Fig 15: *Black Narcissus* (Powell and Pressburger, 1947). Clodagh (Deborah Kerr) in chapel.

Fig 16: *Black Narcissus* (Charlotte Bruus Christensen, 2020), lighting effects in chapel.

Fig 17: Wall paintings in *Black Narcissus* (Powell and Pressburger, 1947).

Fig 18: Wall paintings and coverings in *Black Narcissus* (Charlotte Bruus Christensen, 2020).

Fig 19: Red curtain effect in *Black Narcissus* (Charlotte Bruus Christensen, 2020).

The paintings gesture to the palace's past, as well as to the text's re-working of Alfred Junge's designs. In Godden's novel it is Sister Clodagh who senses the women from the past: "The house had its own people [...] She seemed to hear the door opened in the night, and hear them coming, running, gauze hurredly twisted round their bosoms, flowers seized and pinned in the hair, feet with anklets chiming, hastening to the door. She heard them come and she heard their voices, whispering as they gathered their finery, coming to the door to welcome Dilip Rai" (Godden [1939] 1994, 105) Even though in the mini-series Clodagh remembers her past in Ireland as she experiences Mopu's unsettling atmosphere, these particular hauntings associated with the "House of Women" are identified more with Ruth and are expressed through color and costumes.

Color and costume

As we have seen, both screen versions use red to dramatize Ruth's increasing psychological disturbance. Powell and Pressburger expressed this link strongly through Ruth's costume and make-up. Rather than wear a western-style red dress as Ruth does in the 1947 film when she sits opposite Clodagh and puts on red lipstick (Fig. 20), in the mini-series Ruth removes her habit and puts on a pale, pink-tinged dress she finds in a trunk and which resembles those worn by Hindu princesses, and the lighting works to de-emphasize its color (Fig. 21). In this choice of costume Kave Quinn was aiming for authenticity rather than the shock value of Byron's western-style red dress (Quinn 2021). The Hindu dress was also appropriate to embellish a storyline developed in the mini-series about Ruth becoming possessed by the spirit of the princess who died tragically in the scene referred to earlier, which is briefly shown at the beginning as a framing device and subsequently glimpsed as intermittent allusions. Ruth quite literally represents a site of hybridity as the ghost of the princess appears to possess her. In the 1947 film Ruth is not given this perspective, or direct reference to being haunted by the spirits of the women who lived in the palace. Her choice of western dress is telling; she wants to appear like a modern woman and ordered the dress especially. Although in the mini-series Ruth finds the dress in the palace it nevertheless assumes an associative role with the princess who lived there. This prefigures Ruth's fate, becoming another figural site of correspondence between past and present, as well as highlighting the collapse of binary notions of East and West as Ruth's physical appearance is transformed. In this way the mini-series departs from the film in suggesting a very different kind of transformation for Ruth in which the figural excess associates her with the women of the palace rather than westernized femininity.

As Branigan has also noted, red is the central color which gathers momentum in Powell and Pressburger's film as expressive of jealousy, sexual passion, frustration and anger (Branigan 2019, 223–26). The viewer tracks this as red gradually assumes more and more importance in the scenes that show Ruth's escalating instability. Kathleen Byron's performance as Ruth remains one of the film's most compelling elements. Replicating its power to shock in 1947 would have been difficult, and in this respect the mini-series does not repeat the sequence in which Ruth confronts Clodagh, applying red lipstick shown in a mid-shot (Fig. 22) and then an extreme close-up to symbolize the extremity of her rebellion (Fig. 23). Instead, Ruth in the mini-series applies the lipstick in darker light, and she is on her own. Rather than wearing a burgundy red

Fig 20: *Black Narcissus* (Powell and Pressburger, 1947). Ruth (Kathleen Byron) putting on lipstick.

Fig 21: *Black Narcissus* (Charlotte Bruus Christensen, 2020), Ruth (Aisling Franciosi) in pink/red accented dress.

Fig 22: *Black Narcissus* (Powell and Pressburger, 1947). Ruth (Kathleen Byron) putting on lipstick medium shot.

Fig 23: *Black Narcissus* (Powell and Pressburger, 1947). Ruth (Kathleen Byron) putting on lipstick extreme close-up.

Fig 24: *Black Narcissus* (Powell and Pressburger, 1947). Ruth sees red.

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dress that made Ruth's transformation so striking in the film, in the mini-series Ruth swaps her nun's habit for the pink garment referenced earlier and puts on sparkling jewels. She wears this ensemble when she goes to Mr Dean's cabin after running away from the palace. She proclaims her love for him, he refuses her advances, speaks of Clodagh and offers to take her back to the palace.

In Powell and Pressburger's film this scene also takes place in the intimate space of Mr Dean's cabin (in the novel he takes her to his office at the factory) and deploys a red-suffused screen to dramatize Ruth's anger at Mr Dean's mention of Clodagh, and her brief physical collapse (Fig. 24). This most striking effect of one color totally covering the screen conveys the extremity of her psychological disturbance. Hitchcock later used a similar effect in *Marnie* (1964) when a red screen functions as an expressionistic marker of subjectivity, an exteriorization of the character's inner psychological state (Belton 2013, 191), and Michael Powell repeated the technique in *Peeping Tom* (1960). It indicates a loss of control as the characters "fall into color" in the sense that David Batchelor identifies when describing color as "a drug, a loss of consciousness, a kind of blindness – at least for a moment. Colour requires, or results in, or perhaps just is, a loss of focus, of identity, of self" (2000, 51). Such cases highlight the power of color, how pure color suffusion appears to ultimately consume the person with whom it is associated: they "become" the color but have lost control. As Bucklow (2016, 8–9) notes, red "triggers different things in us at different times. Red is associated with anger, shame, fear, attraction and an extraordinary range of emotions." This mercurial character and easy slippage of meaning surrounding red dramatizes the in-between, hybrid characteristics

of both texts. Used in this extreme way red appears more prominently in the film of *Black Narcissus* although as we have seen the mini-series uses red and pink light effectively as Ruth's rebellion escalates. The use of the red curtain referenced earlier as functioning as a gateway into Ruth's state of mind can be thought of as another means of achieving a similar, if perhaps less visually arresting, effect. The extremity of the film's red suffusion which quite literally makes Mr Dean as seen from Ruth's viewpoint appear red, is perhaps an instance in which an effect so identified with the film was best not repeated. Red was not used by Godden to dramatize Ruth's dissention so in this instance the mini-series engages with the film's prominent use of red selectively, reserving its full power to shock for the bell tower struggle and as a natural feature of the locale. In this way a strategy of acknowledging the film, yet distancing itself from it in terms of emphasis, was deployed for a differently nuanced mobilization of red as a resonating color.

White habits, skin tones, color and race

Color is used in both the film and mini-series to suggest the contrasting worlds represented by the nuns and the people of Mopu. Jack Cardiff recalled that this required a striking yet not overdone approach: "The effects had to be exaggerated to a point almost of incredulity in order to plant the fact that the nuns are in constant psychological conflict with the wild unearthly beauty of their surroundings, yet the photography must never become vulgar and gaudy" (Huntley 1949, 113). As I have argued, the apparent gulf between these two worlds however becomes less distinct and more complex as the narrative develops and the nuns become increasingly affected by the impact of place and space. At the beginning of Godden's novel, the

nuns are however seen as "other" by the people who watch their arrival, as marked out by their distinctive religious habits. One man describes seeing them from afar as appearing "like a row of teeth," and he fears that they will "eat into the countryside and want to know everything and alter everything" (Godden [1939] 1994, 6). Yet both screen versions do not dress the nuns in starkly white habits. In the film the nuns' habits were a very specific off-white shade and their faces were framed very precisely by their wimples. Michael Powell recalled that giving the nuns off-white/oatmeal robes was "an inspiration" because they "gave a key to the picture to which all other colors had to conform" (Powell 1986, 584). In the mini-series this look was maintained rather than opting for white habits which would have looked over-sharp and white when filmed using digital cameras. The color and the specific shape of the wimple were broadly similar to ensure that lighting the nuns' faces was correct. As a costume, the habit was particularly important in emphasizing the contrast between Clodagh's present status and past life, as seen in flashbacks which show her flowing red hair (described in the novel as "honey and satin") and, particularly in the mini-series, her sexual desires. The habit also adds to the drama of Ruth's physical transformation which occurs at a key point in the narrative when events conspiring against the nuns begin to unfold. The idea that maintaining whiteness was difficult in Mopu is however indicated in the novel when Godden describes how "even their clothes seemed grey and discoloured against the whiteness of snow and cloud" (Godden [1939] 1994, 47), as if the place is actually re-inscribing whiteness as part of the environment rather than representing the nuns and their "civilizing" mission.

An emphasis on whiteness as a structuring color has other connotations. As Sinclair Dootson has argued: "Film stocks, lighting practices, make-up technologies and laboratory methods are all components in a system conventionally engineered to privilege the correct rendition of whiteness at the cost of darker skin tones" (2020). Processes such as Technicolor used whiteness and Caucasian skin as the foundation of their approach to rendering flesh tones, but the company also exploited other hues and density to present Orientalist-influenced fictions which emphasized racial "otherness" through skin tones in films such as *Toll of the Sea* (Chester M. Franklin, 1922), *The Thief of Bagdad* (Ludwig Berger, Michael Powell and Tim Whelan, 1940) and *Arabian Nights* (John Rawlins, 1942). These tendencies form the background to the presentation of the nuns' facial tones in the 1947 film, an emphasis that found a basis in the novel in which Godden contrasted the nuns' skin with that of the locals and also of Mr Dean, who Father Roberts informs Clodagh has "gone native" (Godden [1939] 1994, 26). In another passage Ruth observes him and is struck by how "she was fragile and white beside him; his flesh was live and bronze," as if his attitudes and familiarity with Mopu's customs and people have actually changed his physical appearance (Godden [1939] 1994, 51). As pointed out by Richard Dyer, white women in "end of empire" fictions such as *Black Narcissus*, are often depicted as having very white skin as an indicator of purity, femininity and "civilizing" presence (Dyer 1997, 48–49). Jack Cardiff explained how to offset Technicolor's reddening tendency for lips the nuns wore flesh-colored lipstick which underscored their pale complexions that remained so for the entire film, as seen in the numerous close shots of Sister Clodagh [Fig. 25] (Bowyer 2003, 80). The little make-up worn by the nuns was "white and bloodless," an effect which made Ruth's lipstick scene all the more shocking

Fig 25: Sister Clodagh (Deborah Kerr), pale skin tones in *Black Narcissus* (Powell and Pressburger, 1947).

Fig 26: Sister Clodagh (Jemma Arterton), bathed in light and skin tones in *Black Narcissus* (Charlotte Bruus Christensen, 2020).

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(Powell 1986, 584). In the mini-series however this emphasis on whiteness is not maintained. The nuns' faces are shot far more naturalistically, showing the reddening effect of the high altitude in their cheeks. The invasion of the pink light accentuates this tendency (Fig. 26). This creates less of a contrast with the skin tones of the local people which in the 1947 film supported the accentuation of racial difference. The nuns' red cheeks in the mini-series are a marker of how they are being affected by the climate, as if the atmosphere is quite literally seeping into their very beings, threatening to disturb the clear distinction between themselves and the local populace. Yet it is important to note that in the novel Godden described how the longer the nuns were at Mopu the impact of the climate on the nuns made their skin "more yellow against their wimples" (Godden [1939] 1994, 47).

In the mini-series ethnic actors were cast for character roles such as Kanchi (Dipika Kunwar) and Angu Ayah (Nila Aalia) that were played in the film by British actors Jean Simmons and May Hallatt. This achieved a more authentic look for the Hindu palace and local people that the nuns encounter. This contrasts with Hein Heckroth's more exaggerated colors for costumes worn in the film by characters such as Dilip Rai (Sabu, Fig. 27) and Kanchi (Fig. 28). These were designed, along with the "colourful background of the palace" as a deliberate contrast to the nuns' off-white habits (Huntley 1949, 110). In the mini-series Dilip Rai was played by Chaniel Kular and although his costumes are richly textured and similar to those worn by Sabu in the film, Kular's performance invests the character with greater maturity (Fig. 29). Angu Ayah, the local caretaker at the palace for many years, was played by English actress May Hallatt in 1947, whereas in mini-series Nila Aalia performed the character in a far less caricatured way, bringing out instead

her sagacity and showing her kitchen as containing many props that contributed to the impression of authenticity (Fig. 30). Such interventions are an important means of distancing the mini-series from what were conventional yet ideologically infused decisions about casting in 1947, which highlighted the spectacle of physical transformation through make-up of well-known white British actors such as Esmond Knight who played the General rather than hiring an ethnic actor to play the role. Drawing on Rodowick's discussion of the figural Mules (2018, 1) notes contemporary media's potential to "draw out pastness as a configuration of the text's potential futurity." In this way a different approach to casting reflected the mini-series' critique of ideological assumptions of the past while using that space to explore new directions. Rather than interpreting the film of *Black Narcissus* as a closed text the mini-series took the opportunity to use it as an expressive force for critical re-evaluation and the promotion of new formations. This is particularly timely in view of current re-evaluations of film history which are informed by debates on "decolonizing" film and screen studies.

Conclusion

In the closing pages of the novel Clodagh contemplates the palace after the nuns have left: "The house was empty now; the corridors and rooms empty and silent except for the creaking and straining in the wind" (Godden [1939] 1994, 223). Unable to leave a lasting legacy, the mission will perhaps only be remembered occasionally by the children and local people, if at all. The bell will no longer be rung at the tower and the wind will continue to seep into the palace's interiors. Yet as the novel and screen versions bring out, the nuns have been profoundly affected by Mopu with each text deploying

Fig 27: The Young General (Sabu) in *Black Narcissus* (Powell and Pressburger, 1947).

Fig 28: Kanchi (Jean Simmons) in *Black Narcissus* (Powell and Pressburger, 1947).

Fig 29: Dilip Rai (Chaneil Kular) in *Black Narcissus* (Charlotte Bruus Christensen, 2020).

Fig 30: Angu Ayah (Nila Aalia) in *Black Narcissus* (Charlotte Bruus Christensen, 2020).

recurrent aesthetic tropes which have generated insights inspired by the figural, hybridity and intertextuality. As "end of empire" texts, the versions of *Black Narcissus* can be related to postcolonial theories in which a series of hybrid, in-between spaces and cultural attitudes are explored. As we have seen, experimenting with color, lighting and diffusion techniques enabled boundaries between exterior and interior spaces, as well as between characters' memories and their repressed desires, to be problematized. While the film was particularly strident in its assertion of red as a dominant affective register, the mini-series used it selectively to present its own account of Godden's characters, particularly Sister Ruth. Color was crucial in visualizing Godden's text, using Technicolor and digital technologies to create the fictional world of the palace at Mopu, as well as to delineate characters, cultures and dramatic sequences. Exploring the comparative use of color in *Black Narcissus* and foregrounding its figural, intermedial dialogue between texts and media, enables us to appreciate the complexities of finding apposite visual expression for its many ineffable and "exaggerated" dimensions.

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Edson Costa Júnior

Memories from the Darkness in the Films of Pedro Costa and Affonso Uchôa

This essay analyses realist works from contemporary world cinema wherein the representation of space-time is directly affected by the color black, referring to both night and dark shadows. It investigates exactly how darkness participates in moments when the filmed subjects remember traumatic events and confront them through their courageous retellings. My hypothesis is that the color black converts the space—realistic and concerning the characters' present time—into a place where different temporalities coexist. Through a comparative analysis of films made by the Portuguese filmmaker Pedro Costa and the Brazilian filmmaker Affonso Uchôa in the past two decades, I show how this modulation in space-time produced through color has a political meaning, since the narrated memories are related to a social experience of class and race.

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Introduction

The use of long takes as a realist method to film a "succession of concrete instants of life"[1]—ordinary events that are apparently devoid of any dramatic role—has been a constant in contemporary world cinema. Such a choice generally pairs a near-ethnographic interest in the quotidian with the desire to restore a trace of phenomenal reality of the world to image and sound. In recent years, a range of scholars have highlighted the prominence of the corporal meaning/perception of the in-scene subjects with this realist aesthetic. Among them, Thomas Elsaesser (2009) identifies the recurrence of characters in contemporary transnational films whose experience with the world is mediated by restricted or augmented sensorial capacities, abnormal psychologies, pathologies, or postmortem situations. According to Elsaesser, the externalization or reallocation of the consciousness or subjective states of such characters through the world of "things" (objects that they handle, spaces they inhabit) directly affects the space-time coordinates of a narrative, and as a result, the viewer's reception—the viewer is invited to readjust their presuppositions and perception of the diegetic universe.[2]

My essay traces this articulation between a realist aesthetic regime and a representation of space and time as categories modulated according to the experience of the filmed subjects. I hope to contribute to the discussion by approaching it from an angle situated between the fields of aesthetics and politics. To be more precise, I will investigate examples from contemporary world cinema wherein the space-time axis is affected by the color black, understood here as being from the perspective of illumination. I refer to works whose predominance of the color black in the represented space is the result of night scenes and, in general, from the existence of dark shadows. I am interested in examining how the darkness derived from such a configuration coincides with moments when the characters narrate a social experience, remembering and confronting a traumatic past with their words and testimonies. My hypothesis is that in these conditions darkness converts the space—which is realistic and linked to the characters' present time—into a place that welcomes the coexistence of multiple temporalities.

The capacity that I attribute to the color black to interfere in space and, thus, time corresponds to the ideas of Gilles Deleuze, specifically in his understanding that shadows "[potentialize] space, whilst making it something unlimited," at the same time that they determine "virtual conjunctions which do not coincide with the state of things or the position of characters which produce it" (Deleuze 1986, 112). Shadows are one of the three means of production of what his then-student, Pascal Auger,[3] calls *espace quelconque* ("any-space-whatever"). The other two are lyrical abstraction, defined by the relation of light to white, and image-color. The following is one of the definitions of the concept:

> Any-space-whatever is not an abstract universal, in all times, in all places. It is a perfectly singular space, which has merely lost its homogeneity, that is, the principle of its metric relations or the connection of its own parts, so that the linkages can be made in an infinite number of ways. It is a space of virtual conjunction, grasped as pure locus of the possible. What in fact manifests the instability, the heterogeneity, the absence of link of such a space, is a richness in potentials or singularities which are, as it were, prior conditions of all actualisation, all determination. (Deleuze 1986, 109)

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Though it is relevant to the topic discussed in this essay, I will resist the temptation to apply Deleuze's concept. First, in contrast to Deleuze, I consider that some of the shadows take on an aspect of color—which I will explain in the following section.[4] The second and more important reason for my resistance to a direct application of the *espace quelconque* is because it is capable of eliminating what happened in it, enabling it to become independent of the relations and orientations that give it to the characters. This independence is not present in the works that I analyze, in which the spatial color cannot be separated from the social experience of the in-scene subjects. Additionally, the use of the *espace quelconque* in contemporary films would demand a complex and anachronistic articulation that, I believe, would draw me away from my primary objective with this article.

I will defend my hypothesis of a modulation of space-time driven by the color black in certain works of realist contemporary cinema using a comparative analysis of the films of two filmmakers: the Portuguese filmmaker Pedro Costa and the Brazilian filmmaker Affonso Uchôa. Created from and about the social experiences of poor individuals and communities, their works also share connections in the way they couple aesthetics, including the artistic potential of the image, with politics. I will discuss Costa's *In Vanda's Room* (*No quarto da Vanda*, 2000) and *Horse Money* (*Cavalo Dinheiro*, 2014) and Uchôa's *Seven Years in May* (*Sete Anos em Maio*, 2019). In these films, it is important to stress, beyond the types cast previously by Elsaesser (2009), what is in question is the sociohistorical condition of the character—the subject—and not so much their sensorial capabilities.

As regards Pedro Costa's work, the transversal and heterogeneous presence of darkness and the color black has been the object of analysis for authors such as João Bénard da Costa (2009), who addressed the topic beginning with Costa's first feature-length film, *Blood* (*Sangue*, 1989), and extending to *Colossal Youth* (*Juventude em Marcha*, 2006). I will address the same subject but from a unique basis. My focus is related to the color black as the characters' memory, something that appears at points in *In Vanda's Room*, but that becomes, as I propose, crucial to the meaning conferred on the contrasts between light and shadow in *Horse Money*. In the latter film there is a palpable change in the lighting. According to Leonardo Simões (2015), the director of photography, while in *Colossal Youth* there was the possibility of working with natural light in combination with mirrors, metallic surfaces, and other reflective objects, in *Horse Money* the prevalence of interior settings and spaces with insufficient lighting required projected lights and even a small generator.

Affonso Uchôa, whose cinematic influences include the work of Pedro Costa (Uchôa 2020), represents a new generation of Brazilian filmmakers, with a filmography concentrated in the last decade. Though the night was of occasional importance in his prior film, *Araby* (*Arábia*, 2017, co-directed by João Dumans), *Seven Years in May* takes the expressive power of darkness a step further. Entirely nocturnal, the film joins the visual choices with the verbal testimony of a marginalized young Black man who was tortured by the police. The work was released at the end of the 2010s, the same period in which a variety of other Brazilian films used the night and the color black to give shape to a political position, including: *Tell this to those who say we've been defeated* (*Conte isso àqueles que dizem que fomos derrotados*, Pedro Maia de Brito, Cristiano Araújo, Camila Bastos, Aiano Bemfica, 2018); *Dazed Flesh* (*Vaga carne*, Grace Passô,

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2019), *Tremor Iê* (Elena Meirelles, Lívia de Paiva, 2019); and *Republic* (*República*, Grace Passô, 2020).[5]

Although my concerns are directly related to the cinematography of Costa's and Uchôa's films, my interest is less about how the darkness is produced and more about the meaning that it engenders in the works. In a complementary sense, it is important to distinguish that the focus on the color black as a result of the lighting carries implications for the topic of race. Directed by white filmmakers,[6] the films that constitute our object of analysis star marginalized Black subjects[7] from countries—Cape Verde in Costa's case, and Brazil in Uchôa's—scarred by Portugal's colonial enterprise.[8] By concentrating on the color as a product of the lighting, I do not disregard the fact that the characters' lives in the two films being analyzed hinge on this historical framework and on different levels of racial identity. On the contrary, I hope to demonstrate how the film aesthetics are associated with the experience of the Black subjects portrayed within. I take a perspective that dialogues with that of authors like Racquel Gates (2017) when she states, "Recognizing that aesthetic choices carry racialized politics requires acknowledging that the very process of filming is a political act." [9]

In order to develop my argument, I will divide the article into four sections. The first and most succinct section is dedicated to explaining the approach to the question of color. Second, I will develop the comparative analysis between Costa and Uchôa based on a common visual motif in *In Vanda's Room* and *Seven Years in May*: subjects wrapped in darkness and illuminated by fire during moments when they share their traumatic experiences. Third, I hope to strengthen the relationship between visual elements and memory by comparing *Horse Money* and Uchôa's film, with an emphasis on the potentials

of spatial darkness to engender distinct temporalities in the image. I will conclude the article with a brief commentary, expanding on the main theme: the possible effects of aesthetic choices in the films for the viewer. Ultimately this article will contribute to the debate on the potential of color to modulate space-time in realist films in contemporary world cinema, and also, through a comparative approach, to the scholarship on the works of Pedro Costa and Affonso Uchôa.

Notes on the color black

Until now I have referred to black as a color. There is not a consensus on this, however. Throughout Western history, philosophers, scientists and artists have diverged on the identity of the color black.[10] The source of the controversy is that depending on the system adopted to define colors, black may or may not be classified as a color. From the perspective of physics, one way of defining color is to consider it to be a phenomenon depending on the radiation of visible light—whose spectrum is composed of the colors red, orange, yellow, green, blue, indigo and violet. The color that reaches human eyes is the result of how the wavelengths of light are absorbed or reflected by an object. In this case, black is not considered a color because it is the result of an absence of visible light waves and, thus, color. In contrast, when the color is defined in terms of pigment, black is "what you get when all the primary colours are present equally in the mix. It is what you get when there is equality among colours" (Sexton 2017, 5). From this point of view, it is conventionally considered the sum of all colors.[11]

In this article the focus is on the color black as a phenomenon resulting from the partial absence of light. Why, then, is it considered a color? The reason is because Costa and Uchôa

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confer a pictorial quality upon it, transforming it into an element of visual composition and using it as a medium to form images. With its dark tones, the black that comes from the shadows and the night is used as a pigment on the screen, directly participating in the conception and the expressiveness of the spaces; this functions in a similar way to paintings made with a dark and nocturnal palette, such as *NO-OD for Me* (2008) and *Painting for My Dad* (2011) by Noah Davis. In these terms, and despite being produced by darkness, black acquires, aesthetically, an effect of color. In addition, as previously stated, the spatial use of the color black by Costa and Uchôa is a visual shape connected to the social and subjective experience of Black people, playing on a resonance between the aesthetics of the image and the color as an affirmation of racial identity.

As regards the meaning of the color black, I should add that the perspective taken throughout this essay is aligned with an understanding that has reached a reasonable consensus in film studies. I am referring to the refusal to understand color, including black, as possessing a function or meaning, or as having emotional intelligibility prior to the existence of the work, in other words, as possessing fixed symbolism. Film scholars have for some decades been alert to the countless variables that contribute to the versatility of color, from its perception in everyday life to aesthetic uses (Everett 2007b). In this sense, Sergei Eisenstein's (1957, 150) defense is widely known, that color values and meanings are multiple and may assume contradictory positions: "In art it is not the absolute relationships that are decisive, but those arbitrary relationships within a system of images dictated by the particular work of art." From this perspective, each film builds its own "figurative economy" (Brenez 1998, 12, my translation), requiring the scholar to pay attention to the

specific context in which colors are used—the work itself, as well as the technical, historical, cultural, and social conditions in which it is produced. The method employed, naturally, will depend on which aspects of the color are being investigated. In this article, although there is (also) an interest in its political effects, the analysis of color black will be based on aesthetic criteria. Wendy Everett (2007a, 111) gives us the precise analytical possibilities of such an approach: "The critic must therefore notice precise details, such as the various shades or nuances of colour that are used, the overall tonal range established by the film, the chromatic harmonies, dissonances, and modulations that structure the work, and the point in the narrative at which particular colours appear [...] Moreover, it is, of course, essential to establish how the colour relates to, and interacts with, other filmic signifiers."

A flame in the darkness

Costa's and Uchôa's films confront an issue that Jacques Aumont, in an essay entitled "Noirs," attributes to the filmic medium itself with regards to turning black into an essential color and not merely a chromatic quality of things: despite the effort to manipulate it as a matter of artistic expression, it is quite possible that the film image as "a victim of its photographic inclination" (Aumont 2009, 117, my translation) can lead to considering black as part of the world represented by vast shaded surfaces. Despite this, some films are able to transit from the black that chromatically qualifies certain objects to the black of an abstract background, and, thus, produce a figure that belongs to the material of the filmic medium. Aumont identifies these characteristics in cinematographic expressionism as well as in works by Stan Brakhage and Peter Goldman, among others. As his analysis suggests, the autonomy of the color black increases inasmuch

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as it dissociates from a figurative value and is confused with the filmic material itself, interfering with or referring to the properties of the film.

In the cases of Costa and Uchôa, the qualities of the color black must be thought of initially in relation to the prominent realist aesthetic in the use of long takes, real locations, and non-professional actors; individuals that act out their own experiences or others directly related to the communities to which they belong. On account of such choices, the viewer might be led to ask: is the black of the night and shadows only a chromatic quality of what is being filmed? Or does it address a visual element present there with the purpose of producing some other type of meaning? As I hope to justify going forward, the darkness that dominates the represented spaces creates an indistinctness, contributing to a constant and fluid transition between the three-dimensional represented space and a territory of heterogeneous temporalities, between the present and the traumas of the past.

In *In Vanda's Room*, Pedro Costa depicts the daily life of residents, most of whom are Cape Verdean immigrants, in the old neighborhood of Fontainhas, on the outskirts of Lisbon. The film focus on gatherings and dialogues among the residents Vanda, her sister Zita, Nhurro, Paulo Muletas and Russo. Although these are occasions for affection and togetherness, their gatherings are equally dedicated to the use of drugs. There is no diegetic explanation for this, but it can be inferred that drug use is directly linked to the socioeconomic environment of the residents, who live in impoverish conditions, with no prospects for a better life. When Costa shot the film, using a small video camera (Panasonic DVX-100) that he operated himself, the neighborhood was in the process of being torn down by order of the Lisbon city council, and the residents were gradually leaving their houses.

Throughout *In Vanda's Room*, there is a predominance of dense masses of shadow that extend through the small rooms of the neighborhood's residents. The darkness appears to take on a specific meaning in scenes when the character Nhurro meets up with other residents to drink, talk, and do drugs, generally at night. When the meetings occur during the day, they happen inside Nhurro's house, with doors and windows shut. In these scenes, the only or main source of light comes from candles (Fig. 1), whose flame is insufficient to dispel the darkness. Without a source of lighting to supplement the candles, and since it was shot on a small DV camera, the image of these scenes is not very sharp. Little can be seen. It is important to highlight that these meetings are occasions to share sad and atrocious experiences for the residents of Fontainhas: times when they slept in shelters that were criminally set afire; incidents when they were robbed, even when they had little more than a few coins in their pocket; the failure of people to give them change; the fear of dying in poverty.

In the described scenes the predominance of the darkness covering the space makes it difficult to name who is speaking. The figures of the subjects dissolve into the shadows. The low visibility of the image directs our attention to the residents' stories. Traces of their bodies and the sound of voices saunter through the shot and occupy it with a ghostly presence. The integrity of the human figure "disappears on behalf of the collective presence, framed by the visual horizontality of the darkness [...]. A dark veil wraps the figures together into one, visually recreating the shared experience" (Costa Júnior 2020a, 277). In contrast to the demolition of the neighborhood, the voices and experiences of the Fontainhas residents signify a means of survival through

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Fig. 1: *In Vanda's Room* (Pedro Costa, 2000)

oral memory, preserved in film like a document for posterity's sake. Coming from people who fight to survive—at the same time that they destroy their own bodies through drugs—the narratives shared under darkness acquire an air of testimony. At least, a testimony in the sense of the Latin word *superstes*, which refers both to the survivor of a misfortune, or death, and to the person who witnesses a fact (Benveniste 2016).

Seven Years in May, directed by Affonso Uchôa, also draws on the visual motif of a flame in the darkness. Before discussing the work, it is necessary to understand its political purpose, for, as with Costa, nothing is merely a question of aesthetics. The film concentrates on the real testimony of a marginalized youth from the city of Contagem in the Brazilian state of Minas Gerais, who was tortured by the police after being mistaken for a drug trafficker. Rafael dos Santos Rocha, a young Black man, returned home from work and was surprised by two vehicles. The police said they were there to investigate a complaint that there were drugs buried in his backyard. They entered his house, searched the rooms, and destroyed objects and furniture. Without finding anything, they took Rafael to a field, where they punched and kicked him repeatedly, asphyxiated him with a bag over his head, hanged him, cut his mouth with a revolver, burned his back with a lighter, and nearly killed him. They threatened to return to the youth's house a few days later to fetch 15,000 reais in drugs and money. Terrified, Rafael was forced to move to another city. His exile started with a trip to São Paulo, where he started using drugs, became a drug addict, and worked in a crack house and chop shops until he was arrested. Leaving prison, he continued his wanderings in Belo Horizonte, where he roamed the streets under the influence of crack until he returned to Contagem. Even today, says the youth,

he dreams that the police will kill him.

In the film, Rafael gives his testimony in the same place where he was tortured. It lasts 17 minutes, in a fixed shot, with no cuts. Though the boy's testimony is the nucleus of the film's narrative, the work has four other sequences that are all filmed at night. The visual motif of a flame in the darkness is present in two of them: firstly, in the reenactment of the torture, which happens on a plot of land that is on fire (Fig. 2); and later, during the sequence of Rafael's testimony, when the youth tells his story sitting in front of a campfire that illuminates his face. At first glance, we notice a change between the two moments. The fervor and the threat of the flames during the reenactment that produces a hellish ambiance in the torture scene[12] is substituted, during the testimony, by a temperate and intimate flame to which Rafael directs his gaze (Fig. 3, top). The dying fire seems to indicate a movement from the traumatic event to the memory of it, from the terror experienced to facing it, through the courage of giving testimony about it.

Another aspect to point out, specifically about the testimony scene, is that the flame in the darkness allows for self-contemplation, an internal gaze protected from the world.[13] Similar to *In Vanda's Room*, the low lighting creates an ambiance favorable to the reflection and sharing of memories. In this sense, it is possible to recount Aumont's commentary about the films of Godard, Alexander Sokurov and Bill Viola in which the refuge in the darkness is a "condition of meditation, rest, and reappropriation of the self. Inhabited, the shadow is a metaphor, even while it is experienced, of poetry. In it, the time necessary for thinking can be experienced" (Aumont 2012, 119, my translation). In the case of *Seven Years in May*, contemplation is necessary to confront the trauma that was experienced, with the witness

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Fig. 2: *Seven Years in May* (Affonso Uchôa, 2019)

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assigning it a shape. At the same time, darkness is also a condition of the clandestine. According to Leandro and Araújo (2020), Uchôa's filming in the dead of night goes back to the furtiveness imposed on the testimonies of young Black and poor Brazilians, who, when denouncing the violence suffered, are in danger of disappearing by execution or imprisonment.

While in the analyzed scenes from *In Vanda's Room*, darkness creates conditions for the representation of a collective experience, in *Seven Years in May* the narration of Rafael's torture takes place in a dialogue with another young Black man who is poor and also a victim of police violence (Fig. 3, bottom). He is a fictional character who, after listening to Rafael, says: "I have been through so much that almost every story I hear seems to be mine." Through dialogue, the real experience of torture is amplified, and it is no longer an individual injustice. It acquires a collective scope, presenting itself as part of the current genocide of the Black and poor population in the peripheries of Brazil taking place at the hands of the State.[14]

A territory between times

While the visual motif of the flame in the darkness allows a first approach to the connection between the space dominated by the color black and the memories of the filmed subjects, *Horse Money* and *Seven Years in May* use the spatial shadows to develop an elasticity in the represented space, converting it into a means of welcoming heterogeneous temporalities.

In *Horse Money*, the narrative structure is marked by pendular movements, a constant coming and going between historical times. At the core of this movement is the character Ventura, a Cape Verdean whose presence is assailed by the memories of 11 March 1975, in Portugal, when

General António de Spínola attempted a coup d'état. The film explores the tension between the country's official history and the Black immigrants' experience of it, or between the memory of the former and the forgetfulness of the latter. The narrative centers on the Cape Verdean perspective. While a part of the Portuguese population experienced the consequences of 11 March, Ventura, Vitalina, and other immigrants from the former Portuguese colony have suffered the cruelty of daily life, surrounded by poverty and socio-racial inequality. In the film they appear in underground tunnels (Fig. 4, top), hospitals, abandoned factories, dark rooms, and deep nights (Fig. 4, bottom), recalling unhappy memories, such as the wife who traveled from Cape Verde to Portugal to bury her husband; workers who have been waiting for payment for decades; and victims of fatal or deeply scarring work accidents. *Horse Money* is devoted to these stories and the individuals who carry them (see Costa Júnior 2020b, 13).

The shadows in space define one territory or, in fact, two: the light and the dark. The strong contrast separates the two poles into two worlds (Fig. 5). The shot is fragmented when it is cut by the lines and shapes. The dark tones reinforce the mourning in the immigrants' reports. At the same time it drags haunted areas and the traumas of the past into the present. The conversion of a represented space into a remembered time is associated with the composition of dark masses in the shot. They take on the appearance of abstract shapes or pure surfaces of color that slip away from the recognizable three-dimensional space, creating an unknown territory.

In order to corroborate the existence of a territory of remembrance, we can recall the function of shadows in the work of an influential figure for Costa: Jacques Tourneur.[15] The French filmmaker's collaborators, as well as

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Fig. 3: *Seven Years in May* (Affonso Uchôa, 2019)

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Fig. 4: *Horse Money* (Pedro Costa, 2014)

scholars devoted to the study of his work, have frequently emphasized the importance of twilight in creating a particular atmosphere in his films. Three testimonies, gathered by Chris Fujiwara (1998, 74), deserve to be highlighted: 1. Producer Val Lewton's remark: "If you make the screen dark enough, the mind's eye will read anything into it you want!"; 2. Paul Willemen's distinction of the presence of a dark area in the foreground of shots that have contributed to the essential structure of fantasy in Tourneur's work; 3. J.P. Telotte's understanding of dark patches as void of meaning in the physical realm, a space that is irreducible to the viewer's natural desire to fill it with consciousness and significance.

The three comments on Tourneur are close to what Aumont (2012, 98, my translation) calls "the shadow as a medium," that is, a formal, figurative, and even figural operator. More than a denial of light, the dark environment is as much a part of our daily experience as it is a poetic power: "The twilight is a world apart, which has a rationality and, above all, another value. It is not so much the opposite of the luminous world than it is a completely different world. […] The shadow world […] has its own time, its own resonance, its particular ways of being inhabited and its privileged human actions" (Aumont 2012, 124, my translation).

This power of the shadows also exists in *Horse Money*. In his shots divided between light and darkness, the color black infiltrates the domain of other times, the memory of a traumatic past, in the realist representation. The subject in the image simultaneously inhabits the present and the layers of memory; as is suggestively indicated, for example, in the duplication of Vitalina's body from her projected shadow in the shot of her arrival (Fig. 5, bottom). Such a reading, of course, takes into consideration the verbal

remembrance through the Black immigrants' speeches, the appearance in abandoned spaces linked to their cruel life histories, and, also, the very editing of the film, in its constant coming and going between times. Color allows this intertemporal dynamic to happen within the shot itself, visually.

As in Costa's film, I believe that the possibility of the use of multiple temporalities, born from the color black, can be seen in *Seven Years in May*. In this case, night takes on this intention. While during the filming process some scenes were shot in the daytime (Barbi 2021), the final cut exclusively features night takes. There are various possible reasons for this choice. Earlier we mentioned Leandro and Araújo's (2020) hypothesis that darkness offers a clandestineness necessary for the testimony. Another reason, given in the diegesis of the film itself by the fictional character (Fig. 3, bottom) who talks with Rafael, is to make a reference to the genocide of Black and poor people in Brazil: "There are many people dying every day. We are surrounded by a pile of dead people, bro. And that pile is only growing, since before we were born. And it's so tall it capped the sky. That's why everything is so dark." Here I would like to follow the more obvious hypothesis that the exclusiveness of the night directly refers to Rafael's memories, including those of his torture. In this sense, the spaces in the film allow for, through the darkness, the constant commute between the present and the past.

The first indication of the association comes from the film's opening scene, when Rafael, backlit, appears walking on a deserted street. He comes from the background of the image to the foreground, crossing zones of light and shadow created by the flashing of the streetlights (Fig. 6). In the end, darkness enters, when the figure and space, the subject and the night, become one. The montage makes this

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Fig. 5: *Horse Money* (Pedro Costa, 2014)

Fig. 6: *Seven Years in May* (Affonso Uchôa, 2019)

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scene a passage into memory, as the following shot shows a reenactment of torture, materializing the past, although without the intention of exhausting it or of faithfully or objectively reproducing it. In fact, the reenactment develops reflexively: in the beginning, friends of Rafael, dwellers from Contagem, dress up as policemen in front of the camera while commenting on the clothes and the role they will play. Like Rafael's verbal testimony, it is one of the film's other ways of narrating the past and confronting it with fiction.

The plurality of perspectives adopted to tell Rafael's story seems to take into account the way traumatic events resist representation, or the survivors' difficulty in providing a narrative form, in line with the terror experienced.[16] In the face of that which is resistant to symbolization, fiction becomes a power to be explored. Seen in this way, the predominance of the color black in the film, due to the predominance of shadows and nighttime, can be justified as one of the signs of the poetically/fictionally revised past, an occasional fragment of torture that spreads through and infects the present. The film images suggest this fluidity or migration of elements, spaces, and temporalities; one example is the fire in the torture and testimony scenes, as discussed above.

In the conditions analyzed above, the trauma narrative, through Rafael's speech and the filmic form, renounces a fixed past that is reproduced with accuracy and clarity; but rather it opts to access memory as a dark pocket, without safe beacons, as a medium open to fiction and rewriting. While in cinema "the entrance into the shadows always carries a risk of getting lost at the very least, and, generally, it means death" (Aumont 2012, 111, my translation), in *Seven Years in May* the passage through the darkness at the beginning of the film is a crossing, not without danger—given the return to

the wound opened by the trauma—to the territory of memory. In this way, Rafael's testimony is not inscribed on the white page of a judicial document, but in the dark tones of the night.

A means of sharing

We have seen that the films analyzed here present narratives directed towards sharing the social experiences of Black and marginalized subjects. About *Horse Money*, Costa (2014) says that when he searched the Portuguese newspaper archives of 1975 about the protests against the coup d'état that occurred that year, he did not find a single Black face in the photographs. While a part of Portugal fought against the military forces, Cape Verdean (like Ventura), Angolan and other immigrants were distressed, worried about job security, if they would be able to save enough to bring their wives and children from their homelands, if they would be deported. *Seven Years in May* is about hearing a testimony that refers both to Rafael's past and to the present state of the Brazilian Black and marginalized population that continues to be exterminated (Cerqueira et al 2020), while the current federal government denies the existence of racism in the country (Cabral 2020). Considering the cited conditions, both *Horse Money* and *Seven Years in May* are opposed to forgetting the experience of sociohistorical subjects through the official written history. As I have demonstrated, the color black is directly involved in this political function.

Besides directly contributing to the modulation of filmic space-time according to the memories and testimonies of the filmed subjects, the color also promotes the communication between the diegetic universe and the viewer's space. I am referring to the effect caused by the predominance of darkness that softens the edges of the filmic frame, the "frame-object"

(Aumont 2004, 118, my translation) that makes the cinema screen a separate space, a window that distinguishes the world of the film from that of the viewer. Thus, the color black blurs the limits, creates a zone of continuity (not homogeneous, given the different shades) between the diegetic universe and the place where the work is being shown, making one an extension of the other.[17] The darkness of the theatre no longer provides a safe distance between the spectator and what is in the image,[18] but it becomes the means of communication between the two poles. Sharing the darkness strengthens the reach of the subjects' experiences filmed by Costa and Uchôa, making their words and experiences resonate with the viewer and returning them to their place of origin: real life.

Translated by Alisa Wilhelm

1/ I cite Bazin's (2014) well-known quote describing one of the scenes in *Umberto D* (1952) by Vittorio De Sica.

2/ Through a distinct approach, Asian filmmakers like Malaysian/Taiwanese Tsai Ming-liang and Thai Apichatpong Weerasethakul cross the present time with dimensions from the past in their films. In spite of the emphasis on daily life and the aesthetic methods commonly associated with realism, the coexistence of ghosts, spirits, and living people is common in their works. In accordance with religious traditions like Buddhism, Taoism and animism in their lack of separation between the spiritual and material worlds (Mello 2015), their films allow for the interaction of different timelines and ontological realms of being.

3/ In *The Movement-Image*, the name was mistakenly written as Pascal Augé (Auger 2011). Some researchers took the confusion even further, believing it to be a mention by Deleuze to Marc Augé and the concept of non place (*non lieux*).

4/ Although Deleuze recognizes that both the darkness of expressionism and the white of lyrical abstraction perform, in certain aspects, the role of colors, he chooses not to discuss them as such.

5/ Night and darkness respond to different political questions in this filmography. *Dazed Flesh*, which the Black filmmaker Grace Passô directs and stars in, questions the socio-racial identity as something under constant construction. *Republic*, filmed during the COVID-19 quarantine, is based on the despair and incredulity of living in Brazil, in which life, especially that of poor and Black people, has no value to the state. Finally, *Tell This...* and *Tremor Iê* respond, through documentary and speculative fiction respectively, to the troubled Brazilian political landscape of recent years, especially after the 2016 parliamentary coup that deposed the then-president Dilma Rousseff.

6/ Although I'm considering Affonso Uchôa as white, it would be important to know the racial self-declaration. The criteria of racial categories in Brazil are often controversial because of interracial mixing within the Brazilian population. In the country, for instance, race depends on appearance, ancestry and even socioeconomic factors.

7/ Recognizing the political value of language in defining the place of an identity, Kilomba (2019) opts to use the term Black, written with a capital "B", to refer to people and a political identity. Throughout this article I will use Black in this sense, and reserve black with a lowercase "b" to refer to the color as an aesthetic element produced by light.

8/ About the Atlantic slave trade, which extended from the 15th to the 19th centuries—and which Portugal benefited from with its colonialism—Mbembe (2017, 2) writes that "men and women from Africa were transformed into human-objects, human-commodities, human-money. Imprisoned in the dungeon of appearance, they came to belong to others who hated them. They were deprived of their own names and their own languages. Their lives and their work were from then on controlled by the others with whom they were condemned to live, and who denied them recognition as cohumans. And yet they nevertheless remained active subjects."

9/ The author discusses the priority typically given by the cinema industry to the beautification of white skin on the screen, with lighting and color set-ups and technologies designed to optimize it, while they were incapable of capturing the nuances of darker skin tones. It was because of this, Gates remembers, that at the end of the 1970s Jean-Luc

Godard criticized the Kodak film stock as inherently racist, refusing to use it in his works.

10/   Its status as a color was denied, for example, in *A Treatise on Painting* by Leonardo da Vinci in the 15th century, in Isaac Newton's color spectrum in the 17th century, and by artists such as Paul Gauguin (Pastoureau 2008) and Ad Reinhardt, for whom "black is interesting not as colour but as noncolour and as the absence of colour" (artscanada 1967, 3).

11/   Beyond the physical properties that define the color black, it must be recognized as a matter of perception and interpretation, as with the other colors: "Far from being a straightforward property of the objects around us, colour is, in reality, both a physical characteristic of light and pigment and a psychological and physical sensation, both an objective and a subjective phenomenon" (Everett 2007b, 10).

12/   The director of photography for the film, Lucas Barbi, stated that the presence of flames in the reenactment of the torture happened by accident. The film crew went to the locations when they saw a fire burning a plot of land. At that moment, they decided to get the actors and go there to film the scene. Everything was very quick, before the fire went out (Barbi 2021).

13/   In the history of European art, this quality is present, for example, in the paintings of Georges La Tour where the presence of a flame evokes a protection from the darkness, blocking out the outside world and forming a refuge created by the respite of a flickering flame (Milner 2005).

14/   In 2018, 75.7% of homicide victims in Brazil were Black. In addition, from 2008 to 2018, the number of homicides among this group increased by 11.5%, while among non-Black people it dropped by 12.9% (Cerqueira et al 2020).

15/   As Costa (2009) admits, the initial script for his feature film *Down to Earth* (*Casa de Lava*, 1994) was a remake of *I Walked with a Zombie* (Tourneur, 1943).

16/   I am basing this on Seligmann-Silva's (2003) reflection on the literature of testimony, a field with which Uchôa's film, I believe, maintains strong affinities.

17/   Even seen at home, the films discussed here require darkness as a display device. Otherwise, the brightness can substantially alter the black tones in the image.

18/   As was believed by authors associated with the psychoanalytic-semiological paradigm, according to which darkness was the basis of a scopic regime, as it separated the spectator-voyeur and the object of the gaze. According to Metz (1982, 64), for example, "[...] the obscurity surrounding the onlooker, the aperture of the screen with its inevitable keyhole effect" directly contributed to scopophilia.

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The True Colors of "False" Color: Representing Data Chromatically in NASA Films

This paper investigates the multifaceted uses of color — not (only) to aesthetic ends, but as a tool for translating data into narrative — in a corpus of recent NASA films. Often called 'false' color or accused of manipulation, these uses of digital color stray from photorealism but nonetheless have a direct, measurable relationship with physical reality: they use data to render visible that which lies outside the spectrum of visible light. The focus of this paper is on the truth status of these digital films and on the practices used to produce them. It situates them, as a corpus, within and in response to film studies historiographies of color centered around spectacle and the dichotomy of fantasy versus reality, addressing how color can deploy the powers of the false to reveal otherwise invisible truths through art and artifice.

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Scientific images in the Age of Suspicion

Starting with important 20th century milestones such as the televised footage of the Apollo 11 moon landing and *The Blue Marble* photograph taken by the Apollo 17 crew, public access to images of outer space has grown exponentially. These images have long been a source of wonder for spectators, but are, at times, also met with a degree of suspicion, particularly as increasingly ambitious space exploration provides ever more spectacular images, and as cross-pollination occurs between the technologies used by scientists and those used by Hollywood, producing vividly colored images often seeming more like science fiction than science fact.

In the digital age, the truth status of images figures perhaps more than ever in public and academic discourse. On the one hand, technologies used to create, enhance, and manipulate images of all registers (Photoshop, CGI) blur the boundaries between image and visualization; live action and animation; the naturalistic, the realistic, and the real. This is not merely an issue of image production but also of reception, as some contemporary audiences seem particularly primed for suspicion and doubt due to growing concerns about fake news, deepfakes, and the manipulative powers of the media, not to mention recent anti-intellectual movements and science denialism. On the other hand, as the digital increasingly eclipses the analog, there is a resurgence of concern for the role and status of photographic indexicality as guarantor of the reality—or the link to reality—of reproductive images.

The question of what it means to *capture* an image, and by extension, of what precisely an image is in today's media landscape has more urgency than ever. This is true, not only for film and media scholars, but also for practitioners of scientific visualization and imaging, who must reckon with how shifts in media materiality and production processes affect the truth claim and perceived "scientificity" of contemporary scientific images. In other words, the stakes of indexicality extend beyond the bounds of medium specificity or realist aesthetics, into broader questions of credibility and authenticity in terms of how scientific images assert their status as viable scientific objects. This is particularly true for images produced by compiling, transcribing, and translating data into a visual form which exceeds the immediacy and the automaticity of the photographic (for example, in the case of computational images), and which may no longer benefit from an aesthetics of visual naturalism or photorealism to bolster their truth claim. Indeed, as Mary Ann Doane states, "[c]ultural production today seems to be haunted by anxieties surrounding the status of representation in what has been described as our post-medium condition" (Doane 2007, 1). As a result, some of today's most scientifically significant images of outer space, produced through synthetic processes involving multiple technologies, platforms, and practices, have been called into question on precisely these grounds.

There is a sort of double standard that emerges when we set these scientific images in dialogue with other registers of photographic or cinematic images, even fictional ones. Images that rely on the truth claim of indexicality are often subjected to a lower threshold of verification than images which are transparent about their composed, composited, or constructionist nature. Indeed, the hand-drawn or animated infographics which are so common in science communication tend to be judged on the merits of the data that they convey rather than on their

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aesthetic qualities, while image-based visualizations may also face scrutiny for being too photorealist or not photorealist enough, in addition to being evaluated on their transmission of data. The vast assemblage of choices made by filmmakers of fiction films—ranging from decisions regarding the position of the camera and staging of filmed objects to choices in lenses or lighting to the use of complex editing procedures, for example—may pass imperceptibly or seem less likely to undermine the perceived objectivity of their final product, so long as they uphold a commitment to visual realism. However, scientific visualizations which deliberately make less (or no) effort to disguise their own plasticity or materiality, which choose to forego photorealism in service of a greater transparency regarding their own creation, and which derive their truth claim not from their indexical nature or naturalistic aesthetic but from their reliance on source data as their condition of possibility—in other words, what we might call a "data realism"—are often paradoxically perceived as less objective or less credible because they eschew an aesthetics of visual realism. For example, even images created using technologies like night vision or thermal imaging are often perceived to be less "real" by virtue of their video game-like aesthetics; studies have shown that, in the context of the military, this can contribute to derealization and dehumanization, and "[generate] psychological distance between the viewer and the viewed" (Vasquez 2008).[1] It is symptomatic of what Doane has called a "politics of the index," in other words, an unintended consequence of the "project of extricating the real from the business of realism" (2007, 4).

Indeed, color in particular continues to be disproportionately critiqued in scientific visualizations, especially as compared to other vectors of image manipulation, because it is so easily misconstrued as an embellishment, an enhancement, or a decoration, and because it is so often divorced from the discourse of realism in film scholarship since the age of Technicolor. Where color might be perceived as ostentatious, processes such as stacking, layering, and compositing, for example, are granted greater acceptance, first because they are largely understood as constitutive elements of the final image itself; and second, by virtue of their relative self-effacement. This paper seeks to refute these preconceived notions. It argues that, (1) the association of certain film formal devices such as color with spectacle, artifice, and visual pleasure often leads these devices to be misconstrued as signifiers of fantasy or falsity; (2) by taking into account the data-motivated justifications behind color choices in scientific visualizations, we can situate these films within a larger framework of film color which has always addressed the question of aesthetics versus functionality, on the one hand, and within a larger framework of scientific art which has always linked plastic creation with practices of rigorous observation, on the other; and (3) the aesthetics and functionality of data-motivated uses of color are concomitant in upholding the truth claim of scientific images, which assert their link to reality not via a photochemical imprint of light (classical indexicality) but instead due to the source data that serves as their very condition of possibility (data realism, or data as index).

The comparative angle of this paper seeks to apply these questions—of realism and the fantastical, of the materiality and functionality of the spectacular, and of the truth status of images—to a novel corpus of films for which color plays an integral part. Scientific visualization films employ

complex chromatic schemata in order to translate arrays of research data into a visually legible form. This paper thus investigates the multifaceted uses of color, not (only) to aesthetic ends, but as a tool for translating data into narrative, in a corpus of recent digital NASA films—*Cassiopeia A 3D Model: A Star from the Inside Out* (2009), *Perpetual Ocean* (2011), and *Tour of the Moon in 4K* (2018)—situating these films within and in response to film studies historiographies of color in order to address how color can deploy the powers of the false to reveal otherwise invisible truths through art and artifice.

"Real" images from space

In the case of recent digital NASA films, this suspicious reception is at times unintentionally exacerbated by well-meaning explainers produced by specialists in science communication and data visualization. The jargon of image processing itself is often at fault, as some popular audiences have difficulty wresting terms like "false color" or "image manipulation" from their negatively charged lay connotations which seem to imply some form of trickery. This is the case even when such terms are employed in service of explaining their precise mechanisms and field-specific meanings, and even when these explanations explicitly absolve the methods of production in question of any ill intentions or effects.

A notable example of this is a short science communication video that was released to mark the occasion of NASA's updated *Blue Marble 2012* image of the Earth captured by its Suomi NPP satellite in 2012. This image, like myriad others of its genre, is not exactly a photograph; it was produced through a complex process of compositing in which a series of high-resolution slices were digitally stitched together and enhanced to form a single view of our planet. Shortly after its release, Flora Lichtman of NPR's *Science Friday* recorded an interview with NASA/Goddard Space Flight Center visualization specialists Gene Feldman and Robert Simmon entitled "Blue Marble: The Making Of."[2] The goal of this interview was twofold: first, to situate the *Blue Marble 2012* image within the larger context of previous "portraits" of Earth taken from outer space, and second, to explain the technical processes used in the capturing and processing of these images for lay audiences. Feldman and Simmon describe the various image processing procedures—from techniques like stacking, layering, and compositing, to the removal of gaps between slices in the source material using Photoshop, to adjusting and enhancing elements like color and transparency in the composited image—which are typically used in preparing NASA images for public release.

This effort toward transparency was met, however, with an unexpected backlash. In 2014, the "Blue Marble: The Making Of" video was re-posted on YouTube using the title "NASA ADMITS THEY DONT USE REAL IMAGES FROM SPACE" (sic) and with the description, "SPACE TRAVEL IS NOT POSSIBLE WHY DOESN'T NASA HAVE HUNDREDS OF ACTUAL IMAGES OF EARTH FROM SPACE? WHY ARE THEY PAYING ARTISTS MONEY TO RE CREATE EARTH IN THEIR OWN VISION THROUGH PHOTOSHOP?" (sic) by user leucotomy101.[3] Under the video hundreds of YouTube users posted comments of a similar ilk, decrying supposed NASA fakery and spreading the rhetoric of popular conspiracy theories. What is striking about this video—which is by no means unique in its genre (and setting aside debates of whether the post and subsequent comments were made in good faith

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Fig. 1: *Blue Marble 2012* (NASA/NOAA/GSFC/Suomi NPP/ VIIRS/Norman Kuring, 2012)

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ignorance or as an Internet trolling scheme)—is the fact that, other than the re-titling and new description of the post, it makes no attempt to alter, analyze, or annotate the original video's content in any way. Its poster and commenters rely exclusively on the charged connotations of the original video's terminology—the very mention of image manipulation, the very mention of Photoshop—to do all of the work of their "gotcha"-style exposé. The absence of photographic indexicality is invoked as a marker of inauthenticity (though, of course, not in so many words), as the description and comments question why NASA does not simply release raw point-and-shoot photographs of the Earth rather than "paying artists," implying that the plastic nature of these images—regardless of how transparently they are presented or explained—is in and of itself evidence of falsification or trickery.

This suspicious reception of images produced by astrophotography or by scientific visualization is neither recent nor uncommon. It seems to have gained momentum since the early 1990s with the Hubble Space Telescope's launch and ensuing public relations campaign, during which science communicators had the momentous task not only of explaining the images it produced, but also of reasserting the credibility of Hubble's images following the discovery and repair of the telescope's initial mirror defect. While damage control was largely successful, a negative response nonetheless remained, not resulting from the resolved defect, but instead due to the spectacular quality of the images that it produced. The fantastic colors of images like Hubble's 1995 *Pillars of Creation* were a source of wonder, but precisely due to their beauty, they were often dismissed as scientific objects. In *Coloring the Universe* (2015), Travis Rector, Kimberly Arcand, and Megan Watzke explain that

this was the case even among some members of the scientific community: "Many scientists labeled the *Pillars of Creation*, and other images like it, as 'pretty pictures'—and not in a complimentary way" (2015, 61), as they saw the use of the telescope for the explicit goal of producing color images for public release as an infringement on telescope time that could otherwise be used to produce data for scientific purposes. Rector, Arcand, and Watzke go on to detail precisely how the fantastic colors of these images come about in the production process, notably arguing that their spectacular nature is not at odds with but rather *reaffirms* their scientificity. Hubble's narrowband color filters were chosen and calibrated such that they could best convey data about the different temperatures and elements present in cosmic bodies (2015, 122). Indeed, NASA's Jet Propulsion Laboratory confirms that, in Pillars of Creation, red corresponds to singly-ionized sulfur atoms, green corresponds to hydrogen, and blue to doubly-ionized oxygen atoms (NASA Jet Propulsion Laboratory 2005). The vivid colors of the image are not mere aesthetic embellishments, but functional data points; spectacular images like *Pillars of Creation* forego visual naturalism in favor of a data realism that instrumentalizes color to express scientific information. Today's "real images from space" are decidedly constructionist and rarely purely photographic; due to their reliance on source data, they retain a direct relation to the reality of the objects that they represent.

Film color: aesthetics versus function

There is a certain tradition of film theory that has understood the uses of cinematic color in mainstream narrative film as a site of spectacle and visual pleasure, on the one hand, and as a visual shorthand for
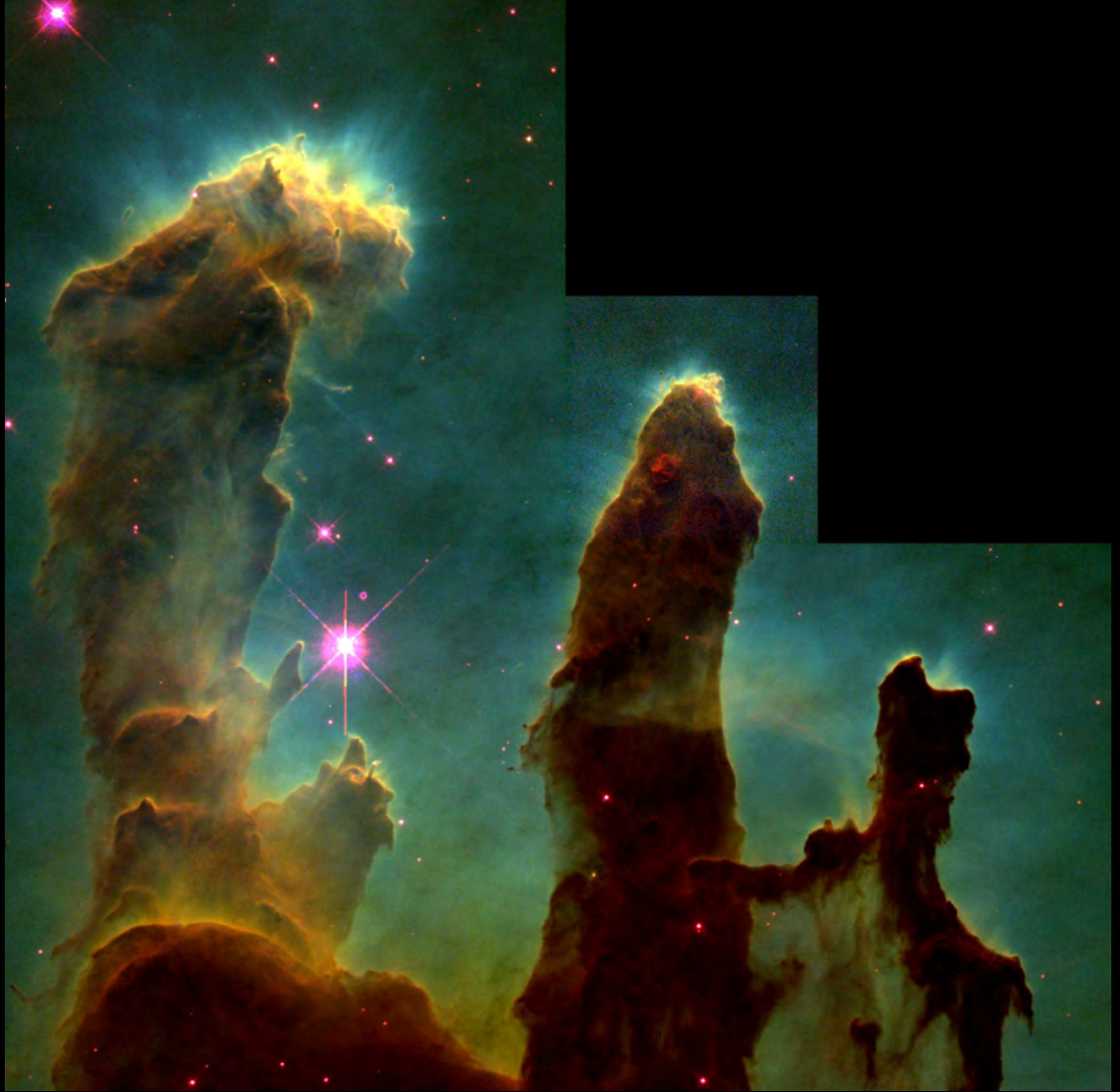
Fig. 2: The *Pillars of Creation* taken by the Hubble
telescope (NASA/Jeff Hester/Paul Scowen [Arizona State
University], 1995)

distinguishing between different registers of images, on the other.[4] In the early period, hand-painting techniques or the tinting of specific portions of film stock—from *Annabelle Butterfly Dance* (William Kennedy Dickson, 1894) to *The Lonedale Operator* (David Wark Griffith, 1911)—contributed to the visual fascination characteristic of the cinema of attractions. In classical cinema, color could be invoked as a fanciful or fantastical counterpoint to the realism of black and white images, even expressionistically enhancing the emotional content or arc of films, as in the practice of Golden Age melodramas with their use of Technicolor. As color films eclipsed black and white, specific chromatic palettes and uses of lighting often took on a functional role toward the guarantee of continuity, used to set apart, for example, flashback sequences from otherwise linear film chronologies, rendering jumps in time or space more visually transparent for spectators. Finally, in recent years, the use of particular color palettes has even been described as a matter of zeitgeist, as in the case of the oft-cited Hollywood predilection for teal and orange color grading in the 2000s, for example (Miro 2010).

While this is admittedly a vast over-simplification, it serves simply to highlight a long-standing tradition of linking cinematic color—and the material nature of the cinematic spectacular writ large—to questions of realism versus fantasy, and of form versus function. Film devices that do not fit neatly into the constitutive formal categories of cinematography, *mise en scène*, and editing—such as music or color— are particularly susceptible to these debates, sometimes being reduced to an aesthetics of the decorative or to a functionality of emotional manipulation. However, as outlined in the following section, aesthetics and functionality need not be seen

as diametrically opposed. Indeed, in the case of scientific visualizations, there is a much longer tradition of linking art and plasticity to the pursuit of intellectual rigor through the observation and transcription of the qualia of scientific objects.

Artistic vision in the service of astronomical knowledge

The scientific field of astronomy has two primary branches: observational astronomy, in which data is collected through direct and indirect observation of astronomical objects and phenomena; and theoretical astronomy, which attempts to describe and explain these objects and phenomena through mathematical, statistical, analytical or computer modeling. What unites these two branches, in addition to their common objects of analysis, is the complementary nature of their epistemological approaches. As film and visual studies scholars, here we can see a clear parallel to the cinema, with its realist and its constructionist pasts: together, they *record* images of reality, and also *create* images to describe what that reality might entail. Of course, the term "images" is being used here in the broadest possible sense, in order to account for the fact that scientific imaging does not always operate within the realm of the optical, the photographic, or even the visual. Nonetheless, of particular relevance here is the notion of scientific knowledge acquisition through the production of images as both *observational* and *creative*.

Art historian Elsa De Smet traces a history of this epistemological stance in astronomy back to the 17th century, in which there was a forthright link between science and art. Describing Galileo as "the defender of a necessary coalescence between aesthetic attitudes and scientific thought,"[6] she goes on to explain that "this Galilean
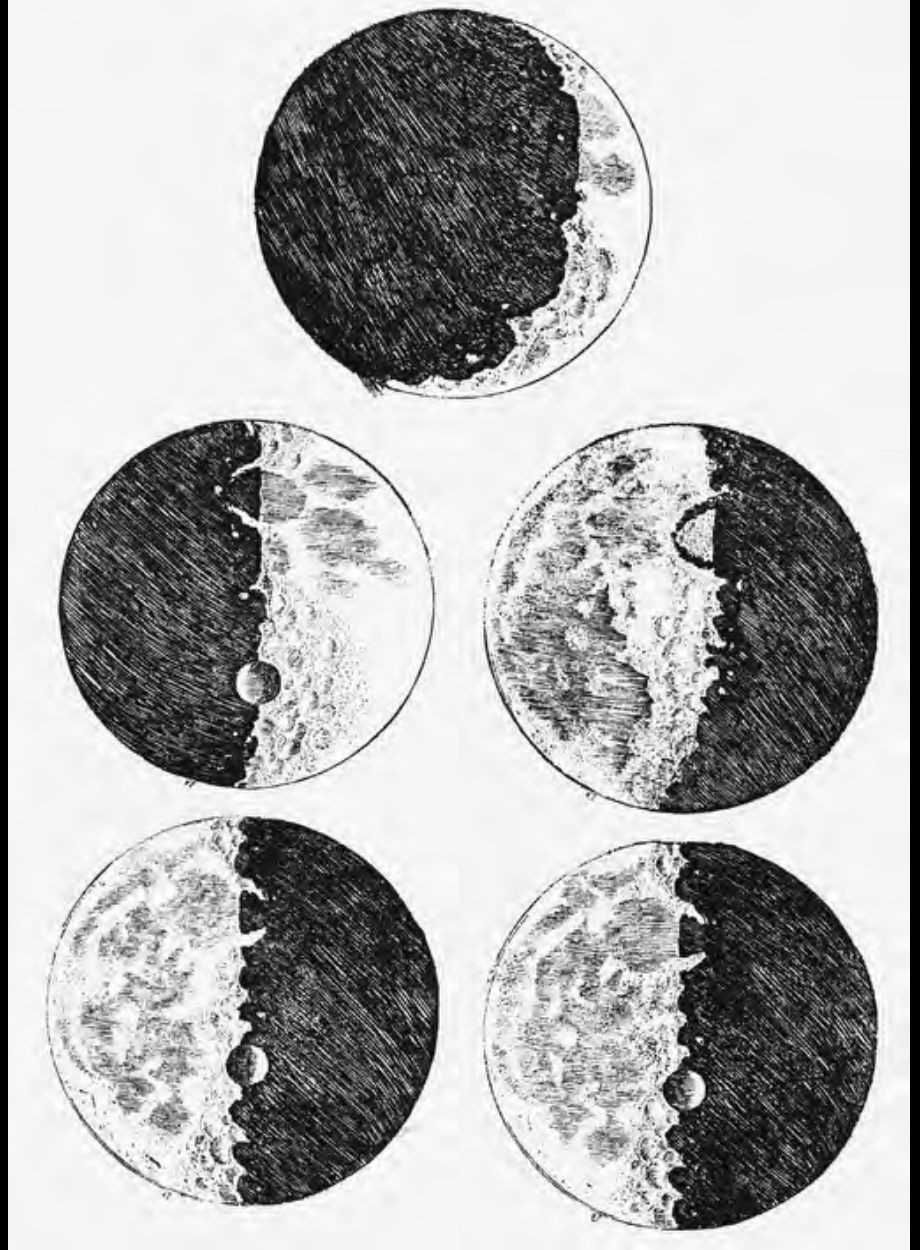
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Fig. 3: Galileo's sketches of the Moon (*Sidereus Nuncius*, 1610)

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tradition of artistic treatments of outer space—pictorial, naturalistic, figurative, and picturesque in nature—which make[s] art of scientific content in order to render it intelligible" [7] persisted well into the 20th century (De Smet 2017, 22). She also cites Johannes Kepler, who "turned toward fiction as a 'cognitive vehicle'"[8] when he wrote his novel Somnium (in English: The Dream, or Posthumous Work on Lunar Astronomy, 1608, published 1634). Despite being a work of fiction, it has long been lauded for the rigor of the thought experiment that it conducts as a means of thinking through what it might entail to conduct serious astronomical study from the Moon rather than from the Earth.

This tradition of artistic science and plastic observation—of conducting serious and rigorous astronomy research that relies on fiction, painting, drawings, etchings, dioramas, etc.—might seem anachronistic today, especially as the hard division between STEM disciplines and the humanities is reinforced institutionally, financially, and even politically. However, in many ways, astronomy is resisting this tendency, asserting its interdisciplinary character more than ever. In 2016, Lisa Messeri, an anthropologist of science and technology at Yale University, published her monograph Placing Outer Space: An Earthly Ethnography of Other Worlds. In this work, she describes how the field of planetary science is migrating more and more toward what she calls "the new interdisciplinary science of the solar system" (2016, 5). She situates this shift as a logical extension of a long history of regarding scientific objects from both "realist and constructionist approaches," in other words, by considering objects not only as "discoverable" but also as "inventions[, as] things molded from a historical and local context" (2016, 8). It is in this light that scientific objects can—and must—be considered

not only (or primarily) as realia, but also for how they "embody what one does not yet know" (Hans-Jörg Rheinberger, quoted in Messeri 2016, 9), in order to give rise to an approach of doing science that legitimizes "experimental ways of knowing" (2016, 12). For Messeri, this extends beyond the first degree of bridging the so-called hard sciences with fields like sociology, anthropology, and cultural geography; it also entails what she refers to as "planetary imaginations" (2016, 9), which take seriously the constructionist methodologies of simulation, visualization, modeling, and creative imagination as a means of doing science.

Indeed, there has been a recent boom in interdisciplinary re-thinkings of scientific epistemology through the humanities and the arts. National and international scientific organizations like NASA or the European Space Agency (ESA), for example, now have entire branches dedicated to outreach, targeting new audiences (non-STEM university researchers, citizen scientists, as well as the public at large) often by explicitly linking the study of science to the arts. To this end, they employ and engage with artists, animators, visual designers, science communicators, philosophers, sociologists, and scholars of the digital humanities, among others. In 2000, the French government's space agency, the CNES (National Center for Space Studies), created a cultural laboratory invested in space art, as well as a sub-division called "Spatial Humanities" (humanités spatiales) dedicated to bringing together humanities scholars that study outer space, its objects, and its representations, whether "scientific, artistic, literary, audiovisual, etc." (Humanités Spatiales, n.d.). NASA has also increasingly formalized its efforts to engage with artists who work in the fields of digital animation and visualization in order to collaborate on

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several of their most important—and award-winning—outreach projects of the past few years. This is not only for public outreach or educational purposes, but is also an increasingly important tool for the processing of collected data. NASA scientist Gene Feldman, who has participated in many of these visualization collaborations, has said, "[b]ecause the data *volumes* that we get from space now are astronomical, the only way that we can really handle this anymore is to visualize it. And no matter what computers we may build, the human mind and the human eye, in my mind, is (sic) still the most powerful integrator of information" (Feldman and Simmon 2012, my italics). It is precisely this genre of visualization—visualizations created in the service of processing and deciphering data—that is the object of the three case studies presented below.

The three films that this paper is concerned with have been chosen for their innovative digital treatments of color. These are not always naturalistic, but they are pictorial, figurative, and picturesque in nature, and above all, they are firmly engaged in a project of *making art* of scientific content in order to render it intelligible not only to the general public and education audiences, but even to research scientists themselves. The subsequent analysis attempts to tease out a new paradigm of digital color use in films which relocates the digital from an additive or supplementary element of editing (or a package for distribution) to the very basis of their production. In other words, today the digital does not simply replace or enhance elements within an image, but is now able to construct the image itself from the ground up using data as its foundation.[9] As computer-generated, data-driven computational images become increasingly ubiquitous in our media landscape, we must consider

how they relate to prior traditions of scientific observation and plastic epistemologies, and how they can help us look to the future, beyond paradigms like the hegemony of the optical[10] and the primacy of the photographic index, as they render visible facets of reality to which we have previously had little or no prior access.
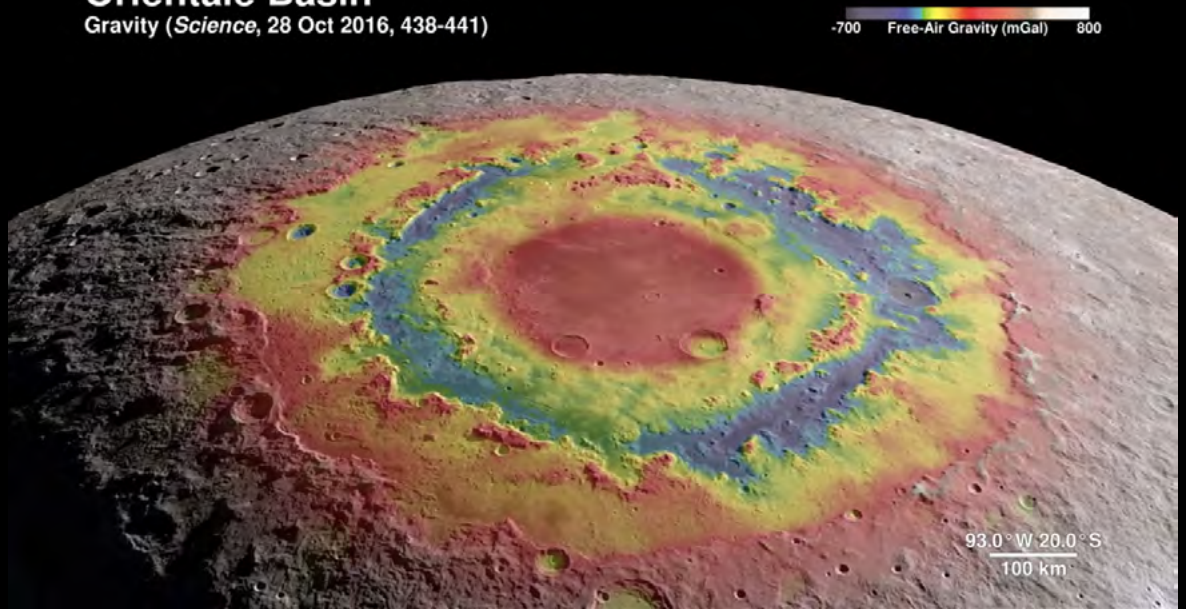
Tour of the Moon in 4K (2018)

The culmination of nine years of data collection, *Tour of the Moon in 4K* was released by NASA's Scientific Visualization Studio in 2018, and is a hybrid film on multiple levels.[11] First, it uses photographic images captured by the Lunar Reconnaissance Orbiter (LRO), stacked and stitched together to create a seamless 360-degree representation of our moon in high resolution. Secondly, the visualization is animated by reconstituting the LRO's actual flight paths, in order to create a spatially realistic fly-over. Finally, "false" color—color that does not correspond to what the naked eye would perceive—is added to the images in order to reveal data points that would otherwise be invisible. At 43 seconds into the visualization, an otherwise photorealist image of the moon, with all of its topographical detail, lights up in bright colors to highlight a variety of data points taken at precisely chosen landmark locations. These colors are accompanied by a key, superimposed over the top right-hand corner of the image or by a voice-over narration, which explains the units of measurement of the specific data points being visualized by the digitally-added color, as well as a numeric indicator which ascribes particular colors to each numeric range for easy deciphering.

First, we are shown the free-air gravity measurement (in mGal units) of the Orientale Basin in a sequence that digitally paints the moon in vivid

Fig. 4.
Top: The Orientale Basin in *Tour of the Moon in 4K* (NASA's
Scientific Visualization Studio/NASA's Goddard Space Flight
Center/David Ladd & Ernie Wright, 2019)

Bottom: The Aristarchus Plateau in *Tour of the Moon in 4K*
(NASA's Scientific Visualization Studio/NASA's Goddard
Space Flight Center/David Ladd & Ernie Wright, 2019)
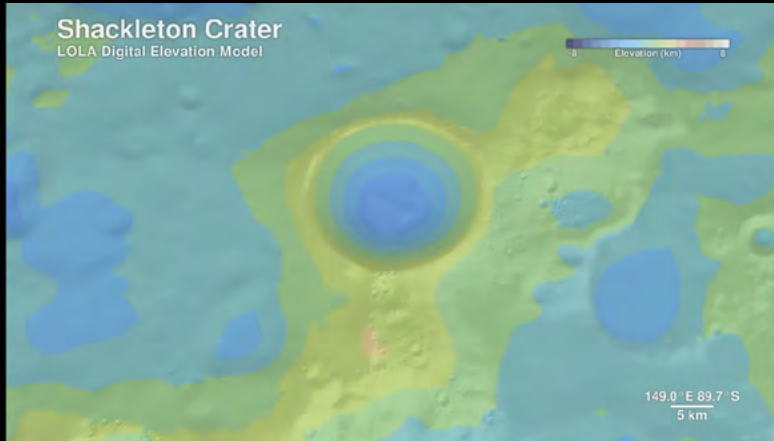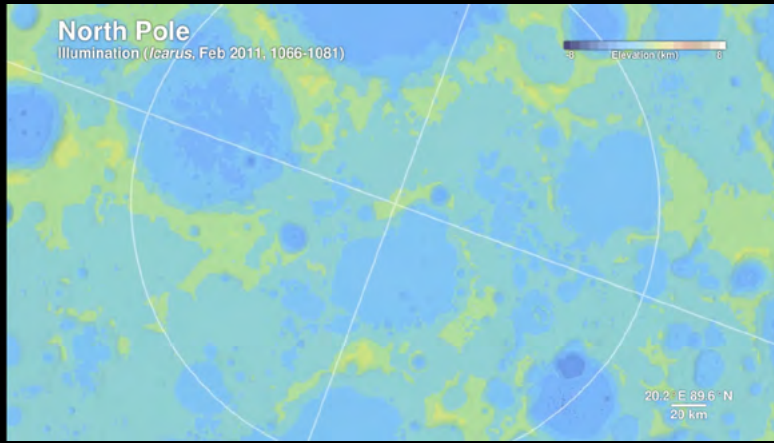
Fig. 5.
Top: The North Pole in *Tour of the Moon in 4K* (NASA's Scientific Visualization Studio/ NASA's Goddard Space Flight Center/David Ladd & Ernie Wright, 2019)

Bottom: The Shackleton crater in *Tour of the Moon in 4K* (NASA's Scientific Visualization Studio/ NASA's Goddard Space Flight Center/David Ladd & Ernie Wright, 2019)

Fig. 6.
Top:
The North Pole without color in *Tour of the Moon in 4K* (NASA's Scientific Visualization Studio/NASA's Goddard Space Flight Center/ David Ladd & Ernie Wright, 2019)

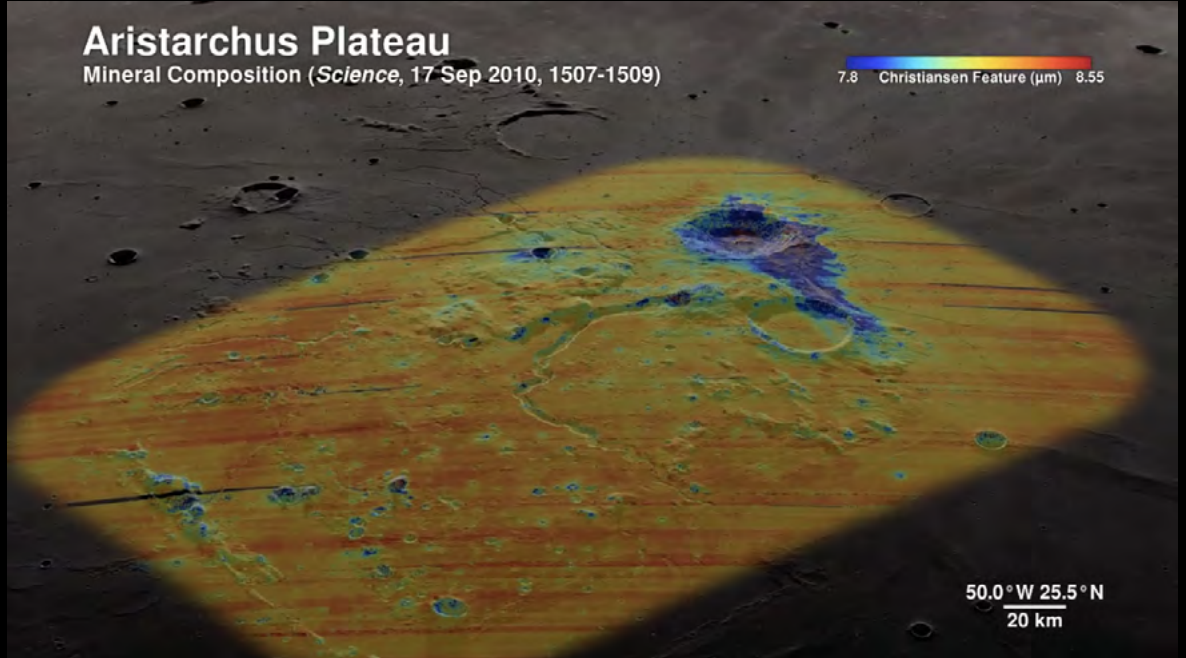Bottom: The South Pole without color in *Tour of the Moon in 4K* (NASA's Scientific Visualization Studio/NASA's Goddard Space Flight Center/ David Ladd & Ernie Wright, 2019)

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reds, yellows, blues, and greens and highlights the structure of the moon's crust. We are then "flown" to the moon's South Pole, which appears speckled with teal in varying degrees of brightness; the location of the colors corresponds to the location of polar ice troves discovered on the moon's surface, and the brightness of the colors here indicates quantities and temperatures, as measured by temperature readings and reflectance from the LRO's instrumentation. Digital elevation models of the Shackleton Crater appear in pastel blues, yellows, and greens, whose gradient corresponds to variations in elevation measured in kilometers. From here, the simulated LRO zooms out to reveal a brightly colored topographical map of the entire moon, in order to render visible the immensity of the Aitken Basin crater through chromatic contrasts with surrounding geographies. The Aristarchus Plateau is highlighted in a rainbow of colors to reveal the presence, location, and concentration of mineral deposits in order to detail the volcanic history of the moon. In the Taurus-Littrow Valley, blue, green, and orange lines superimposed over present geological features highlight the Apollo 17 travel pathways in accordance with locations and times. These digital color visualizations are always superimposed over a photographic 3D reconstitution of the moon's surface, and are often interspliced with photographic inserts which show magnified detail of specific points and locations, even including images of the current location of the lander and rover of this mission which were left behind. Finally, we are taken to the North Pole to explore an area devoid of sunlight due to the moon's tilt. Bright blues and yellows reveal crater rims and topographical features which would otherwise be invisible to our optical instrumentation due to the permanent absence of light in this

location. Data collected by non-optical measurements is rendered visible only through this use of color.

At first glance, this visualization seems to fit into a "classical" paradigm of digital film production, with live-action images which were first recorded and then supplemented by CGI. However, the use of color here is more complex than that. It is precisely *not* what William Johnson calls "decorative color," in other words, color serving as a "decorative wrapping that adds pleasure to a film" (Johnson 1966, 8). Color, here, does not merely enhance the image; it is not intended—like other classical uses of CGI—to contribute to its photorealism by adding in high-quality visual elements that would otherwise have been difficult to film; and it does not serve as a corrective for a faulty image. In fact, it is quite anti-realist in terms of the visual aesthetic it creates. Instead, it is a means of translating data into a visually accessible form, revealing measures and information that would otherwise be inaccessible, and mapping them such that it becomes clear how each data point relates to the others. What starts as a form of cartography winds up providing a whole new context through which the original moon image used in this film—under its layers of CGI colors—becomes legible. In short, color does not simply add another element to the image, but another means of reading the image entirely.

Cassiopeia A 3D Model: A Star from Inside Out (2009)

Cassiopeia A 3D Model: A Star from Inside Out, produced through a collaboration between teams from NASA, the Chandra X-ray Center, and MIT, was released in 2009 and visualizes data collected between 2000 and 2007.[12] What is immediately obvious in watching this visualization is its complete lack of photorealism. The

glowing object in the foreground is an artist's digital rendering of a rotating supernova remnant—the remains of a star which exploded approximately 330 years ago. As the simulated camera "dollies" backward to show the remnant in its immediate cosmic environment, we see what appear to be multicolored clouds of varying opacity—red, green, yellow, and blue—revolving around this remnant while the simulated camera, in turn, arcs around the cluster, seeming to pass through the clouds. Faint stars dot the black void of space, making up the background of the image as points of reference that render legible the flurry of circular movements that we see. From an aesthetic point of view, these images in no way resemble what we might expect from a visual document of an astronomical object, and instead evoke an aesthetics of spectacular fantasy or science fiction.

This 3D model is a digital animation produced using a combination of commercial (Hollywood) software and a 3D slicing program originally used in medical imaging that was modified for NASA's use by Harvard University (Chandra X-Ray Observatory, n.d.). But despite its fanciful appearance, I want to insist on its realism—not, obviously, a photorealist or naturalistic realism, but a data realism. On the Chandra X-Ray Observatory Center's website, where we find the publication of this visualization, we are invited to compare the digital imagery to other images of what Cassiopeia A might look like to the naked eye—or at least to a telescope viewing it in the visible light spectrum—and what it looks like using other forms of non-optical data. A side-by-side comparison is available using real optical light images created by the Hubble Telescope, the Digitalized Sky Survey, and other sources. These images impress upon us the stark difference in aesthetics and serve to highlight the fact that optical light imagery is precisely not the source

material—or the target goal—of this visualization.

Instead, the 3D model was built by layering data sets recorded *outside of* what human vision can perceive and then *translating* these into faithful visual representations. First, multiple levels of X-ray energy were recorded in three colors: blue is used to represent high energy X-Rays, green corresponds to medium energy X-Rays, and red corresponds to low energy X-Rays. These images were then combined digitally. Kimberly Arcand, the visualization lead for NASA's Chandra X-Ray Observatory, explains this process by showing images of each step of the process in her 2018 talk, "Exploring Hidden and Exotic Worlds: How Astronomical Data Transports Us," and in its accompanying visual materials available online (Arcand 2018). The Chandra website also includes a detailed explainer which offers a key to further color usages and nuances, highlighting how the final product of the visualization uses color to show not only X-Ray data, but also infrared data whose colors correspond to different elements (argon, silicon, iron) present in the Cassiopeia A cloud cluster, as well as synchrotron radiation (Chandra X-Ray Observatory, n.d.). Because the original data lies outside the spectrum of visible light, it is functionally invisible to the human eye and to natural light optical devices. By translating non-optical data into visible light and color, scientists studying these cosmic bodies are able to literally render visible what would otherwise be invisible (Arcand 2018). Since the color attributions do not correspond to the visible light spectrum, they are what some have called "false color," assigned based on choices made by the visualization specialists in order to most clearly convey the desired information and messages of the visualized data.
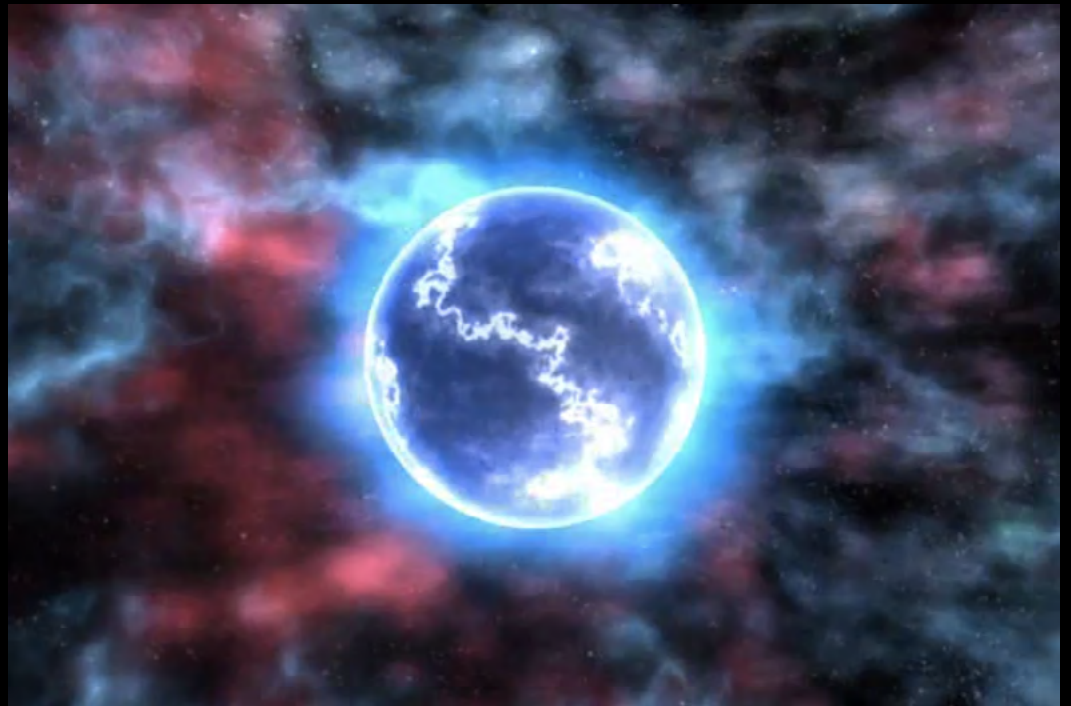
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Fig. 7: Cassiopeia A in *Cassiopeia A 3D Model: A Star from Inside Out* (Visualization: NASA/CXC/D.Berry; Model: NASA/CXC/MIT/T.Delaney et al., 2009)

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However, in a talk entitled "The Art of Science Visualization," Robert Hurt, a visualization specialist for NASA's Spitzer Space Telescope Science Center, explains how terms like "false color" and "colorization" are misnomers in this context:

> False color [is] a term that had a purpose [...] when almost every photo you ever saw was a photo of representing the way light hits the eye. They needed a way of calling out images that have been processed in some other way. [...] But it carries with it a horrible connotation that we are doing something wrong with the imagery and somehow these colors aren't real. Instead I like to divert people to [terms] like representative color [or] translated color [... as] most of the spectrum of light is at wavelengths I can't see. So we want to take those colors that are real at other parts of the spectrum and translate them into the red, green, blue that our eyes can see. [These colors] aren't false. They're only misunderstood. (Hurt 2018)

Here the use of color is translated and representative, a package for conveying data by visual means. This data, translated into color, is compiled, layered, and then digitally rendered in three dimensions in order to allow scientists to render visible what our naked eye would otherwise be unable to perceive. Color here is the visualization of data sets outside of the optical realm.

Perpetual Ocean (2011)

Finally, *Perpetual Ocean* is a 2011 visualization created from data collected between 2005 and 2007 in an ambitious NASA-MIT collaboration.[13] According to NASA, it is "based on a synthesis of a numerical model with observational data [...] in order to obtain realistic descriptions of how ocean circulation evolves over time. These model-data syntheses are among the largest computations of their kind ever undertaken" (NASA 2012). Indeed, one of the primary functions of this visualization was to render intelligible data from several extremely large data sets that would otherwise be unwieldy to work with, even for the scientists compiling them. The Estimating the Circulation and Climate of the Ocean (ECCO) data set parent directory reveals roughly 30 distinct sets of measures and variables that were studied and compiled into massive data arrays; each array appears to contain little more than thousands of strings of numbers off-set by commas, and is entirely opaque to the uninitiated expert. These data sets are made publicly available by MIT, and simply perusing them highlights the complexity, despite whatever precision this data contains, of the vertiginous task of rendering its data intelligible and even useful (ECCO Group 2007). The *Perpetual Ocean* visualization effectively translated millions of individual data points into legible, dynamic computational models of the oceans, winds, currents, and ice around the world, including the interaction of effects of currents like the Gulf Stream, average monthly temperatures, and ocean salinity, among others. According to Earth scientist Ying Fan, through this simulation, "we are able to set the atmosphere and the ocean into such magnificent motions based on a few conservation laws and a set of empirical relations, and by doing so we are able to construct a crystal ball [...] and gaze into the past and the future of this planet" (Fan 2015, 3053). The data is the primary material that constitutes the visualization; with its precise measures and variables dictating how the visualization looks and behaves, it can grant us access to verifiable information about our planet.

Once again, the film is decidedly *not* within the realm of the naturalistic or photorealistic. If the *Cassiopeia A*
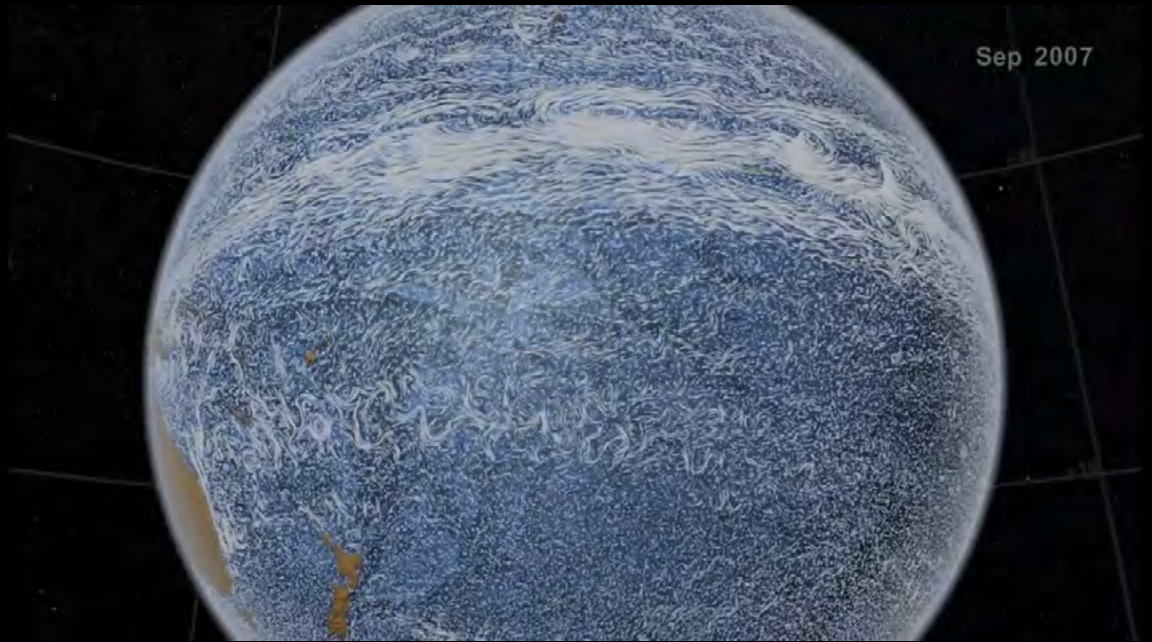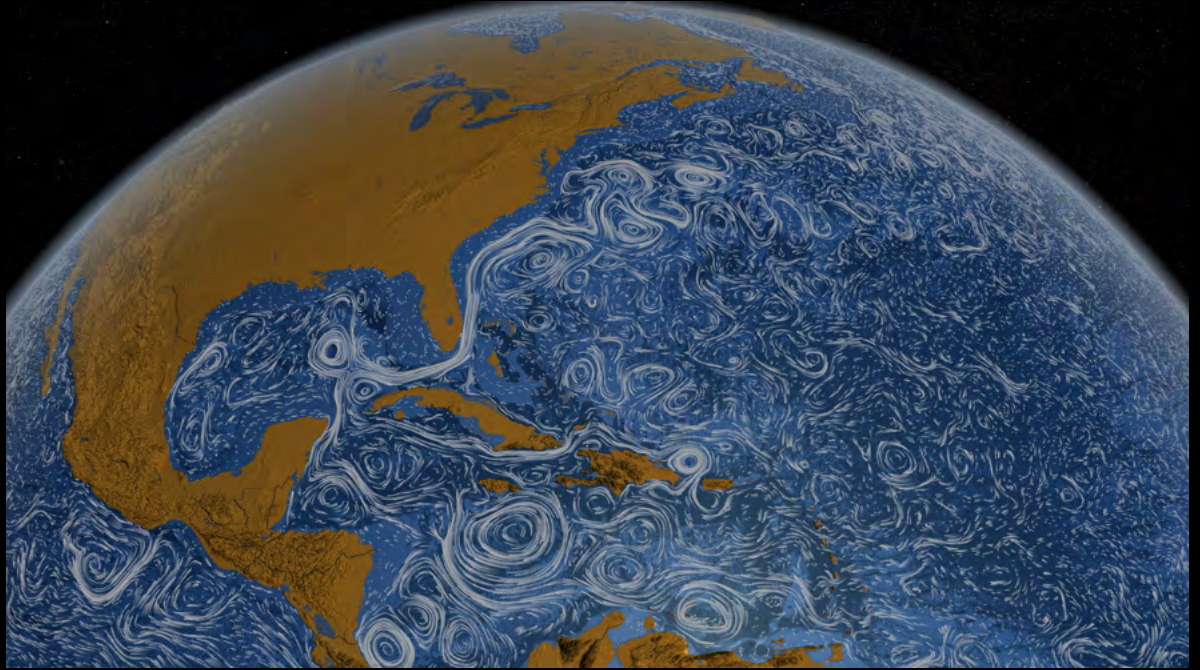
Fig. 8: The Earth in *Perpetual Ocean* (NASA/Goddard Space
Flight Center Scientific Visualization Studio, 2011)

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film was a digital animation, this is even further pared down, more closely resembling Google Earth as if it were rendered by Van Gogh. The Earth appears in close up in the foreground, against a star-speckled black background demarcated by a grid of coordinates. The Earth slowly rotates to reveal the locations of specific areas of activity in the wind and ocean currents, which are visualized by swirling white and grey lines reminiscent of paintbrush strokes. Ocean-related data variables are shown using a spectrum of hues of blue, contrasted with orange-brown landmasses shown with basic topographic detail. As the visualization accelerates and takes us to various locations, swirls and strokes of color come to life, in different shapes, thicknesses, and lengths in accordance with the data points that animate them. *Perpetual Ocean*'s aesthetic palette merges the digital with the painterly, and it is difficult to miss the visual and conceptual resonance with painting. In a 2001 panel entitled "Realism, Expressionism, and Abstraction: Applying Art Techniques to Visualization," Theresa-Marie Rhyne considers the possibilities that such painterly techniques could open up for the processing of data in scientific visualizations:

> Non-photo realistic computer generated techniques explore distortions. Interested in neither reproducing the look of things, like the realist, nor in being specific about emotional reactions, like the expressionist, the abstractionist is interested in the world as a complex of ideas. If interested in trees, the abstractionist would ask what the idea of a tree might be and proceed to visually depict a pattern revealing that idea. Some mathematical relationships and the computer imagery associated with them are abstractions. (Rhyne et al. 2001, 523)

The animators who worked on *Perpetual Ocean* have explained how

color in particular was a key factor in rendering the very complexity of its source data. Not only were the color choices motivated by naturalistic visual cues—blue for water, orange-brown for land, white for currents—but also factors such as tone, hue, and transparency/opacity were applied in order to render details of the numerical data in dynamic graphic form. At times, it goes beyond what is immediately visible to our eye and delves into precise measures that computers and subsequent visualization scientists can then register and re-transcribe, export, and apply in new contexts. In this way, *Perpetual Ocean* is not only a visualization of data, it is also a source of data that can be farmed to other ends later on. For example, data science and visualization specialist Andrew Leahy was able to use *Perpetual Ocean* as source data; by running it through further processing software and the Codelab plugin, he was able to "write routines to measure the saturation of a color and use this to control transparency" in order to create further interactive visualizations that can explore the data results proposed in *Perpetual Ocean* on other platforms like Google Earth (PlanetInAction, n.d.). Once again, color serves as a visual access point to data, providing it not only with an image, but also with a means of apprehending and comprehending its relation to other data sets, and with a narrative to reveal, explain and even predict real-world phenomena.

Data as index in the digital age

NASA data visualizer Robert Simmon has said that "the purpose of data visualization—any data visualization—is to illuminate data. To show patterns and relationships that are otherwise hidden in an impenetrable mass of numbers" (Simmon 2013). The data sets and digital tools used to create these

visualizations bridge the gap between the realities that they represent and the plastic modes of observation that they engage. The potential loss of the primacy of the photographic image, with its indexical relationship to reality, or of the truth claim of realist aesthetics has brought about what is sometimes referred to as a "crisis" of the digital age. I would argue that these visualizations, with their turn toward digital animation and other contemporary techniques of plastic observation, represent a *recommitment* of sorts to the cinematic and to cinema's preoccupation with realism. They reveal the inherently constructionist nature of both science and cinema as they seek out and legitimize "experimental ways of knowing" through acts of observation (Messeri 2016, 12). By deferring their index from an imprint left by profilmic physical reality on the photochemical surface of film stock to the source data that *gives rise* to the images themselves, they contain, perhaps more than ever, the trace of reality at their core. With their animated, simulated, and translated visual elements, these visualizations engage in a sort of fabulation—a telling of the truth and a presentation of reality via the artifice of their vivid and spectacular colors—that has always been part of the project of cinema: presenting us with novel ways to engage with our world (and beyond) through images.

1/   See, for example, J.N. Vasquez, "Seeing Green" (2008), on the topic of how visual technology and aesthetics have affected the experience of war by shifting away from photorealistic images.

2/   This video is no longer available on the ScienceFriday.com website but can be found on YouTube as of the time of the writing of this article: https://www.youtube.com/watch?v=RS99upE-dPs.

3/   This video was posted on December 12, 2014, but is no longer available due to the termination of the user's account. It exists, however, in archived form on the Internet Archive Wayback Machine, with captures made up through 2019: http://web.archive.org/web/20190726173216if_/https://www.youtube.com/watch?v=4p_0bnICtDc.

4/   Richard Misek outlines this complex historiography in the introduction to his 2010 monograph, *Chromatic Cinema: A History of Screen Color*. In particular, he cites Tom Gunning's seminal article on the topic, "Colorful Metaphors: The Attraction of Color in Early Silent Cinema" (1995), which addresses early uses of film color in terms of the dichotomy of spectacle versus function.

5/   See in particular Rosalind Galt's *Pretty: Film and the Decorative Image.* In the introduction to this 2011 monograph, Galt levies an important critique against the reduction of qualities which may be perceived as "surface decoration"—such as prettiness or colorfulness— to mere "seduction" or "shallowness" (2011, 2).

6/   Original quote: "[...] Galilée, qui fut [...] le défenseur d'une coalescence nécessaire entre attitude esthétique et pensée scientifique." My translation.

7/   Original quote: "[...] la tradition galiléenne d'un art spatial pictural, naturaliste, figuratif et pittoresque qui *artialise* les contenus savants pour les rendre intelligibles à notre vue semble même se perpétuer." My translation.

8/   Original quote: "[qui] recourt à la fiction comme 'véhicule cognitif [...]". My translation.

9/   See for example, Richard Misek's *Chromatic Cinema* (2010), and especially his notion of digital color or "color as code" (2010, 12).

10/   See, in particular, Carolyn L. Kane's *Chromatic Algorithms* (2014).

11/   *Tour of the Moon in 4K*, created by David Ladd and Ernie Wright for NASA/Goddard Space Flight Center Scientific Visualization Studio. 2018; Web video. https://svs.gsfc.nasa.gov/4619 [accessed 23 October, 2021]

12/ *Cassiopeia A 3D Model: A Star from the Inside Out*, created by NASA, the Chandra X-Ray Observatory Center, and D. Berry, using a model created by NASA, the Chandra X-Ray Observatory Center, MIT, and T. Delaney et al.. 2009; Web video. https://chandra.harvard.edu/photo/2009/casa2/ [accessed 23 October, 2021]

13/ *Perpetual Ocean*, created by Greg Shirah et al., for NASA/Goddard Space Flight Center Scientific Visualization Studio. 2011; Web video. https://svs.gsfc.nasa.gov/3827 [accessed 23 October, 2021]

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Andrew I. Philip

True Colors: Chromaticity, Realism and Technological Honesty

I propose an application of agential realism to my practice as research, a film about my mother getting one tattoo covered with a new one, to investigate the material-discursive role played by the camera in determining meaning within the film image. I use my practice as a comparative case study, considering how a specific camera apparatus determines and negotiates standards of colour accuracy, and what it means to remove those colour values in post-production. I argue that the different colour processing of the same footage produces perceptible onto-epistemological difference, even while it remains indexically equivalent. Second, I will show exactly how this particular digital photosensitive technology meets the pro-filmic event to record colour, enacting agencies that reduce matter to fit a specifically programmed colour system, prior to any manipulation in post-production. The system itself draws the boundaries of accuracy it claims to achieve, with inevitable ethical implications.

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A.I. Philip is a PhD researcher, practitioner and sessional lecturer at the University of Reading. His research attempts to diffract cinematic realism through agential realism, as developed by Karen Barad. He is currently producing a series of essay films as part of his doctoral research, co-supervised by Professors Lúcia Nagib and Cecília Mello. He has over twenty years' experience working in the private sector in London and New York, producing, editing and animating films.

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"I think black-and-white photographs have more character, more life." My mother made this statement to my sister as I filmed them in the waiting room of a tattoo parlor in Salt Lake City, Utah, in 2010. My mother, Regina, was about to have a new tattoo, her first inked in color, inscribed over an existing one she no longer liked. In an audio interview recorded two years later, unhappy with the new tattoo, she repeated her preference for the monochromatic, equating it to a favorable experience of reality: "one thing I like is black-and-white tattoos. [...] Actually, I like life to be black-and-white" (*We Tattooed Your Mother*, Andrew I. Philip, 2021).

I am making a film based on this shoot and the proceeding interview two years later, as well as footage and audio yet to be recorded. This practice functions as a research testing ground to explore the entangled agencies enacted by the camera in the determination of cinematic realism, and the ethical implications therein. In the film, my mother's comments trigger a shift from color to monochromatic images. On a conventional, literal level, this transition defers to her words by materializing her desire for "life to be in black and in white." But what meaning, if any, is activated by this technical operation? André Bazin suggests that a photographed object is ontologically identical to its referent regardless of being recorded in color or black-and-white (2005, 98). There are various ways to represent the same object, he says: "each representation discards or retains various of the qualities that permit us to recognize the object on the screen" (2005, 27). Does the in-sequence desaturation of a shot in post-production therefore in no way change the material meaning of the recorded object, beyond its recognition as an object? Does the technical accuracy of the recording shift because color values have been subtracted? Can such questions be objectively measured?

By addressing these queries, I aim to sketch out a practical application of Karen Barad's "agential realism" (2007) that investigates the material-discursive role played by the camera in determining meaning within the film image. Barad argues that being and knowing are inseparable: every phenomenon is meaningfully material-discursive by default, making this an inextricably onto-epistemological account of the universe, with corresponding ethical implications. Barad is not a film theorist. However, I propose that engaging with film practice through agential realism generates opportunities to contemplate the meaningful activations enacted by certain technical functions of cinematography. These remain an indivisible, but often seemingly indiscernible aspect of the event on screen. For this article, I will use my practice as a comparative case study to consider how a specific camera apparatus determines and negotiates standards of color accuracy, and what it means to remove those color values in post-production. Using a single still frame adjusted in color grading software, I will compare the shift in computational color values within the contextual techno-cultural color system that produces them. In the first instance, I argue that the different color processing of the same footage produces perceptible onto-epistemological difference, even while it remains indexically equivalent. Second, I will show exactly how this particular digital photosensitive technology meets the pro-filmic event to record color, enacting agencies that reduce matter to fit a specifically programmed color system, prior to any manipulation in post-production. The system itself draws the boundaries of accuracy it claims to achieve, with inevitable ethical implications. While the filmed object might be transcendentally conceived

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to be ontologically identical regardless of the recording apparatus, I contend that in the determinate reality of the technical image it is always already meaningful, as Vilém Flusser has also argued (2011, 41).

I do not wish to minimize the importance of the pro-filmic event by over-determining in favor of the camera, but rather to highlight some of the "technological specificities" (Parikka 2012, 96) that draw material boundaries within the image in ways that are sensed, but that defy language. As Laura Mulvey points out in reference to photography, but equally applicable here: "there is the 'intellectual impossibility' of reducing the photograph to language and a grammatical system of meaning" (2006, 63). Material-discursive practices are difficult to verbalize, and will certainly never be universal for every filmmaker, theorist or spectator. Nonetheless, certain scientific facts can be established within their technical context, highlighting some of the "categories" designed into the camera that program the gestures of the operator (Flusser 1984, 22) to create the conditions for the specific reality generated on screen.

I begin with a brief overview of "agential realism" and my proposed adaptation to film practices. I will outline how color functions as a superlative example of entangled agencies generating meaningful phenomena, and how in technical images, color or black-and-white footage ineluctably entangles the discursive-materiality of the pro-filmic event. I describe my practice as research methodology within a closed loop of production, theory, close analysis and re-production, to generate further connections that can feed back into theoretical considerations. For this case study, I break down the subtractive process of recording color in-camera, followed by the subtraction of color saturation from footage in post-production to outline precisely what recorded data is lost, if any. The motivation here is to consider the specific techno-scientific arrangement of the camera's "rigorous determinism" (Bazin 1958, 15, my translation[1]) that enables the recording of color in this particular pro-filmic scene. I conclude that while footage presented either in color or in black-and-white can evoke varying spectatorial significance, the image is already materially-discursive to begin with, requiring this filmmaker to take responsibility for that particular meaning. I argue that this transition between color and monochrome within a sequence generates a certain technological honesty (as proffered by Coates 2010, 13), a renegotiation of documentary footage that foregrounds the role of the recording apparatus in the determination of cinematic realism. While I see this research as reasonably distinctive from the flourishing field of research around the history of color in cinema, including work by Sarah Street, Kirsty Sinclair Dootson, Joshua Yumibe and Paul Coates, I refer to a selection of these studies throughout.

In living color: Agential realism, intra-actions and the apparatus

Karen Barad argues that the constant, dynamic performativity of the universe and our place within it create a foundational problem for Newtonian notions of objectivity and causality. The tendency to neatly separate the world into any number of Cartesian dualities assumes the possibility of observing the universe from an exterior perspective. Inspired by studies in quantum physics, Barad proposes that all matter is performative: a perpetual, generative *enactment* of change upon other matter (2007, 170). This notion of enactment forms the backbone to Barad's reformulation of agency, expanding it from the classically understood definition of an individual

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human's "capacity to act" (Ahearn 2001, 112). Troubling the anthropocentric, simplistic dualisms of cause-and-effect between subject-object, for Barad agency is less a property that belongs to a pre-given (human) entity, and more of an energetic action in the meeting between different matter through which each entity is enacted. Rather than a fixed capacity some ascribed subject or object inherently *has*, agency is what matter, human and non-human, *does* within each unique dynamic encounter (2007, 178). Barad proposes that how we observe the world from within it, including our instruments of observation, always performs agential change, entangling with other agencies to enact the observed phenomenon. Phenomena emerge from the *intra-action* of matter being observed and the material observing apparatus (as opposed to interaction, which presupposes the existence of distinct entities before this encounter). The specificity of experimental conditions draws the boundaries of particular scientific outcomes, meaning that how we understand the world is mutually articulated by the matter being measured and the measuring matter (2007, 152).

Color demonstrates intra-action in practice. Neither a purely phenomenological experience nor easily defined as a property of nature, color emerges in the meeting of a visual system and reflected, refracted, and diffracted light. The visible spectrum refers to the determination of wavelengths perceptible to human beings, a small range within the established gamut of electromagnetic radiation. In other words, the *visible* aspect of the spectrum implies *visible to humans*, rather than a purely exterior phenomenon. The very determination of light as a wave is complicated by wave-particle duality, a paradox giving rise to the field of quantum physics. Simply put, measured one way, light

behaves as a particle; measured another, it displays wave-like patterns. Classical physics cannot account for this contradiction, as a particle refers to a point of matter in space, whereas a wave is understood as turbulence in a field of matter; a phenomenon cannot be both at the same time. To account for this conundrum, pioneering quantum physicist Niels Bohr proposed that experimental conditions play a *complementary* role in generating particular results, thus rejecting the mechanistic cause-and-effect account of the universe described by classical physics. The visible spectrum, therefore, emerges from specific conditions whereupon one type of matter (light) makes itself intelligible to another (a visual system). Matter intra-acts with other matter to enact what we identify as the visible spectrum, rather than either one pre-determining the other, an "entanglement of matter and meaning" (Barad 2007). Sean Cubitt suggests that: "the division of subject from object, which so deeply characterizes the Western tradition, does not obtain in the case of color. Neither produced by us alone nor an exclusive property of the world, it belongs to the intersection, the *mutual greeting* of human and universe" (2014, 112, my emphasis). It is this mutual greeting, this meeting of the universe halfway, that Barad terms "agential realism."

What then, is the difference between realism and reality? For Barad, reality is enacted through every intra-active phenomenon. It follows that what appears on screen is a specific enactment of reality. Realism, both in cinema and for Barad, is a commitment to the notion that "how reality is understood matters" (2007, 205). However, to define a universal, fixed reality means somehow encompassing all possible and potential intra-actions, an effectively infinite and ever-changing quantity. This does not imply a transcendental or unknowable

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reality, but rather that a universal notion of reality, like color, is rendered indeterminate through its very potential for agential enactments, emerging immanently by and through intra-actions. This account refuses reductive, rigid definitions of the real, attending instead to the inescapable, dynamic complexities involved in the specificity of each material encounter, and crucially removing humans from the center of these encounters. Barad's approach is resolutely political, feminist, and ethical as well as scientifically grounded. Agential realism incorporates the indeterminate, non-human, vigorous multiplicity of the universe, and the insufficiency of any singular grand narrative, anthropocentrically patriarchal or otherwise, to fully encompass the near infinite potential probabilities of material encounters. However, in Barad's own words: "The existence of indeterminacies does not mean that there are no facts, no histories, no bleeding – on the contrary, indeterminacies are constitutive of the very materiality of being, and some of us live with our pain, pleasure, and also political courage…" (2014, 178).

Any absolutist determination is a drawing of specific boundaries that do not necessarily inhere prior to that determination and is "materially haunted by – infused with – that which is constitutively excluded" (2014, 178). The ethics in the onto-epistemological approach proposed by Barad aim to address the exclusions in any knowledge-making practices. And it is here that I find the relevance to my filmic approach, one that attempts to take responsibility for my filmmaking practice materializing the world in particular ways. I aim to entangle the technical "exclusions and effacements" (Lyotard 1986, 353) inherent in the making of films by finding ways to include them, highlighting their agential role in the enactment of reality on screen. By doing this, I am adapting the ethical underpinning of Barad's theories with my reading of André Bazin, expanding both by entangling the agencies of the recording apparatus into a personal agential realist filmmaking approach.

It is worth noting that I do not intend to discredit or critique Bazin; on the contrary, his always carefully considered reasoning seems endlessly adaptable, which is why his theories continue to persist so long after his untimely death. As a filmmaker, I share his enthusiasm for the creative possibilities of cinema's relationship to reality, as well as the responsibility that comes with that relationship, leading me to ponder these technical questions. Bazin's enduring argument is that the use of long takes and deep focus maximize the potential intrusion of dynamically indeterminate reality in the enclosed, determined world of the narrative. Bazin suggests that cinema blurs the line between object and subject. Reality is "multiple and full of ambiguity" (2005, 37). The unity of the world on film is necessarily "refracted" through the aesthetic consciousness of the filmmaker, "a mental landscape at once as objective as a straight photograph and as subjective as pure personal consciousness" (2005, 98). He famously ends his seminal vindication of the objective properties of photography by admitting that "cinema is also a language" (1967, 16). In my view, Bazin suggests in these qualifications an awareness of the anthropocentric discursivity inherently built-in to filmmaking practice—not necessarily in *what* it records, but in *how* it records it. His ambivalence to color in film also nods to this; he claims that painting remains superior to photography in its objectively subjective expression of color (1967, 12). His defense of realism acknowledges this tension, proposing that the only honest approach, always limited by the primacy of the narrative and the artifice of the artform, works

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hard to counteract the manipulative discursivity intrinsic to filmmaking. A filmmaker achieves this by presenting a unified, unfragmented, believable respect for reality, regardless of genre.

I argue that Bazin's suggestion that any photographic camera produces "objectivity in time" (1967, 14) needs some expansion to include the recording instrument within that objectivity. The indexical, an impression or trace of reality (Wollen 1969), can undeniably be registered via various photographic practices. Nonetheless, given enough time to plan, a filmmaker chooses specific equipment to tell a particular story—including how it records color. After Bohr and Barad, the experimental conditions form an indivisible part of the enactment of phenomena. The recording of the dynamism of the pro-filmic event by the camera apparatus performs an "agential cut" in the world, an objective measurement within the parameters of those specific material conditions (2007, 148). As such, any apparatus assembled to observe the world in a particular way must be considered an integral part of how that reality is enacted.

The cine camera does not spring "full blown from the head of Zeus" (Barad 2007, 144), ready to reproduce color as it inherently exists. The historicity and culture of any mechanical or technological apparatus, designed within specific techno-cultural environments, articulates particular performative processes. Each camera assemblage (format, lens, technical configuration, etc.) enacts a different meaning to the indexical, generating a material-discursive reality. In her taxonomy of cinematic realism, Lúcia Nagib categorizes the cinematographic apparatus as a "mode of address" (2020, 28), that is to say, a stylistic, presentational choice that functions with a qualified distinction from the "mode of production." The recording of color would be included in the former category. In the latter, Nagib locates a

"physical engagement" with the pro-filmic event. She qualifies that these modes are "entwined and mutually dependent" (2020, 27), and it is precisely in this entanglement where we find the "agential cut" that, as Barad puts it: "enacts a resolution *within* the phenomenon of the inherent ontological (and semantic) indeterminacy" (2007, 140). A film shot slices through all the potential, virtual possibilities of reality, to entangle into an actualized one. What occurs in the pro-filmic timespace evidently matters enormously; less apparent is how the functions taking place within the filming apparatus co-constitute the meaning of those events. The mutual dependency and entanglement of these two performative cinematic practices are all that is left of the ephemeral event itself, a recording that *resolves the indeterminacy of the real into a determinate, reproducible, material-discursive enactment of reality*. How color is resolved on film depends upon the standards of accuracy defined by each camera rather than simply inhering in the natural world, with consequential determinations of meaning—scientific, aesthetic, cultural, and political—within the shot.

Bleeding colors: Chromatic contexts

When Jacques Rancière describes his work as "indisciplinary," he could be talking about color: "it is not only a matter of going besides the disciplines but of breaking them" (quoted in Baronian & Rosello 2008, 1–2). Color blurs the boundaries of science, technology, philosophy, religion, art criticism, popular culture, critical theory, and creative practice. From Newton to Goethe and many more since and in between, science and philosophy have struggled to define color as either an inherent quality of nature or an embodied perception; color resists being fixed in place. Indeed, Sarah Street claims that in cinema even "the history of color is a living thing as

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we balance evidence of contemporary reactions on first release against our own perceptions" (2012b, 210). The study of color in film has generated fruitful output, as historiographies of color's industrialization weave in the manifold techno-cultural threads of modernism, post-modernism and post-colonialism intertwining through our digital present. Joshua Yumibe, in his study of early cinema color tinting practices, goes so far as to say that "color perception and the issues it raises about sensory experience are central to the history of cinema" (2012, 9). For this article, I take a leaf from Edward Branigan's recent Wittgensteinian "tracking" of color in cinema and art: "In thinking about color today, perhaps one should pause between positive and negative assessments in order to simply untangle *which contextual elements* are being selected to *blend with color* in order to interpret its general nature and function. How is color being colored?" (2018, 106).

The instruments used to record and process color in the images being analyzed make up the contextual elements within this study, as well as the material significance of removing color from technical images. It is worth briefly summarizing the circumstances giving rise to the film and my approach to this practical research. The footage comes from the largely unplanned shoot of my mother in the tattoo parlor. The details pertaining to how we got to that place at that time remains a disputed issue among those who were present. What can be ascertained is that I shot just under 42 minutes of footage. The metadata encoded in the original rushes verify that the first shot was taken roughly two hours before the last. I used the camera I had with me: a Canon EOS 7D Digital SLR and the zoom lens that came as part of the camera kit, a Canon EF-S 18-135mm. My Brazilian mother and I were visiting my sister Libby at

her home in Utah; at some point, my mother told us she disliked the tattoo on her left shoulder and wanted to cover it with a new one, leading to the idea of filming the process. My mother's original tattoo, one of nine at the time, was an unidentifiable winged insect inscribed with the names of her four grandchildren. I filmed as a new tattoo, a blue butterfly, was superimposed while my sister and her daughter watched, footage that remained largely untouched for ten years. Contemplating the pivotal implications of Barad's work for film and screen studies, I decided to use the archived images as my research praxis.

Rather than charting an *a posteriori* rational reconstruction of a body of finished professional work as a source of data, as proposed by Desmond Bell (2001), my practical methodology is processual and remains open to change. By considering theoretical and practical ramifications as well as productive possibilities that might be folded back into the work, the film becomes a ground for experimentation, "an exploration and testing of ideas about the medium, its creative capacities and its mode of public address" (Bell 2001, 4). To produce small, personal films in this way presents a controlled practical opportunity for renegotiating the complexities of the technical cinematographic apparatus and its encounter with the pro-filmic event. Praxis affords experimentation beyond the page, which in turn feeds back into theory. Instead of constructing a generically passive spectator, as has been the burden of apparatus theory in the past, I propose a closed loop: a film made by me, about me (through my mother), and for my own research, although I will also screen it more widely at a later date. By experimenting with modes of address, I create a shifting filmic text I can subsequently closely analyze, with resulting conclusions or questions folded back into the film.

My mother's metaphorical preference for a "life in black-and-white" narratively triggers a transition into monochrome images. By comparing two stills from the footage (Figs. 1 and 2), we can confirm that the indexicality of the footage remains identical, but the noticeable change in the image shifts the mode of address. But what else might this transition signify? There are no definitive answers. David Batchelor's *Chromophobia* (2000) proposes that color has been the subject of disdain for European philosophers and artists at least since Plato, variously dismissed as primitively foreign, seductively feminine, or dangerously queer. Might my mother's preference be due to an inherited Aristotelean aesthetics of line over color, *disegno versus colore* (Batchelor 2000, 53)? This seems the case when it comes to her tattoos. By "black-and-white tattoos," she implies black ink outlines inscribed against "white" skin; hers is incidentally closer to brown although she is officially classed white in Brazil. When she talks about "life in black-and-white," however, what might she mean? My mother is no minimalist: given the choice, she prefers bright red cars, her favorite color. She once dyed a rebellious streak of shocking pink in her short-cropped salt and pepper hair. She may not fit normative conventions of Brazilian femininity, but neither is she an austere modernist who avoids color. Even her beloved football clubs, São Paulo FC and Rio's Fluminense, have tricolor shirts, as opposed to Corinthians, who she reviles, in their black-and-white strip. Her visual life is phenomenologically in color, having never worn glasses in her youth or having been diagnosed with color blindness. Whatever this stated preference for monochrome might involve, it is not a simple Euro-centric cultural rejection of vulgar, feminine or queer color as elaborated by Batchelor. What she might be alluding to is the presumed simplification of life in black-and-white.

Street photographer Joel Meyerowitz defended his shift from black-and-white to color film, against the grain of the 1970s New York art world's chromophobic snobbishness, by suggesting: "all a camera does, it describes what's in front of the camera when you press the button. I thought: If description is what it's all about, black-and-white description is half of what color description is" (quoted in Walker 2013, 2). Perhaps a halving of description, of discourse, of expression, is the appeal of "life in black-and-white." Wim Wenders submits, in his film about a film *The State of Things* (*Der Stand der Dinge*, 1982), that thinking in black-and-white allows you to see "the shape of things," leading fictional cinematographer Joe, played by director Samuel Fuller, to say: "life is in color, but black-and-white is more realistic." While Wenders is making a philosophical, political and aesthetic point about the "usual Hollywood colour tricks" (Nagib, 2020, 51), we might expand upon this to suggest that by appearing different from my mother's everyday vision, black-and-white allows her to see things differently. The "halving" of description makes it simpler to parse the "shape of things." The complexity of every color encounter can be deemed incorrect, manipulative or at odds with our individual phenomenological sense of reality. Making the same arguments about greyscale images, beyond levels of brightness and contrast, might prove more challenging. As Batchelor points out, our perception rapidly adjusts to monochrome images: "it takes no time and no conscious effort to adapt to the greyscale of certain films and many photographs, not to notice the absence of a vast part of our everyday visual experience. It's not just that colour is not there: its being not there is also not there: its absence is not present, not felt or experienced" (2014, 77). Batchelor is speaking of his own experience, but in my view he alludes

Fig. 1: Ungraded footage converted from the in-camera H264 codec into ProRes format for editing.

Fig. 2: Black-and-white footage from the offline rough cut (desaturated using DaVinci Resolve software).

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to how the illusion of movement in film functions to make us accustomed to a recognizable sequence of images after a few seconds, regardless of the quality of the image. However we explain why it happens, film tends make us to forget its own mediation to an extent, or at least allows it to take a back seat to the events recorded within the images themselves. This is not to imply an always passive, inert, universal spectator: it is possible to take stock and remain actively aware, and individual consciousness does not disappear while experiencing a film. Yet surely one of the perennial allures of cinema, however one explains it, is this involution into the animated life generated on screen (and its disruption). Batchelor also highlights an important aspect of black-and-white images: that color does exist within monochrome, albeit rendered into a range of luminous tones—shades of grey. This becomes apparent in the mathematical data when we compare the same image as it was shot, and when it is computationally desaturated, as I will outline shortly.

By desaturating this footage within the film, I aspire to revise the documentary image. In "Kill the Documentary as We Know It" (2002), filmmaker Jill Godmilow proposes that renegotiating documentary footage adds a "second track of meaning" (2002, 9). Godmilow is reaching for an ethical, Brechtian "distance between the way things are and the way they should be" (2002, 10). She calls for "cinema as poetry, as speculative fiction, as critique" (2002, 3) rather than a presentation of documentary footage as a fixed account of the past. The second track, in my case the use of non-sync audio, voice over, and the renegotiation of footage, formulates the subject matter as a series of questions addressed to my mother (and, by extension, the spectator), seeking to highlight the incomplete or

insufficient reality on screen as well as the unreliability of memory, embodied or technical. The agencies enacted by the apparatus come into question: by renegotiating footage, I hope to destabilize programmed categories, to propose alternatives that make meaningful shifts in the materialization of images.

In the case of this particular analysis, using a simple software function to renegotiate the footage generates a useful illustration of the technical shifts between color and monochrome footage and their comparative relationship to the reality of the pro-filmic event. The software, DaVinci Resolve, subtracts color by desaturating all chroma values. A layer of computational code displays the footage in monochrome without inherently changing the original files; the desaturation can be undone at any point. At first glance it appears self-evident that I have manipulated the fidelity of the footage. However, comparing a graphical representation of the same data distances us from the photographic image of pro-filmic events, mathematically displaying precisely what has been changed. The video scopes in Figs. 3 and 4 will be a familiar sight to anyone who has color graded a film. They help a colorist identify and match levels of luminance (brightness), hue (color tint) and saturation (color intensity) between shots, as well as accentuating any imbalances that might be hard to discern by examining the image itself.

Video scopes make it easier to understand the shifts in data consequent to the software removal of chroma from the shot. The "waveform" graph on the top right maps the distribution of luminance values across the image from left to right. Values closer to white, mapped to 940, are plotted towards the top of the graph, with darker values near the bottom towards black, mapped to 16. For example, towards the right of
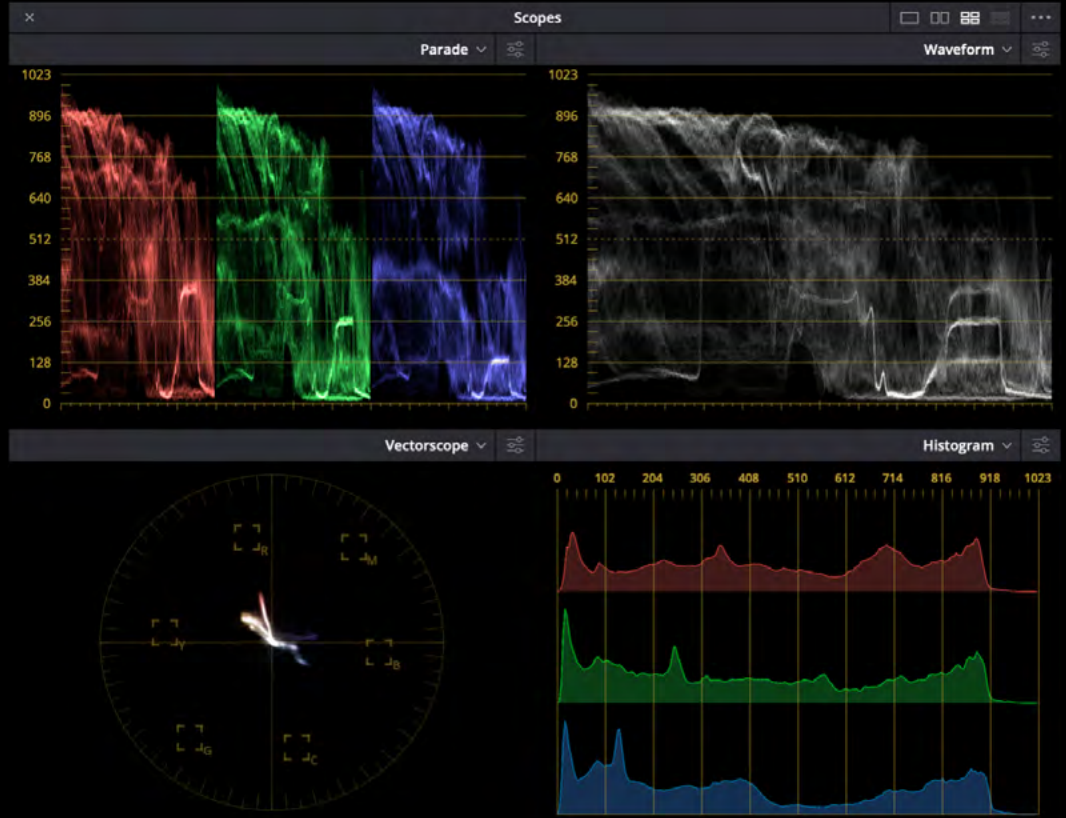
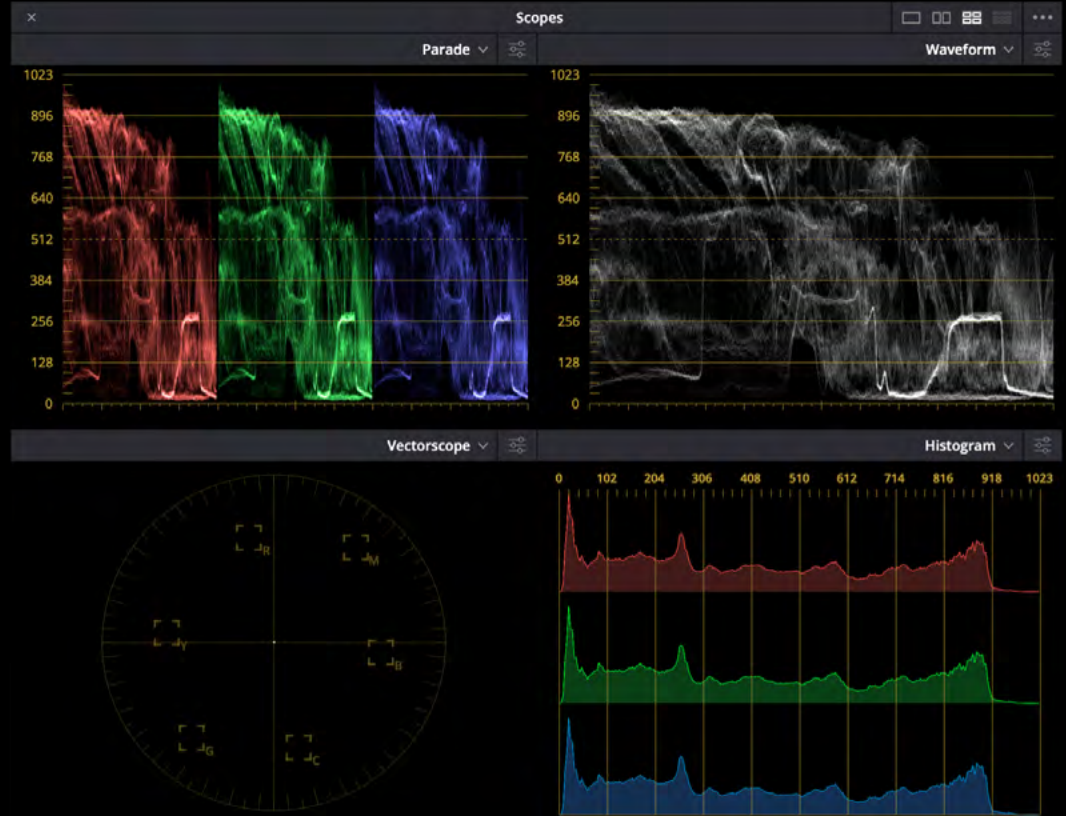Fig. 3: Video scopes interface for the ungraded shot in Fig. 1.

Fig. 4: Video scopes interface for the desaturated shot in Fig. 2.

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the graph, there is a thick collection of points measuring around 256, and this reflects the levels of luminance on my mother's face. The "parade" graph functions identically to the waveform but is divided into a parade of the three color components used in video: red, green and blue. We can see from Fig. 3 that my mother's face reflects more red luminance than blue, with green lying somewhere in between. The parade allows a colorist to quickly determine whether one particular color or another unbalances the highlights or shadows in a shot, for instance. The "vectorscope" displays the range and distribution of hue and saturation in an image with the center representing naught and each color arranged in a radial configuration. In Fig. 3 we can see the range of values veering towards red (the cushion), blue (the blanket and t-shirt print) and a streak of values between red and yellow (my mother's skin tone). Finally, the "histogram" graphs all tonal values in the image arranged horizontally from black (16) to white (940). The second peak from the left references my mother's face, at different heights across the three color histograms according to the relevant distribution of color luminance. Fig. 4 displays data from the same shot with saturation set to zero, and no further edits made. From the waveform and histogram data, we can ascertain that no luminance data is lost, but the spread of luminance across colors contracts to similar values: all red and blue values shift to match the green from the original shot. This also produces a noticeable shift on the waveform: values are less spread out as the red and blue channel now match the green, as can be verified from the parade graphs. Equalizing all chroma values to green removes saturation to produce shades of grey. The green channel in-camera records twice as much data, thus being designated the dominant component. The vectorscope displays the starkest transformation:

all values coalesce around the center of the graph to signal the absence of saturation.

We can infer from these graphs that no luminance data is lost by desaturating footage, even if its graphical spread shifts somewhat. Outside of color, the indexical light record remains objectively the same, in a technical sense, to the original image. I certainly do not mean to equate removing color values in post-production with shooting monochrome at the point of production; they are patently distinct processes. Rather, the point is to show that there has been no subtraction of the light data recorded from the pro-filmic event; the only change is an equalization of all values to green to generate a greyscale image. However, by renegotiating color values from the original recording in this way, is the image a somehow less accurate record of the pro-filmic event? This brings into question what we might mean by color accuracy, and how we can measure it.

Color coding: Transformative standards

To industrialize color is to set about taming its essential mutability. The human visual system is an enormously complex, always changing system, and as such unique to each unique individual at any given moment, a constant becoming rather than a fixed being. The complexity of matter's dynamism enacts not only unique, ephemeral and protean entanglements of light, but also in their intra-action with unique, ephemeral and protean visual systems. Evidently, the ever-shifting complexities of the universe cannot be industrially replicated in the manufacturing of camera apparatuses. The unpredictable dynamism of color must be ordered and standardized in order to be technically re-synthesized. Digital cameras are marketed as

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accurately recording light and color, even beyond what a human might perceive, that can later be "corrected" in post-production. As Sarah Street puts it: "Digital encourages a fascination with seeing better, deeper, sharper, to attain 'perfect' vision and a greater colour range and depth which is manipulated during post-production. The premise is that the technology is delivering a visual experience that exceeds human perception" (2012b, 379).

Ludwig Wittgenstein, in his posthumously published *Remarks on Colour* (1977), provides a fragmentary collage of unanswered questions, thoughts and ruminations on the "language-games" of color. According to Marie McGinn, Wittgenstein suggests that it is only by asking questions of our use of color systems that we can find any patterns and properties regarding the ephemeral phenomenon. Regarding the Newtonian system of organizing color relations into a circle, she says:

> The question of whether this abstract system records the *correct* relations among colour concepts makes no sense; the system itself is what determines the structural relations between the elements of the system. The pattern within the system does not record relations between colours that were already there to be discovered. Rather the system itself constitutes the grammar of these colour concepts. [...] [T]hese patterns orderings and relations, are not only experienced as inevitable, but define what it is to calculate, or to use colour terms, correctly. (1991, 443–44)

We can therefore infer that the accuracy and clarity of color images marketed by digital camera manufacturers speaks only about precision within a particular color system, a programmed category of the apparatus rather than the measurement of an inherent property of the universe. The technology built-in to my digital camera aims to record accurate color, but how can these unrepeatable phenomena, individually experienced in always dynamic situations, be industrially standardized? By reducing and ordering phenomena to a color framework that limits and fixes it in place through a subtractive process of color recording.

There are different methods used to digitally capture and process light and color values. The engineering involved in digital imaging technology rapidly becomes complicated, far beyond the limitations of this article and in excess of the information needed for our purposes. However, I hold that it is key to understand the technical, material framework that creates the conditions for color accuracy. As Jussi Parikka has it: "recognizing the way abstraction works in technical media from voltages and components to the more symbolic levels allows us to track back [...] from the world of meanings and symbols— but also a-signification—to the level of dirty matter" (2012, 97). The material basis for any digital sensor is a gridded array of photosensitive capacitors, pixels, that release electrons when struck by photons, thereby creating a small charge commensurate to the collision's intensity. A series of transistors amplify the signal, converting the electrical current into voltage and eventually binary data (0 representing a small voltage, 1 a larger voltage) recorded onto a removable storage device. Each photodiode is then reset, ready for the next jolt of photons. This complex material and computational entanglement occurs for every frame of footage.

The majority of contemporary digital cameras also record color data from the pro-filmic event in this way. Similar to most color film processes (cf. Street 2012a), digital color photography usually operates in a subtractive manner: filtering out two thirds of the photons to produce a greyscale image range of either red, green or blue values that an

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algorithm subsequently coalesces into a full color image. The EOS 7D sensor is covered by an array of micro lenses that bend light into each pixel, as well as a color filter array (CFA), also known as a Bayer filter,[3] made up of repeating grids of color filters: two green; one red; one blue (Fig. 5). According to the patent application, the doubling of green filters mimics the photoreceptors in the human eye which have greater sensitivity to green light (Bayer 1976). This is why desaturating an image in post-production rearranges the blue and red channels to match the green, as the latter channel contains twice the record of contextual luminance data. Nonetheless, the subtractive element of color filters inevitably results in a sum *loss* of luminance data before the image is recorded, as some photons are obstructed from reaching the photosensor.

The raw data from the pro-filmic events recorded by the digital sensor form a matrix of numerical luminance values, a mosaic of discrete red, green and blue channels reduced from the full spectrum light that struck the pixels (illustrated as images in Figs. 6, 7, 8 and 9). The data is then typically interpreted by a computational algorithm that "de-mosaics" the image by interpolating the missing details: a mathematical *estimation* of absent data based on the averaging of values in surrounding pixels, amalgamating luminance levels from each channel to generate the final image output (Li et al 2008). The EOS 7D does not have the computational capacity to process and store raw image data fast enough and still shoot twenty-four frames per second. The data is therefore compressed into a smaller, manageable file standard as it is recorded, so that any color correction preset within the camera software is irreversibly baked into the final image. More expensive professional digital cine cameras, such as those produced by RED, Arri and Blackmagic, are able

to store large amounts of raw data and metadata that record camera settings within the image file, allowing filmmakers to change programmed color processes after the shoot (Misek 2010). RED offers monochrome sensors that record all luminance levels, but the sensors that record color use the same subtractive method to do so. All color technical images visible to humans, analogue or digital, are already multiply renegotiated from the pro-filmic event, subject to abstract, yet material chemical or electronic processes made inviolable through their scientific base, as Jean-Louis Baudry points out (1986, 287). In the case of color digital sensors of the type used by my camera, the technology breaks apart and reduces light values to put them back together into a system it can store and then decode into an image format. The quality of the indexical color is co-determined by the technology designed into the recording apparatus, which leaves its own material trace upon the index. The complex scientific process that has been greatly simplified here is perceived as accurately reproducing the objective real, concealing the consequential abstraction of matter that enables its functions.

The recording of skin tones on analogue film presents a clear example of the potential exclusions inherent in such techno-cultural standards. Lorna Roth's historical analysis of inherent bias in visual technologies shows how photographic film stock devised for specific use (and users) enact prejudicial boundaries in scope and practice. The "light-skin bias embedded in colour film stock and digital camera design" (2009, 111) rendered darker skin poorly, with techniques of color balancing based on standards to "correctly" expose white flesh tones. By necessity, photographers of color designed their own technical methodology to get around the oversights and biases of

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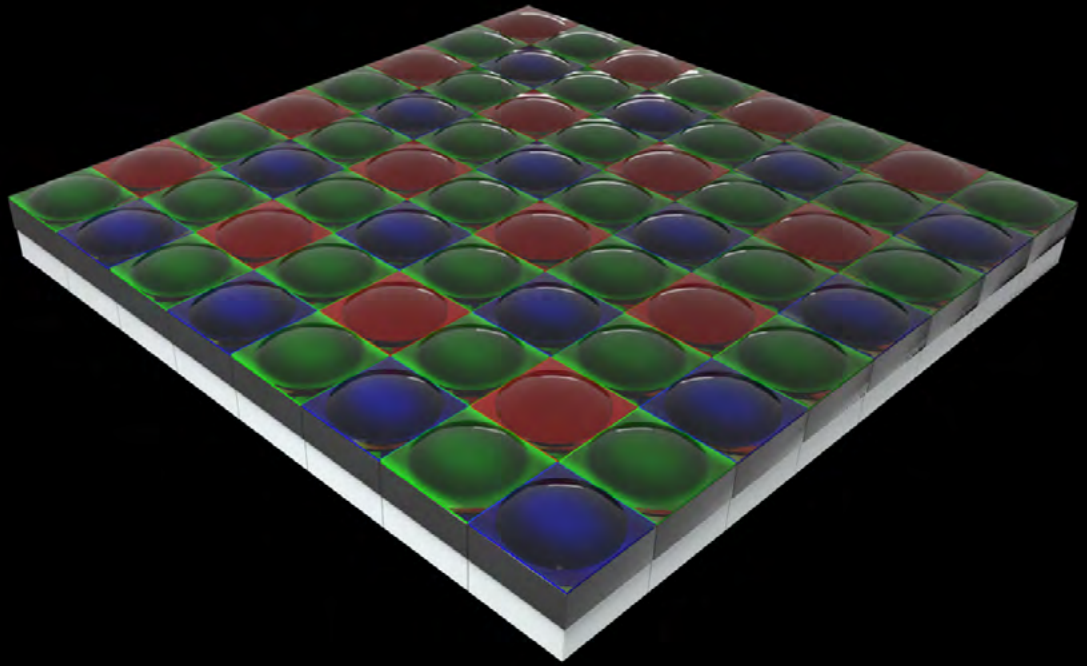
Fig. 5: Author's simplified diagram of a section of lens and Bayer color filter array atop photosensitive pixels.

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Fig. 6: Red Channel.

Fig. 7: Green/luminance channel.

Fig. 8: Blue channel.

Fig. 9: Red, Green & Blue channels combined (author's illustration, color added for reference, not to scale).

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film manufacturers. Euro-centric visual technologies, both analogue and digital (cf. Benjamin 2019), are often designed around standards of whiteness that excludes darker skin from visible recognition. To paraphrase Judith Butler, a normative, culturally performative technical standard produces the conditions for the very accuracy that it names, "enacting its own referent" (2011, 70).

Color values: Concluding remarks

Based on the comparison of numerical values within the pre-established standard parameters of digital cinematography, the monochrome image in question is technically no less accurate than its color counterpart: we lose none of the light record. Computational data allows us to objectively measure any changes in indexical luminance levels to arrive at this conclusion. However, shifting from color to black-and-white evidently enacts a different meaning than not doing so; the footage performs differently, and the unchanged pro-filmic events take on a different significance. Based on existing scholarship, determining this significance is just as slippery as defining color itself. Stanley Cavell, for instance, maintains that color films can generate a world of "the immediate future" (1979, 82), but paradoxically certain black-and-white films might also accomplish this by making monochrome images "function like colors" (1979, 82). Color for Cavell, even in monochrome, is thus enacted by luminous surfaces and contrasts to represent fantasy and futurity. Roland Barthes claims that black-and-white photography produces a certain truth in the purity of its recorded light, and that the "artifice" of color is akin to makeup used to paint the dead (1984, 81). Mulvey refers to an uncanny ghostliness inherent to black-and-white film images, the haunting

between "the camera's time and its address to the future" (2006, 61). For Lara Thompson, the use of black-and-white in contemporary films "can be read as the product of monochrome photo-filmic osmosis," a cultural memory that imagines the past in terms of its technical images as well as the cultural capital of monochrome images associated with artistic modernism (2010). For Flusser, "black/white photographs are the magic of theoretical thinking, and they transform the linearity of theoretical discourse into a surface" (1984, 30). In his account, all technical images are images of the techno-scientific concepts through which they are produced rather than of the scenes they depict. He suggests that monochrome images more closely attest to this conceptual origin by appearing noticeably different to normative human phenomenological vision. However, per Batchelor, the lack of color in monochrome sequences becomes unremarkable after a few seconds of viewing. In a sense, this lack of consensus is pure intra-action: the meaning is only enacted when it meets a particular spectator and is specific to that material encounter.

Nonetheless, my view is that the noticeable *movement* from color to black-and-white effectively reframes the meaningful agencies enacted by the camera within the pro-filmic event. By generating a discernible shift in the material surface of the image through desaturation, the same indexical image takes on a different meaning: it reveals onto-epistemological difference. By undergoing said transformation, the film interrogates the performative generation of reality on screen, aspiring to a technological honesty. To include material movements within a filmic sequence is to

interrogate the boundaries drawn in their recording, to provoke questions about the construction of the image. I seek to take responsibility for the exclusions in the boundaries of my filmic frame and duration by shifting the material-discursivity on screen. Singularly defining what this shift means remains as indeterminate as a universal description of reality; but to interrogate what it means presupposes it is already meaningful matter.

1/ Bazin writes: "[p]our la première fois, entre l'objet initial et sa representation, rien ne s'interpose qu'un autre objet. Pour la première fois, une image du monde extérieur se forme automatiquement sans intervention créatrice de l'homme, selon un déterminisme rigoureux" (1958, 15). Hugh Gray appears to combine these sentences, translating "selon un déterminisme rigoureux" and "objet" from the previous sentence to "the instrumentality of a non-living agent" (1967, 13). Perhaps Gray was attempting to clarify Bazin's logic, although the original phrase cleverly leaves enough scope to question what (or who) construes the camera's rigorous determinism, or indeed what that determinism might mean. The word "agent," particularly in the context of agential realism, is in my view too easily misconstrued, so I opted for a more direct translation here.

2/ Barad's theories have been applied to account for some theoretical entanglements within film and media: see Brown 2018; Kember & Zylinska 2012; Kuc 2016.

3/ The Bayer filter was named after its inventor, Bryce Bayer, an employee of Eastman Kodak.

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The Hybrid Color Film: Multiplicity of Space, Time, and Matter

Hybrid color films of the 1920s such as *The King of Kings* (Cecil B. DeMille, 1927)—that is, films comprising a mix of different historical color processes—are a particularly fruitful resource for the comparison of the silent era's various color technologies. This article analyzes these cinematic hybridizations and argues that this type of film is much more than the sum of its parts. In embodying a multiplicity of layers of space, time, and color on a literal and metaphorical level, hybrid color films are not only symptomatic of the transformation of the medium in the 1920s but also symbolic of current approaches to film historiography based on media archaeology.

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Introduction

The twentieth century witnessed the invention and deployment of hundreds of diverse analog color film processes, each with its own material aesthetic and characteristic color style associated with the technology. The hybrid color films (that is, films that use multiple coloring techniques) of the 1920s are thus not only a valuable resource for comparing the different color technologies of the era of silent film, but also furnish an illustration of how the parameters of filmic space, time, and color interact on a literal and a metaphorical level. The field of film studies has dealt with the subject of color hybridity in differing ways. Among the most significant theoretical contributions are Philippe Dubois's "Hybridations et métissages" (1995), which focuses on the dialectics of chromatic hybridization in early film and classical Hollywood cinema; Richard Misek's (2010) overview of color cinema and (inter alia) hybrid film up to the early 2000s in relation to the changing approaches to the function of color and black and white; and Sarah Street and Joshua Yumibe's *Chromatic Modernity* (2019), which includes an analysis of hybrid color films of the 1920s from an intermedial perspective. Although I, too, discuss the relationship between technology and aesthetics in this article, as well as aspects of intermediality, my primary concern is to theorize the phenomenon of cinematic hybridizations using color film of the 1920s as a case study.

The concept of artistic hybridity is widespread in the field of visual arts, especially in mixed media art. The birth of mixed media itself is typically associated with cubism. In the early twentieth century, artists such as Pablo Picasso and Georges Braque began to integrate "ahistorical" and/or "unartistic" materials (e.g., fabric, paper, found objects) into their artworks, creating assemblages and collages aimed at undermining the classicist-academicist dogma of mimesis in figurative art using "traditional" materials (Wagner [2001] 2013, 33). Mixed media artworks, then, embody two or more (traditionally unique) media and/or materials, and in this sense, are marked by a particular medial/material hybridity. Jerrold Levinson (1984, 6) argues that an art form's status as hybrid—that is, its constitution *as* hybrid or as a type *of* hybridity—can only be recognized in relation to the historical context of its creation and its acknowledgement as a medium or as an artistic material or technique. Levinson, however, only discusses the moving image very briefly: he regards silent film as a hybrid of photography and theater (1984, 7); sound film as a hybrid of sound and film (1984, 5); and abstract color film as a remediation of painting and black-and-white film (1984, 11). Although I would argue that this is an oversimplification of the derivation of the medium, I will return later in the article to his underlying idea that the relationship between hybridizations and technical and material developments (here, the cinematic techniques of sound and color) may seed new (film) art and (film) styles, and, in certain historical contexts, media transformations. If we apply this concept of hybridity in early twentieth-century art to the hybrid color films of the 1920s—which combine different media, not in the primary sense of art forms, but in terms of their manifold film materials and (among other things, intermedial) coloring technologies—the numerous color film processes they deploy become analogous to the range of painting materials and techniques used in crafts and the fine arts (e.g., watercolors, oils, etc.), rendering these films as mixed media art or some type of hybrid art form.

Although determined by this very material hybridity, hybrid color

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films are nevertheless much more than the sum of their material parts; each color film technology carries its own history and artistic agenda or agency. Drawing methodological inspiration from media archeology's historiographical approaches to temporality and cinema (Strauven 2013, 68–73), this article considers color processes as both literal and symbolic layers of filmic space and time shaping the hybrid color film's material history and aesthetics. I argue that a hybrid color film is marked by its multiplicity of space, time, and matter, and by a particular *simultaneity of the non-simultaneous*: an expression applied in recent years in predominantly Marxist theories of modernity and postmodernity (e.g., Jameson 1991) and in the field of historiographic research (e.g., Koselleck 2000). These characteristics present a vivid challenge to the linear model of classical color film historiography. Overall, the hybrid color film's heterogeneous structure creates a chromatic dialectics that could be described by the term *ästhetische Eigenzeiten*, which refers to a complex modeling of and reflection on (film) matter and (filmic) temporality (Gamper and Hühn 2014, 24). This is especially true for the hybrid color films of the 1920s, which are symptomatic of the technical and stylistic transformations of the cinematic medium at the time.

Before diving deeper into this argument, however, we need to take a comparative overview of historical color film processes in order to better conceptualize color film hybridity.

Historical color film processes until the end of the 1920s

As Dubois (1995, 75–79) demonstrates, hybrid color films have existed since the very beginning of cinema. In the period of early cinema, black and white was often combined with various applied color film processes, including the early autonomous film coloring techniques of tinting, toning, and hand and stencil coloring. Tinting was a direct and relatively cheap dyeing technique in which a black-and-white positive was submerged into a dye bath that uniformly stained the films' gelatin but left the black silver image intact (Read 2009, 13). Toning, meanwhile, comprised a complex chemical reaction in which the metallic silver was eventually replaced by a colored compound, either a pigment or a dye (2009, 14–15). This technique added color to the developed silver parts of the film image while the silver-free areas (the whites) remained transparent. Hand and stencil coloring, on the other hand, relied on the application of dyes to the surface of a black-and-white film emulsion. Hand coloring involved delicate work, frame by frame, using very fine brushes and magnifying glasses (Yumibe 2012, 41–48), while semi-automatic stenciling required pantographs, several separate stencils for each color, and brush rollers (2012, 85–90). Both systems were extremely time-consuming and costly, even though stenciling eventually became more or less mechanized. Aesthetically, they were generally marked by the use of selective colors on black-and-white film, although both processes could also be used to comprehensively color the film image. A typical hybrid film of the time is the fantasy film *Excursion to the Moon* (*Excursion dans la lune*, Segundo de Chomón, 1908), which comprises tinted, toned, and stencil-colored segments.

As a result of the transition from short to feature-length films during the early 1910s, and the respective changes in film narration, color schemes that were dependent on color processes became more diverse (Mazzanti 2009, 69). By mid-decade, a new (applied) color film technology

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called Handschiegl had expanded the existing technical spectrum of color film. This was based on a reversed manual stencil technique combined with the principles of dye imbibition (Cherchi Usai 1995, 101–03). Although it shared some visual similarities with stenciling, Handschiegl, in principle, was a three-color "graphic arts process" (Read 2009, 16) that was able to overlay three layers of color. An example of a hybrid color film of the 1910s is the historical drama *Joan the Woman* (Cecil B. DeMille, 1916), which contains black-and-white, tinted, toned, and Handschiegl elements, depending on the version.

But applied colors were, of course, not the only color technologies available. Mimetic colors, in contrast to applied colors, relied on the automatic registration of color on panchromatic negative film, which was sensitive to all the color wavelengths of the visible light spectrum. For this reason, mimetic color film processes, at least in theory, were assumed to depict the colors of the profilmic setup "mimetically" or "accurately." These so-called "natural colors" were achieved by two different means: additive and subtractive color synthesis (Ryan 1977, 12–15). These technologies had already been invented by around 1900, reaching their first peak with the additive system Kinemacolor at the end of the first decade of the twentieth century (McKernan 2013, 76–86), to be followed by many more in the next decade (Cherchi Usai 2000, 33–37). Yet, mimetic colors were not widely used in the film industry of the time because, unlike applied colors, they were more expensive and geographically restricted by patents.

In fact, the breakthrough of these two-, three-, or even four-color mimetic systems came in the 1920s, when many of them were invented and/or implemented in the Western film market. Technicolor no. III, for

example, was a subtractive two-color technology from the late 1920s based on a dye-transfer process involving the successive transfer of two complementary colored dye layers (typically orange-red and green-blue) onto a single-coated blank film, with the aid of two relief matrices and direct contact pressure (Layton and Pierce 2015, 142–45). The final (rendered) color image was a consequence of the actual mixing of the chosen primary colors using this colorization technique. I discuss several of these 1920s color films below.

A conceptualization of material hybridity

Following this technical description of historical color film processes, we now need to seek a more refined conceptual definition of the (material) hybridity of such films. For instance, while a tinted film is strictly speaking a combination of black-and-white film and a dye, it is not usually regarded as a hybrid since the practice of dyeing is an inherent characteristic of the dyeing process itself. If, however, a black-and-white film encompasses tinted intertitles—a common phenomenon in silent cinema—we could, theoretically, speak of a hybrid film, although not necessarily of a hybrid color film (provided that black-and-white is not considered a color). The terminological distinction is necessary since the term *hybrid film* is also used for the part-talkies, interspersing silent with audible sequences, that emerged during the 1920s (Crafton 1999). Meanwhile, in Germany, the term *Mischfilm* is more common, but this typically denotes the combination of animation and live action (Forster 2013). To complicate matters further, Dubois calls films with double effects—that is, the simultaneous combination of hand or stencil coloring with black-and-white film— "hybridations" (1995, 77), whereas he

uses the term "métissages" (1995, 76) for the successive mixing of coloring systems. He thus differentiates between hybrid *effects* at the level of the individual film image and the hybrid *art form* of the whole film. For all these reasons, I would suggest that a hybrid color film can only be acknowledged as such if the film contains at least two or more color processes.

The typology proposed by Levinson (1984, 8) for the different types of hybrid art forms—"juxtaposition," "synthesis," and "transformation"—is equally useful for the realm of color film as it needs only minor adjustments. For example, juxtaposed color film hybrids would then denote the additional, successive combination of at least two clearly distinguishable color processes "presented as one larger, more complex unit" (1984, 8). Synthesizing color film hybrids (1984, 9–10) would then refer to the simultaneous fusion of two or more color processes, such as the mixing of tinting with stencil, in such a way that the separate elements synthesize with each other and, to some extent, lose their original characteristics. By contrast, a mimetic color film, which entails, for instance, a form of double toning, cannot be conceived of as a hybrid color film in the primary sense since (as mentioned earlier) the colorization strand is an intrinsic part of the conceptual creative process, similar to the way that traditional oil painting relies on a preparatory underpainting. The third kind of hybrid art form mentioned by Levinson, the transformational hybrid (1984, 10–11), which refers to the metamorphosis of one medium into another, needs the most alteration if it is to apply to the field of color film. Nevertheless, the term could possibly be applied to material, aesthetic, and even epistemological alterations caused by a film's provenance and preservation. Film provenance denotes the journey of a film's material essence across

space and time, and its transformation by archival practices that use certain preservation methods, such as the duplication of historical film onto another (modern) film stock, or digital restorations and reconstructions (Fossati 2009, 73–76), illustrating the film's mutability as a "multiple object" (Cherchi Usai 2000, 160). These archival interventions transform the analog color film aesthetics into something similar yet different. In this procedure, the essential features of the color process(es) are "challenged, modified, or withdrawn" (Levinson 1984, 10).

Drawing on this theory of hybridity, the expression *hybrid color film* in this article refers to the combination of a range of historical coloring techniques or technologies used simultaneously (juxtaposition) and/or successively (synthesis) within a single film. Thus, the recognition of a hybrid color film *as* a hybrid requires an identification of the color processes and depends, in its aesthetic considerations, on the version of the film, since different prints of the same film can vary greatly for economic or geographic reasons, and/or reasons of provenance. A critical awareness of the film source (that is, whether it is DVD, Blu-ray, etc.) is especially important when it comes to the period of early color film, as it can lead to substantial differences in terms of length, color scheme, restoration, or reconstruction (Lameris 2017, 120–23). For this reason, we must pay special attention to the hybrid color film's material sources, particularly in relation to the category of the transformational hybrid.

The context of film production in the 1920s

Now that we have a terminological toolbox for the (material) conceptualization of hybrid color films, it is time to establish the context of film production in the 1920s, and its

significance for the aesthetics of its thriving hybrid art forms.

As a consequence of the many experimentations with film color, the aesthetic development of the hybrid color film reached its first peak during the 1920s (Street and Yumibe 2019, 205). This is the period in which a variety of epistemologically different color processes were systematically juxtaposed or fused, generating the feature-length format that is the focus of this article. The increased experiments with hybridity and film color can be explained by the Hollywood film industry's contemporary technological, aesthetic, and cultural production context. Alongside the emergence of new color film processes, panchromatic film stock, although invented before, was implemented across the board in the mid-to-late 1920s (Thompson 1985, 281–85), and film color palettes were significantly extended with the introduction of new, subtle pastel shades. Just as color became a modern paradigm in the visual arts, so it also infiltrated every aspect of everyday life through the influx of colorful consumer goods, reaching a peak in the 1920s (Blaszczyk 2012). The culture of the 1920s, as Street and Yumibe (2019, 205) argue, was marked by a "chromatic hybridity"—"a mixing of color styles and techniques"—that had a strong impact on the intermedial aesthetics of hybrid color films.

However, in the late 1920s and the early 1930s, color film was subject to an existential "crisis" and a period of techno-aesthetic "transition." A number of key problems influenced the visual heterogeneity of these films: the gradual (but far from complete) transition from applied to mimetic colors and their lack of compatibility with prior film technologies; mimetic color's excessive costs and partially unconvincing aesthetic results; the general uncertainty of color

cinema in contrast to its black-and-white rival; the race between the various photographic systems for their widespread adoption and eventual standardization within the film industry; and the continuing conversion to sound film (Bordwell 1985b, 298–304), which forced color film technologies to adjust. In fact, the high cost of color—whether stencil, Handschiegl, or mimetic color— prolonged the existence of the hybrid color film (Street and Yumibe 2019, 223) and was another pragmatic reason why the elaborate color schemes of the 1920s occurred in the first place. At the same time, ideological and moral debates about supposedly vulgar mimetic color films versus the artistry of black-and-white film in film-practice and media discourses, and general psychological reservations about photographic color (Coates 2010, 45–54), probably impacted the production of color films further. These combined developments made the 1920s an era of technological and aesthetic experimentation in the color motion-picture industry in general and an important period of change for the film medium in particular. The hybrid color films produced in the 1920s can be understood as a symptom of these techno-aesthetic transformations and negotiations: they were both an unconscious expression of this transitional crisis in the film industry and a conscious product of the impulse for visual storytelling in a diverse chromatic culture.

Form and style in 1920s hybrid color films

The form and style of the hybrid color films of the 1920s depended not only on the type and amount of color processes but also on their genre and geographical origin. French hybrid color films, for instance, typically included a great variety of fusions of tinting and toning, juxtaposed with black and

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white and sometimes stencil color, as seen in some versions of *The Wheel* (*La Roue*, Abel Gance, 1923). From 1905 up to the 1920s, the French company Pathé was one of the most established institutions in the world, renowned for the artistry of its stenciling (O'Brien 2012, 300–06), which to some degree explains the presence of the coloring process in the French film. On the other hand, American hybrid color films, until about the mid-1920s, tended to employ a mixture of tinting and/or toning alongside black and white, and occasionally Handschiegl, as seen in *The Affairs of Anatol* (Cecil B. DeMille, 1921), *Salomé* (Charles Bryant, 1922), and *Greed* (Erich von Stroheim, 1924). Films from later in the decade, however, often embodied a subtractive color process alongside or instead of Handschiegl; for example, *Venus of the South Seas* (James R. Sullivan, 1924) with Prizma II, *Ben-Hur. A Tale of Christ* (Fred Niblo, 1926) with Technicolor no. II, and Hell's Angels (Howard Hughes, 1930) with Handschiegl and Multicolor or Technicolor no. III. The combination of applied and subtractive color was practical because, in contrast to most additive systems, there was no need for additional adjustments during projection. Moreover, this arrangement can also be explained by the fact that Handschiegl, Prizma II, Multicolor, and Technicolor all originated in the US itself. One such American hybrid color film from the late 1920s is the biblical epic, *The King of Kings* (Cecil B. DeMille, 1927).

Case study: *The King of Kings*

This hybrid color film narrates the story of the Miracles and Passion of Christ, taking the spectator through a journey in time to a distant past in Palestine around AD 30, when the Jews were under the subjugation of Rome. After performing several miracles—including the casting out of seven deadly sins from

Mary Magdalene, portrayed as an extravagant courtesan—Jesus and his apostles enter Jerusalem, where he is proclaimed King of the Jews by the people. But Jesus renounces all claims to the earthly throne. He is later betrayed by Judas in the Garden of Gethsemane, and soon after captured by Roman soldiers and sentenced to death by crucifixion. After his death, he is taken down from the cross and buried, only to rise from the dead three days later and proclaim his religiously motivated message to the world.

According to the film-restoration booklet from the 2017 reconstruction by Lobster Films (2017, 17–20), there were three versions circulating in the 1920s: a 1927 silent, long, prestige premiere version, embellished by a variety of color processes; a 1928 censored version; and a well-known short version from the same year, with a photophone music score and sound effects. The following analysis refers to the reconstructed premiere version of *The King of Kings*, which I will use to illustrate my argument that hybrid color films contain a multiplicity of space, time, and matter, and that their form and style demonstrate the concept of the simultaneity of the non-simultaneous. To this end, I will address questions of film matter—or film material—in relation to (filmic color) space, and (historiographical) time successively.

Matter

In terms of film matter, the reconstructed premiere version contains four color processes in total (or "simultaneously"), besides the black-and-white intermission title. These are the applied coloring technologies of tinting, toning, in synthesis with hand coloring, and the juxtaposed subtractive two-color system, Technicolor no. III. In fact, this was the first time the mimetic process

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had been used on a large scale for a feature color film (Layton and Pierce 2015, 183–84). Since this article relies on the assumption that each color film process has its own material aesthetic, the type and placement of these color elements in a hybrid color film play a decisive role in its aesthetics. Mixing several color film elements creates peculiar aesthetic effects that are reminiscent of modern mixed media art. By deliberately forming the previously individual color elements into a new and more complex unity, *The King of Kings* not only enchants the viewer with a relatively flamboyant color scheme, but is also— as Levinson (1984, 11), referring to hybrid art forms, remarks—a symbol "of *creativity itself*." This makes all the more sense if we recall the transitional film production context of the 1920s with its dynamic experiments with film color. A similar phenomenon of artisanal material mixture, which is more readily associated with creativity but with a different effect, meaning, and/or context, can be traced in the experimental cinema of the first and second wave of avant-garde filmmaking, which operated with diverse materials and cinematic techniques. It can also be seen in the archival film mashups of found-footage films, which use montage to organize film matter anew in space and time, and in the various hybrid films of another period of "momentous media change" (Elsaesser 2012, 587): the transition from analog to digital technology in the 2000s, which mixed epistemologically different materials or technologies (e.g., video, film) to create new, expressive film styles (Flückiger 2012, 87). Whereas this certainly also leads us to the question of whether a wider relationship between mixed media art forms and certain periods of transition or transformation can be established, the particular material combination in *The King of Kings*, and,

as we are about to see, the interactions of these materials, are surely one of the main characteristics and attractions of the film type.

Space

As in many other hybrid films of the time, the choice and placement of a color process is often motivated by narrative and the respective construction of cinematic spaces over the film's viewing time. For instance, expensive and/or new color processes are reserved almost exclusively for a few visually spectacular sequences (Street and Yumibe 2019, 205–06). This principle is also applied in *The King of Kings*, and in such a way that the "spectacular" Technicolor no. III is used for the introduction of Mary Magdalene (Jacqueline Logan) as a femme fatale in the scene of the opulent feast at the beginning of the film, as well as for the Resurrection sequence at the film's climax, which takes place in an idyllic spring environment (Fig. 1).

A similar strategic placement concerns the double effect of a blue tone fused with delicate orange hand coloring in the Kiss of Judas sequence played out in the Garden of Gethsemane. This occurs in the middle of the film (Fig. 2), immediately after the intermission, and marks the beginning of the film's second part. The sequence is also an example of how a coloring technique can be motivated by a film's visual motifs—here, by the diegetic, glowing torches (hand coloring) and the moonlight effects (blue toning).

The cheapest color process of all, tinting, is used as the film's standard means of coloration and, as such, portrays many different cinematic spaces over the course of the film. Consequently, the hybrid color film is not only an expression of its technological-historical era and geographical origins, but its aesthetics also reflect the semantic hierarchy and

Fig. 1: Technicolor no. III at the
beginning (top) and towards
the end (bottom) of *The King of
Kings* (Cecil B. DeMille, 1927)
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Fig. 2: Hand coloring fused
with blue toning in the middle
of *The King of Kings* (Cecil B.
DeMille, 1927) © 2017 Lobster
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Fig. 3: Beige and yellow tinting in *The King of Kings*
(Cecil B. DeMille, 1927) © 2017 Lobster Films

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economic valuation of its respective color segments. Even within the realms of tinting, an internal logic becomes evident: whereas the everyday sequences are typically colored in beige, a yellow hue was chosen for the Crucifixion sequence (Fig. 3).

The film's stable color attributions—beige for the everyday, blue/white for the moonlit night, orange for the torches, yellow for Christ's agony, and two-color for the spectacle—demonstrates intra-textual, structural color arrangements rather than the application of "color codes," a popular but problematic concept frequently assigned to silent cinema (Ledig and Ullmann 1988, 105–10). Color codes, in this sense, are too reductionist a concept to describe the nuanced cinematic language of *The King of Kings*, which creates an overarching aesthetic film "text" based on an immanent logic in its choice of color processes, its construction of (simultaneous or non-simultaneous) cinematic spaces, and the way it deals with film time (or narration). In fact, because of these complex interdependences, it may be preferable to refer to the color process in the film as a changing *color space* or even a cinematic chronotope. Thus, *The King of Kings* not only experimented with color matter but also put a new kind of visual storytelling for feature films to the test.

Aesthetically speaking, however, the particular arrangement of these color spaces—how they unfold over the course of the film—not only fundamentally influences the color scheme and overall style of the film but also generates a variety of dazzling color contrasts. These are, for instance, contrasts in the hue and extension of the different color processes, contrasts in quality in relation to two-color Technicolor, and many cold-warm and complementary contrasts in the relationships within the images, as in the Kiss of Judas

sequence. Fig. 4 demonstrates some of these characteristics visually by displaying the color luminance over the course of *The King of Kings*. The VIAN visualization (Flueckiger and Halter 2020) presents the film's color scheme at a glance, allowing us to instantly detect chromatic transformations and material interactions, and also draws special attention to the light-dark differences between the individual color processes.

The individual color spaces can, of course, also merge into each other as a phenomenological experience or (conversely) interrupt the film's color consistency and disturb the spectator's immersion in the filmic world. The question is: What happens in hybrid color films aesthetically, phenomenologically, and epistemologically during the transition from monochrome tinting to the mimetic two-color technology or the synchronous mixture of two different coloring techniques? Significantly, all the shifts from one color process to another—from the opening to the ending of a sequence in a particular color system—are exclusively fade-outs or fade-ins. The "smooth" cinematic technique eliminates the moment of visual shock that might otherwise occur if the transition were too abrupt. There is also a distinct pleasure in seeing the same characters first in monochrome and then in two-color. For instance, comparing a shot of Mary of Bethany (Josephine Norman) in a beige tint with the shot of her in the Technicolor no. III Resurrection sequence is a visually spectacular experience; there is suddenly an excess of color, reminiscent of an oil-painting, that creates an unparalleled Pygmalion effect. *The King of Kings*, therefore, not only embodies manifold color matter and filmic spaces, but also negotiates potentially diverse modes of seeing and diverse discourses on the subject of color itself.
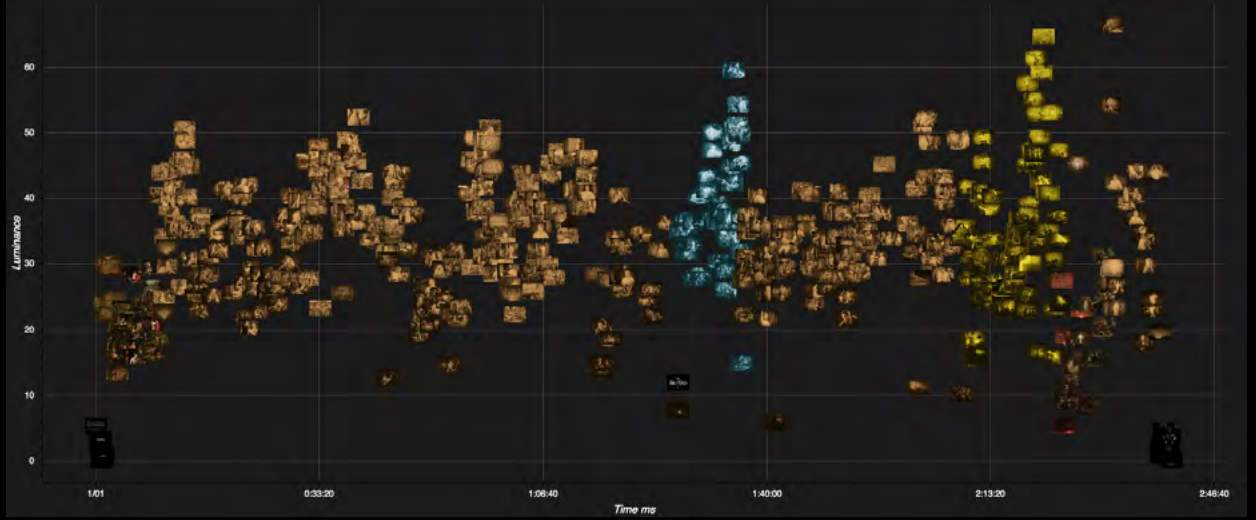
Fig. 4: VIAN color scheme visualization of luminance (y-axis) over time (x-axis) of *The King of Kings* (Cecil B. DeMille, 1927) © 2017 Lobster Films

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Time

Finally, the categories of matter and space must be contextualized by the category of time. The parameter of filmic time is usually associated with narration and temporal organization using cinematic techniques (montage, ellipsis, etc.); however, the focus here is on analyzing the hybrid color film's inscribed temporalities from a historiographical perspective. While the film industry first introduced black-and-white, hand-coloring, tinting, and toning practices in the late 1890s and early 1900s, Technicolor No. III was not patented (let alone adopted) until 1926 (Ball and Comstock 1926). The unusual quality of *The King of Kings* lies in its combination of three "historical" coloring (as well as black-and-white) methods with a "contemporary," recently evolved color film technology, thus mixing the signatures of different film periods. The combination of these various processes from different eras can be described by the term simultaneity of the non-simultaneous, an expression of the modern paradigm of the "coexistence of realities from radically different moments of history" (Jameson 1991, 307).

However, this notion also gives the impression that film styles and techniques are historically fixed and can only be assigned to a specific era. This, of course, is not the case: for example, the tinting of the late 1920s was stylistically different from that of the early 1900s. Yet, like black-and-white film, there is a certain continuity in terms of the characteristic "look" of a color process (whether analog or based on digital emulations) that at a particular point in time may signal "pastness" or, as in *The King of Kings*, a myriad of historical film epochs, creating breathtaking chromatic connections through space and time. The question is, then, from where and under what conditions does this impression of the simultaneity of the non-simultaneous arise? To avoid the danger of technological determinism, we must consider not only the patenting and initial implementation of color processes by the film industry but also their proto-cinematic practices (their diverse pasts), their existing discourse (their present), and their persistence throughout cinema history (their potential futures).

In this respect, many of the applied color processes mentioned above were derived from long-established traditions in the fields of photography or the applied arts and date back far earlier than their adoption by the film industry (Gunning 2015, 17). Moreover, tinted and toned films, alongside black-and-white films, were the visual "norm" and "good practice" for (color) films of the 1920s. This means that each process endured for over twenty years within the film industry. An even more extreme case is the craft of hand coloring, executed in *The King of Kings* by the film colorist Gustav Brock. Theoretically, this technique could have been replaced by stenciling in 1905 or by Handschiegl in 1916 but was not in practice. Moreover, many of the "new" mimetic color film processes of the 1920s still used "old" film coloring techniques: for instance, Handschiegl had already implemented the basic principle of dye transfer used by Technicolor no. III. In fact, Handschiegl itself was inherited from the Sanger Shepherd process (1900) used in still photography and utilized for the colorization of magic-lantern slides (Pénichon 2013, 128–29). What was perceived as "contemporary" or "new" was very often based on the prehistories of these color processes (Street and Yumibe 2013, 149).

Hence, the notion of the simultaneity of the non-simultaneous is also a question of discourse; that is, how we or the historical spectators perceive or relate to the material of the past (or present). In this sense, it

could be a retrospective construction of "non-simultaneity" if historical processes such as hand coloring were used or, as in the case of tinting, newly adapted for the technology of sound by means of pre-tinted film stocks (Read 2009, 21–24). On the one hand, Brock (1930, 62) was defending his art of hand coloring as late as the 1930s, the hybrid color film's "present time"; on the other hand, contemporary critiques of *The King of Kings* tended to ignore the tinted or hand-colored version and typically highlighted the Technicolor sequences as signs of major technological progress. For instance, in an edition of *The Film Spectator* published on June 11, 1927, a film critic expressed the wish that the whole film had been shot in natural color, claiming that this would have made it "a creation of such exquisite beauty that it would have been its own apology for its lack of entertainment" (Anonymous 1927, 6). The critic not only dismisses the then-popular argument of an apparent "eye strain" (e.g., Henry 1926), but also grants color film technology a spectacular visual quality in its own right. Together with the general lack of any reaction to applied colors at the time, this implies either that the "new" coloring techniques were the only ones considered worth mentioning or that tinting or toning were not regarded as actual color but as mere filmic realism (Street and Yumibe 2019, 206). Thus, the impression of the temporal notion of the simultaneity of the non-simultaneous when applied to the hybrid color film is a relational one whose significance or meaning differs according to the viewer, whether it be the historical film craftsman or film critic, or even the modern spectator, for whom all analog color processes are ancient.

In terms of the possible futures of these color processes, the mimetic technology takes on a special position in retrospect, in that, to put it provocatively, it anticipated the same (albeit, two-colored) dye-transfer printing principle as the subtractive three-color process, Technicolor no. IV, which later became the standardized color film technology of the Hollywood studio system (Bordwell 1985a). In this sense, hybrid color films of the 1920s may even represent a prologue to the potential future of the practices of a certain film production system.

This is not to say, however, that I follow a teleological approach in this article; on the contrary. Many color processes besides the later standardized Technicolor no. IV had already existed in cinema simultaneously or asynchronously across the globe for a long time. Tinting, toning, and stencil, for example, could be considered—in terms of cost, technological stability, and aesthetic quality—"standardized" color film practices of the silent era (Rakin 2021, 131–36). Toning was even used until at least the 1960s in the genre of the western (L'Abbate 2013, 143), whereas traditional hand coloring is still deployed or resurrected today in avant-garde cinema (Catanese and Parikka 2018, 53–57). Moreover, during the 1940s, the chromogenic three-color monopack Agfacolor was the main color process in Germany (Beutler 2020, 202), while in the US the subtractive two-color dye-toning process Cinecolor was one of Technicolor no. IV's main competitors until the 1950s and was regarded as a much cheaper and more practicable solution (Belton 2000, 346). As John Belton (2000, 344–45) comments: "Each [color system's] technology exists within a different set of technological, economic-industrial, and socio-cultural determinants and constraints. And, as a result, the history of each technology takes a different shape."

The expression of the simultaneity of the non-simultaneous thus becomes especially useful in bypassing

teleological approaches to color cinema. This is particularly the case with technological determinism and the idea of the signatures of film epochs, in which color film standardization is only (and unfavorably) linked to periodization or to a linear timeline of consecutive color film styles and "maturing" technologies. Yet, as Thomas Elsaesser (2012, 597) puts it, there is no single history of (color) cinema; rather, there are many histories. In this sense, each color process embedded in a hybrid color film of the 1920s has the potential to shape the possible futures of color cinema, which in turn lay the basis for future hybrid color films. Thus, even though the film type (or mixed media art generally) is not necessarily synonymous with media and style transformation, it can certainly encourage the process and lead to fundamental changes. In proclaiming both a literal and metaphorical simultaneity of the non-simultaneous—combining the (diverse) pasts, (potential) present, and (possible) futures of color cinema in one film—this film type becomes rather a symptom of media change and a symbol of contemporary media archaeological approaches to film historiography (Strauven 2013, 68). *The King of Kings*, however, carries yet another layer of space, time, and matter: namely, its odyssey through space and time as a material artifact or as its digital reconstruction.

The journey of film matter through space and time

When we move to the last layer of space, time, and matter in *The King of Kings*, the concept of the transformational hybrid formulated at the outset of this case study comes into play. As such, the notion can be applied to either the film's provenance or its digital reconstruction. In terms of *The King of Kings*, digital

reconstructions can be considered a further material-aesthetic and epistemological sedimentary layer of cinematic provenance that not only influences the appearance of the film but also changes its material basis. In this sense, the film is now marked by a distinct transformational hybridity. And since the analog source material becomes especially distorted in the digital age, due to the digitization process (Flueckiger, Daugaard, and Stutz 2020, 80), the film's "transformation" is also linked to film-ethical considerations. In light of this, it is important to take another look at the Lobster 4k reconstruction of *The King of Kings*.

The comparison of the Mary Magdalene sequence in the Blu-ray version (Fig. 1) with a respective Technicolor no. III dye-transfer material (of the same shot, but from another archive, Fig. 5) already brings several differences to light—even if one takes into account the aesthetic diversity of individual film copies of the same color process. These are most significant in the reds, which are too magenta in the digital version in contrast to the color process's characteristic warm orange-reds, or again in the digital version's too-cold, pink flesh tones.

VIAN visualizes these material differences particularly well by means of selector-dependent colorimetry: that is, the quantification of the perception of color on a micro level (Fig. 6).

Furthermore, according to the Blu-ray bonus material, the torch flames that light up the night sky in the Kiss of Judas sequence are not Brock's original brushstrokes but digital reconstructions, as are the blue toning and the final part of the Resurrection sequence. In terms of the "digital hand coloring," the outlines of the flames were transferred from DeMille's private—unfortunately,

Fig. 5: Photographs of the Technicolor no. III dye-transfer nitrate print of *The King of Kings* (Cecil B. DeMille, 1927) at the George Eastman Museum by Olivia Kristina Stutz. Source: Timeline of Historical Film Colors: https://filmcolors.org/galleries/the-king-of-kings-1927/ [accessed November 7, 2021].
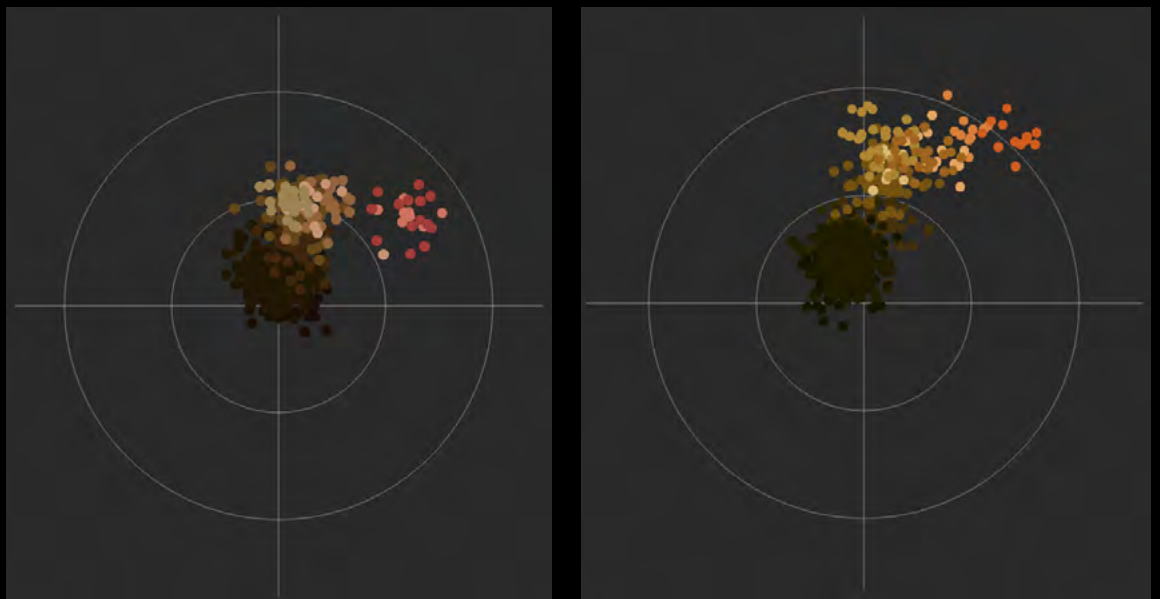
Fig. 6: VIAN colorimetry reveals a significant visual difference, especially in the red spectrum, between the digital version of *The King of Kings* © 2017 Lobster Films (left) and the Technicolor no. III dye-transfer nitrate print (right)

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Fig. 7: Photographs of the toned and hand-colored nitrate print from
the 1927 version of *The King of Kings* (Cecil B. DeMille, 1927) at the
George Eastman Museum by Olivia Kristina Stutz. Source: Timeline of
Historical Film Colors: https://filmcolors.org/galleries/the-king-of-
kings-1927-4/ [accessed November 7, 2021].

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Fig. 8: Comparison of the shade of iron blue in the Eastman Kodak
Company (1918) manual: *Tinting and Toning of Eastman Positive Motion
Picture Film.* Rochester, NY. (Credit: Clayton Scoble and Stephen
Jennings, Harvard University, Fine Arts Library) [top] with the shade
in the *Agfa Kine-Handbuch*, (ca. 1925). Berlin, Actien-Gesellschaft
für Anilin-Fabrikation. (Photograph by Barbara Flueckiger) [bottom].
Source: Timeline of Historical Film Colors: https://filmcolors.org/
timeline-entry/1215/ [accessed November 7, 2021].

already decaying—nitrate print (Fig. 7).

Although the analog hand coloring of the 1920s and the digital hand coloring of today share some basic similarities in the sense of their "autonomously" applied colors, they are still extremely different coloring practices, especially in terms of technology, epistemology, materiality, tactility, haptics, and aesthetics. This last aspect becomes particularly apparent when comparing the hue—which is more yellow and less orange—with the transparencies of the different color transitions in the tongues of flame, which are more delicate in the analog print (Fig. 2 and 7). The nitrate print, however, in which the decaying tone at first sight looks more of a sepia color, was also used as the main reference for the reconstruction of the blue toning. Owing to its severe state of decay, the rest of the image areas were based upon a black-and-white duplicate negative from the 1970s, and "digitally toned" in the blue-white color. A comparison of the two images demonstrates particularly well how specific colors of some historical film prints can deteriorate over time, especially in the case of the iron-blue tone (Read and Meyer 2000, 272), and how such digital reconstructions walk a very fine line between historical accuracy and the application of "imaginative" digital colors. Even if it is known for sure that the film material was toned blue, the specific shade still has to be ascertained: iron tone, for instance, had many different shades of blue. This fact can be demonstrated by a visual comparison of two shades of iron blue in historical color film manuals (Fig. 8).

The same basic critique applies to the digitally reconstructed colors at the very end of the Resurrection sequence. As a consequence of an incomplete American positive print, the reconstruction was based on a negative A—that is, a Technicolor

no. III black-and-white negative from the US market. Although the rest of the American print served as a visual reference for the whole sequence, the filling in of the material loss at the end, known as the "concept of lacuna" (Cherchi Usai 2000, 57), reproduced "lost" colors *that might have been* used, representing a somewhat arbitrary recreation of analog colors using digital tools (Fossati 2012, 560). This digital resurrection of an idealized "Model Image" (Cherchi Usai 2001, 41) in Technicolor no. III—an image with no past or history—is, in the ethics of film restoration, a questionable practice (2012, 536–38), especially if no indication of the intervention is given. However, it is plausible in terms of the integrity of the work and the goal of filmic immersion (Lameris 2017, 119–20). Similar principles of both analog and digital coloration processes can also be identified, such as the successive transfer of two complementary colored dye layers onto a positive in the imbibition process in the 1927 film, in contrast to the superimposition of a red and a green —and, strangely, also a yellow—transparent filter layer on top of each other in the digital recreation. And yet, as explained above, these two techniques are fundamentally different, so one cannot simply replace the other. Hence, the digital version could be regarded as another layer of space, time, and matter that has been added to *The King of Kings* by human agency in the present, a process that fundamentally changes the film's materiality, aesthetics, and epistemology.

In this sense, every digital film reconstruction becomes a transformational hybrid, and thus—especially if the filling in of production stills or inter-titles in other digital reproductions is taken into account—some sort of hybrid art form that is marked overall by a distinct

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ästhetische Eigenzeit. The digitally reconstructed hybrid color film is once again characterized by a simultaneity of the non-simultaneous due to the simultaneous use of different film technologies (if not epistemes) from the past and the present, which potentially lay the basis for the possible futures of moving images to come.

Conclusion

To conclude, the notion of the simultaneity of the non-simultaneous has become a powerful historiographical tool. *The King of Kings* serves as a vivid example of the existence of multiple layers of space, time, and matter in the hybrid color films of the 1920s. It illustrates how such hybridizations of film technologies were progressively and creatively used to showcase the spectacular and dramatic potential of "old" and "new" color technologies, and to tell powerful visual stories that were, at one and the same time, an expression of the film's technological crisis and a manifestation of the techno-aesthetic state of the art in the 1920s. The digital reconstruction of the analog film thereby allows us to access this past, but it alters the film's material foundation, and thus fails to erase its own traces of the present.

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Liz Watkins

The Politics of Nostalgia: Colorization, Spectatorship and the Archive

Colorization describes the digitization and retrospective addition of color to photographic and film materials (celluloid nitrate, glass negatives) initially made and circulated in a black-and-white format. Revisiting the controversial 1980s colorization of 24 classic Hollywood studio titles, which incited debate over questions of copyright, authorship and artistic expression, this essay examines the use of colorization to interpret museum collections for new audiences. The aesthetics of colorization have been criticized for prioritizing image content over the history of film technologies, practices and exhibition. An examination of *They Shall Not Grow Old* (Jackson, 2018) finds a use of digital editing and coloring techniques in the colorization of First World War film footage held in the Imperial War Museum archives that is familiar to the director's fiction films. Jackson's film is a commemorative project, yet the "holistic unity" of authorial technique operates across fragments of archive film and photographs to imbricate of fiction and nonfiction, signaling vital questions around the ethics and ideologies of "natural color", historiography, and the authenticity of materials and spectator experience.

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Introduction

The digital manipulation and circulation of still and moving images has become prevalent, yet, the colorization of archive photographs and films has remained a contentious issue. Colorization describes the digitization and retrospective addition of color to photographic and film materials (celluloid nitrate, glass plate negatives) that were initially made and circulated in a black-and-white format. Whilst the controversial colorization of 24 classic Hollywood studio titles in the 1980s incited debate around authorship, copyright and artistic expression, the recent resurgence in colorization projects has focused on nonfiction photographs and newsreels.[1] Marina Amaral's colorization of over 200 photographs in print publications co-authored with Dan Jones—*The Colour of Time: A New History of the World 1850-1960* (2018) and *All the World Aflame: the Long War 1914-1945* (2020)—and the television documentary Auschwitz Untold: In Colour (Fulwell 73/ Channel 4, 2020) emerged alongside Wolfgang Wild and Jordan Lloyd's *History as they Saw it: Iconic Moments from the Past in Colour* (2018), and Peter Jackson's editing of Imperial War Museum (IWM) archive film in *They Shall Not Grow Old* (2018). This essay asks: what is at stake in the colorization of nonfiction photographs and film as a form for which the veracity of the image is invested in the indexicality of the photosensitive material? Marina Amaral's note that colorization acts as "an emotional enhancing agent: it magnifies empathy and horror, pity and disgust" (Amaral and Jones 2020, 9) is recalled in Jackson's description of the digital editing and coloring of *They Shall Not Grow Old*. Jackson describes "the faces of the men as they suddenly became real people," suggesting that the addition of color, diegetic voices and sound to images veiled behind the

marks, scratches and grain of the film "is the way to humanise them" (14-18 NOW 2019). However, for scholars including Lawrence Napper, there is an irresolute tension between the photochemical film as material record of the physical context of its production and the affective appeal of the digital editing and colorization of archive film. The use of colorization as a mode of interpreting and exhibiting museum collections to new audiences has been criticized for the prioritization of image content over the history of film technologies, practices, and the politics of exhibition. Jackson's use of digital editing and coloring techniques are familiar to his fiction films and used in the colorization of First World War film footage held in the Imperial War Museum archive. This essay reads *They Shall Not Grow Old* as a commemorative project that inflects the holistic unity of authorial technique across the fragments of archival newsreels and photographs. It examines the imbrication of fiction and nonfiction to signal a series of vital questions around the ethics and ideologies of "natural color," historiography, and the authenticity of materials and spectator experience. Such acts of colorization are in keeping with predominant teleological models of film historiography that, as Thomas Elsaesser (2016) has noted, privilege technical and authorial innovations through the retrospective positioning of the images and techniques that preceded them in terms of lack. Reviews of Jackson's film read the addition of color as bringing the past to life, tangibly closer to us (Murphy 2018). The link between color and life, as Roland Barthes reminds us, is a "purely ideological notion" (2000, 81). The use of colorization in the interpretation and exhibition of nonfiction photographs and film, as Paul Grainge notes in "Reclaiming Heritage" (1999), "posits a decline and then appeals to [the

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'restoration' of] a more authentic and politically serviceable" idealized past: a politics of nostalgia that is typified in the reception of projects by Amaral and Jackson. However, Jackson's *They Shall Not Grow Old* constructs a "natural color" image and narrative form familiar to the Hollywood epic. The selection of archive film, use of digital editing and colorization prioritize a spectatorship contemporary to the centenary of the First World War, yet in doing so, reiterates a tract of white British historiography and representation of flesh tones in the construction of a "natural color" image rather than acknowledging the complex and nuanced history of conflict and the work of women and soldiers from across the British Empire.

Why then? The 1980s colorization debate

The contentious colorization of 24 classic Hollywood studio titles, including *Casablanca* (Michael Curtiz, 1942/ 1988) and *It's a Wonderful Life* (Frank Capra, 1946/ colorization, 1992) and the *Maltese Falcon* (John Huston, 1941/ colorization, 1986) sought to revitalize economic interest in the MGM archive following its purchase by Turner Entertainment. The colorized films were intended for broadcast via US Television syndication and averaged 80% higher rating than their black-and-white counterparts. However, the colorized films invoked a series of questions about the legal rights of ownership, copyright, ethics and the moral rights of authorship and artistic expression (see Grainge 1999; Cooper 1991; Sherman and Dominick 1988; Edgerton 2000).[2] John Huston, as the director of a selection of the Hollywood films listed for colorization, commented that "it would almost seem as though a conspiracy exists to degrade a national character" (Huston quoted in Edgerton 2000, 27), a reminder that commercial cinema

in both its fiction and nonfiction forms is an integral aspect of cultural heritage. The emergence of the National Film Preservation Act 1988 in the USA acknowledged classical Hollywood cinema as part of "what counts as legitimate knowledge and culture" (Grainge 1999, 622), more broadly stipulating that the black-and-white source materials be preserved unaltered and that acknowledgment of the work of colorization accompany versions to which the process had been applied. In his study of the 1980s colorization debate, Grainge notes the retrospective positioning of the black-and-white films in terms of lack. The retrospective inference of the colorized image as a correction, a return to an aesthetic that could not be achieved at the time of the film's initial production, positions colorization in a narrative of decline and restoration—the loss of historic record or cultural artefact— that is deteriorating, fading, lacking at a time of uncertainty. This discourse is read by Grainge as a form of nostalgia, that is, a "plea for continuity at times of uncertainty" (1999, 622), be it the politics and culture of 1980s USA or culturally specific responses to the centenary of the First World War as an international conflict that contextualized the reception of Jackson's *They Shall Not Grow Old*.

A hierarchy of film history in which newsreels and industrial process films are imagined without an author and so sublimated, has been challenged by the concept of useful cinema (Wasson and Acland 2011). In this context, the colorization of nonfiction photographs and films, as scholars including Tanine Allison (2021), Martyn Jolly (2018) and Elizabeth Edwards (2019) have argued, distracts from the historical specificity of camera technologies, craft, and variations in the scale and context of the image viewed. The aesthetics of the colorized image—the selection of hues, their application

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and effect—in the museal exhibition of archive materials remains to be explored. Jason Gendler's notes on *Casablanca* indicate that the addition of color could undermine or accentuate the differentiation of character from background, a visual distinction which in a black-and-white image relies on contrasts in light, shadow and pattern (Gendler 2013; Cooper 1991). Further, for Edwards, taking Amaral's *The Colour of Time* as an example, is "not a book about photography, then, or even photographs as possible historical sources, but an illustrative springboard for a potted global history of the one hundred years from c.1850 […] a single image comes to stand for a plenitude of historical, political and cultural complexities" (2019, 331). Edwards notes that colorization instils a different set of "colour values" that nuance the composition of the image and the meanings that can be read of it. Lawrence Napper's reading of *They Shall Not Grow Old*, like that of Tanine Allison, finds that the inference of the photochemical image as an obstruction to viewing pleasure, paired with the articulation of colorization as a form of "restoration," overwrites the political and cultural history of film production (Napper 2018b; Napper 2018c). My analysis of color design and digital editing in Jackson's film, however, begins to unpick the ways in which colorization is imbricated into the politics of nostalgia. The continuities and differences that can be discerned between indexicality of the photographic image and the aesthetics of colorization open a space to discuss the political and cultural context in which the War Office Cinematographic Committee films were made, used by Jackson for *They Shall Not Grow Old*, and exhibited then and now.

14-18 NOW: *They Shall Not Grow Old*

The colorization of IWM film footage in *They Shall Not Grow Old* formed one of 220 projects produced under the 14-18 NOW WWI Centenary Art Commission alongside John Akomfrah's 2018 multi-screen installation *Mimesis: African Soldier*. Akomfrah's work reminds us of the potential of documentary film and archives to demand critical reflection on the marginalization of communities and social classes in existing historiographies of conflict. Akomfrah's three-screen video installation combined archive materials and newly commissioned film recorded in different geographical locations around the world and was shown in the Imperial War Museum from 2018–19 (Imperial War Museums 2018a). Akomfrah reminds us of our moral obligation to remember the contribution, lives, work and death of people from across British Empire in the First World War on the African continent and Western Front. *Mimesis: African Soldier* explores the ways that we "orchestrate that understanding [of the past] in the present" (Imperial War Museums 2018a).

The IWM First World War galleries include several instances of colorization across 17 installations that were designed by ISO digital exhibitions, such as the colorization of digitized archive material undertaken by Jordan Lloyd and Wolfgang Wild for the British company Dynamichrome. Colorized footage from Jackson's film *They Shall Not Grow Old* was included in *Life on the Line*, a permanent exhibition at IWM North. Jackson examined 100 hours of IWM film footage and 600 hours of oral histories from 114 servicemen, editing and colorizing 30–40 minutes of silent orthochromatic black-and-white film stock (Fig. 1).[3] The IWM policy on colorization is framed by responsibility for the preservation of photographic and film collections, alongside an obligation to promote understanding of the collection as primary resource for historical research (Sheppard 2021). The IWM, fastidious

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Fig. 1: Poster for *They Shall Not Grow Old* (Peter Jackson, 2018) showing the transition from colorization to black-and-white.

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in their approach to preservation and digital access to their photographic and film holdings, acknowledge that permission to colorize material "does not include any endorsement for the historical accuracy of the colourisation" and insist that the "viewer/reader must be clearly aware that they are looking at an artistic rendition of original black and white material" (Imperial War Museums 2018b). The IWM policy on colorization indicates the "gradual blending of an original black and white film or photograph to a newly produced colour image" (Imperial War Museums 2018b) as a method of making the act of colorization visible. The work of film archives and museums lies in conservation, preservation and presentation: sustaining source materials and interpreting them for new audiences. In this context, restoration projects are organized around the exhibition of the film contemporary to its initial release, an instance of viewing that Paolo Cherchi Usai (2001) has theorized in *The Death of Cinema* as the hypothetical and unattainable Model Image.

Archive policies, including those advocated by the Federation of International Film Archives (FIAF) and the National Film Preservation Board in the USA, similarly require that the work of colorization, which is a material alteration to the image, be stated. The digitization, editing and colorization of archive materials, retains the reels of celluloid nitrate film and glass plate photographs as artefacts, unaltered, but presents a new image of the past.

The materials and meanings of photographic and film archives as they enter the discursive spaces of exhibition have been explored by Philip Rosen in *Change Mummified* as that between document and diegesis. Rosen writes that Barthes' *Camera Lucida* initiated a reconsideration of indexicality and pastness in 1970s film theory "beginning from the relation of

subjective desire to the configurations of representational technologies" (2001, 175). The negotiation of pastness through cultural practices around historicity includes "architectural monuments, museum culture, tourism, and historiography itself, as well as [...] screen media" (Rosen 2001, 77), which this essay discerns in the digitization, editing and colorization of archive materials. Jackson's film remains a commemorative project in which the use of color and digital editing have been noted as both effective and problematic. The use of colorization in *They Shall Not Grow Old* and the digital editing of analogue filmstock, intricately links private and public forms of viewing "evincing nostalgia for direct, unmediated access [...] the exemplary privatized and particularized experience" (Rosen 2001, 175), which, like the mediation of private grief through public mourning noted by Michael Hammond (2011) in his study of *The Battle of the Somme* (1916), interlaces emotion with the ideological configurations of narrative form and its representational techniques in the social space of cinema exhibition.

British cinema and the First World War

The Imperial War Museum archive includes War Office Cinematograph Committee films, which were recorded during the First World War and used in newsreels. The films offered a view of the conditions in which conflict was fought and were shown at cinemas in Britain. The newsreels were advertised as "new and wonderful pictures of the activities of our forces on the Western Front" and screened alongside lantern slide lectures and home propaganda shorts such as "The Money Behind the Guns" and "The War in the Air," which were both produced by the National War Savings Committee in 1917 ("Official Pictures" 1917). Sections of the War

Office Cinematographic Committee films were also included in *The Battle of the Somme* (1916), which as Michael Hammond (2011) has noted, testify to the social and political function of cinema in the circulation of propaganda. Film offered a form of memorialization in the absence of a body, as the repatriation of the dead was prohibited. The Roll of Honour films that were shown at local cinemas enacted a memorializing process through an ephemeral medium; the public space of cinema and solemnity of its form and subject mediating private grief (see Haggith 2011; Hammond and Williams 2011, 5). Cinema offered a social and political space for private and public mourning. Titles such as The Battle of the Somme combined the existing aesthetic of the industrial process film, demonstrating the processes of operating weaponry and the spectacle of explosions, with a dramatic narrative form, however, as Hammond suggests the "reality of war footage did not live up to these expectations for a number of reasons. The use of smokeless explosives was virtually invisible on film, and the nature of warfare across great expanses and the limitations of lens technology and film stock" (Hammond 2011, 23) thwarted the possibility of filming some aspects of the conflict. The film footage was recorded on black-and-white orthochromatic material, which was "highly sensitive to the blue-end of the visible spectrum and […] often led to totally overexposed skies if used without filters" (Arnold 2004, 217), rendering blue in a lighter grey tone whilst the color red tended to appear black.[4] The translation of color from the specific gradients that are characteristic of a black-and-white image on orthochromatic filmstock is deictic of the history of the photographic materials that mediate the evidentiary aspect of the War

Office Cinematographic Committee records. The black-and-white image, described by Wayne Stables, a colorist at Jackson's Weta Digital visual effects company, remained vital to an application of color that was intended to draw out specific details of the image. In *They Shall Not Grow Old*, colorization is used to both synthesize fragments of film into a cohesive form and highlight details considered salient to the narrative.

> Something that can happen when coloring old footage is that if it doesn't look quite right, you actually have to wind it back to see what was happening in black and white […] Coloring old footage is usually done with broad strokes, but because we were trying to pull out so much of the details, the level of care had to be that much higher (Wayne Stables quoted in Valentini 2019)

The positioning of *They Shall Not Grow Old* as a restoration is problematic.[5] Jackson's film is a commemorative project that reiterates the ideologically complicit aspects of the image and its exhibition by invoking a historically specific association of patriotism and public mourning. The marks of film production and decay, that in viewing archival film are deictic of the past, become a site of disruption to the realist effect of colorization and editing. The addition of color in the production of *They Shall Not Grow Old* altered the hierarchy of information that was integral to the aesthetic of newsreels, industrial process films and their archives. The 2018 presentation of First World War film footage aligns the spectator with the filmed space by overwriting the history of technology, the labor of film making, and the politics of exhibition and censorship.

However, reviewers of Jackson's film persist in the suggestion that the digital editing and colorization of War

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Office Cinematographic Committee film footage allows the spectator to "see more things than you do in black and white," an opinion that is reiterated by the director:[6]

> "They didn't see it in black and white so why would we show it in black and white" (Jackson 2018a)

> "the Great War as the soldiers themselves saw it" (Jackson in 14-18 NOW 2018)

> "to show the experience of what it was like to fight in this war […] the human experience of being in the war." (Jackson 2018b)

> "The clarity was such that the soldiers on these films came alive. Their humanity just jumped out at you. This footage has been around for 100 years and these men had been buried behind a fog of damage, a mask of grain and jerkiness and sped-up film. Once restored, it's the human aspect that you gain the most" (Jackson quoted in Murphy 2018)

The inference is that the marks and scratches registered in the photosensitive material of the film image—that trace the history of its making, circulation and storage—obstruct the viewer's engagement, whilst the digital alteration and addition of color—that constructs a cinematic illusion of realism—emphasize the "human aspect" of the soldiers recorded in the War Office Cinematographic Committee footage.

Surface tension: image, color, text

The work of the War Office Cinematograph Committee forms a fragmented record of the First World War, which in its disunity of form and image resolution signals the chaos of conflict. The digitization, editing, and colorization of the IWM film footage to produce *They Shall Not Grow Old*,

remediates and synthesizes archival materials into a film text through the holistic expression of the auteur. The strategic deployment of the marks of deterioration, the retrospective depredation of image resolution, and use of color design in *They Shall Not Grow Old* are techniques familiar to fiction film, positioning the spectator in narrative of mourning and nostalgia. Jackson's editing of the IWM archive adopts the structure of a Hollywood epic. Fragments of oral histories are assembled into a voiceover, like the epistolary form of a historical narrative, to narrate the black-and-white films recorded by the War Office Cinematographic Committee. Further, the transition into the central section of the film configures the colorized footage in the present tense and as a cinematic illusion of unmediated reality, before returning to the black-and-white images at the end of the film. The editing of photographic documentation of the war into the diegesis of Jackson's film produces what Vivian Sobchack describes as a "subjectively *authentic representation of the production of History*" (1990, 39; italics in original).

The veracity of the IWM archive film lies in tension with its colorized surface. The indexicality of the photographic, as described by André Bazin, refers to a direct relationship between the image and the filmed space (that camera, at that time in that place), an ontology, which is in operation "no matter how fuzzy, distorted or discoloured, no matter how lacking in documentary value the image may be" (Bazin 1967, 14). Reading Bazin in *Change Mummified*, Philip Rosen describes the indecipherable aspects of an image being drawn into an "impression of visual likeness through perspective" which "becomes merely a kind of prop" (2001, 17), necessary as a point of consistency making the image legible as the depiction of objects in

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space. The image and technology of the camera and filmstrip, as automated registration, form the War Office Cinematographic Committee records. These material images encode a representation of the space of conflict that also registers the conditions of the environment in which they were made. The selection of images, which use a perspectival plane (trenches, lines of troops) to emphasize visual logic, counters blurring and disorder (Fig. 2).

Images of conflict are entangled with the physical effects of the proximity of the photographer to battle. The shudder of the camera and blurring of the image, as Lawrence Napper (2018a) writes, record the precarious work of War Office Cinematograph Committee cameraman, Geoffrey Malins and John B. MacDowell of the British and Colonial Film Company, operating a hand cranked camera in a trench close to the Western Front. These filmic remains matter. For scholars such as Rosen (2001), the marks of deterioration that manifest at the level of the image allow the spectator of archive film to invest in the idea of privileged access to the past. The effacement of details by overexposure to light and the blurred movements of conflict are amended, overwritten, by the emphasis on representational form in Jackson's film. The disunity—difficult to watch—of an archive of photographic documentation of conflict has been altered in favor of a more clearly delineated image and narrative.

Jackson's documentary, *They Shall Not Grow Old*, realigns the concept of authenticity, not as the indexicality of a photographic record, but as that of spectatorial experience by utilizing the IWM archive to construct an image of the First World War that he intends to be as close as possible to the way that the soldiers saw and experienced it (Jackson 2018a). The director's articulation of *They Shall Not Grow Old*

as a "restoration" infers the shudder of film shot at 16 frames per second, the instability and variable speed of a hand-cranked camera, and the grain and decay that make film substrate visible, as disruptive of the spectator's response to the film (Napper 2021). However, these marks are an indexical trace of the physical effects of conflict. It is this—the film as material and technological record of the history of conflict and cinema—that Jackson's work sublimates. The sound track of *They Shall Not Grow Old* combines oral histories into a coherent account of signing-up, training for trench warfare and the disquiet of returning to civilian life. The historiographic process of selecting and interleaving interviews, foregrounds commonalities and specific geographical tracts to the Western Front, eliding the devastating scale and disparate conflicts that constitute the war.[7] The film relegates the role of women from industry and agriculture to the realms of home, hospitals, and the sexual anecdotes of soldiers, whilst combatants from across the British Empire and Commonwealth are marginalized by the materials selected. Newly commissioned audio recordings of the conversations deciphered from the silent film by lip-readers, war songs and diegetic sound effects (explosions, the legion of footsteps marching through mud) underscore the events shown. The transition from a black-and-white to colorized image is dramatized as a soldier turns, his hand raised in recognition of the camera and its operator, a gesture that is accompanied by a voice calling "follow me" (Fig. 3). The flicker of the image and prevalence of detritus increases in the frames preceding the visual transition and enact an idea of "restoration" as the return of color and fluidity of movement in the events depicted. The editing of *They Shall Not Grow Old* distills the breadth of a social

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Fig. 2: Images that emphasize perspectival lines have been selected for Jackson's film. *They Shall Not Grow Old* (Peter Jackson, 2018).

Fig. 3: The transition
from black-and-
white to colorization
occurs 25:20 mins into
the film. *They Shall
Not Grow Old* (Peter
Jackson, 2018).

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and historical record into stereotypical images, a recidivist approach that reiterates the politics contemporary to the First World War in the screening of archival materials as part of a mythologizing practice.

The shift from a black-and-white to colorized image proposes not only a temporal transition, from past to present, but a perceptual shift toward a more sensory use of color and editing that is *like* fiction film: a synthesis and effect of the holistic expression of Jackson as the director, another author, secondary to the registration and exhibition of the War Office Cinematograph Committee film. The artifice of deterioration effaces those aspects of the film that form a material record of the historically specific environment in which it was made. The digital copies of archived film have been edited to *emphasize* distortion in a way that diminishes the variations in light and shadow that would otherwise differentiate between figure and ground. The editing of this sequence constructs a transition from the textured surface of a film image (blurred, out of focus, using the paraphernalia of analogue film), into the clear delineation of perspectival lines that configure the optical illusion of space (Napper 2021, 213). The use of colorization and editing alters the aesthetics and narrative form of the film archive in an affective appeal to a spectator contemporary to the centenary of First World War.

In his study of the way that the applied colors (tinting, toning) of silent film are disassociated from photographic realism, yet employed to emotional effect, Joshua Yumibe revisits Terry Eagleton's notes on aesthetics. Eagleton examines aesthetics as a "discourse of the body" that pertains to a range of perceptions and sensations of which "color is a crucial component of visuality" (Eagleton quoted in Yumibe

2012, 9). In *They Shall Not Grow Old*, editing techniques are used to construct a presentational aesthetic that is strategic in its interleaving of simulacra of detritus and digitally applied colors to construct a film that variously sublimates and highlights details within the image. The transition from a black-and-white to a colorized image underscores a shift from the textured surface and sensory appeal of a haptic image to optical visuality, a strategy that is determined to elicit an emotional response in the spectator. The effects of viewing moving image files as they shift between low resolution and optical clarity has been explored by Laura U. Marks (2002), not as a dichotomy of visuality, but as a mode drawing the spectator into a continual process of changes between haptic and optical images. The movement between the textural surface of the film image (the scratches and grain of the archive film that Jackson [14-18 NOW 2019] has described as "bad black-and-white") was, in the transition to the colorized image, exaggerated by digital artefacts. Jackson's team of editors and color graders edited the archive materials to produce an image with sharp contrast, clearly delineated, as a base for colorization. The transition from black-and-white to colorized film uses images that emphasize perspectival lines to construct an illusion of optical space that sublimates the depredation of the image. This section of film retrospectively constructs a narrative of decline that infers the colorization as "restoration" that is deployed to emotional effect. The presentational aesthetic of colorization in Jackson's documentary is in keeping with the dominant teleological model of film history, which privileges technical and authorial innovation through the retrospective positioning of the images and techniques that preceded them in terms of lack (Elsaesser 2016). The

spectacle of colorization, intriguing to new audiences as "the reworking of definitive moments in their collective cultural history" (Grainge 1999, 625), is drawn into discourse of "restoration" that is problematic in its focus on profilmic space, whilst digital editing and addition of color implement a design that highlights and obfuscates select areas of the image to inflect new meaning on archive materials. The use of linear perspective that Rosen (2001, 17) refers to as a compositional device in the representation of space on screen, is one to which a military to topic lends itself: soldiers marching along roads and trenches, the rows of men sat either side of a table, standing in a line either side of a street. The emphasis on perspectival lines creates the illusion of depth of field and facilitates a "more immersive effect" (Jackson quoted in Murphy 2018) for the spectatorship of the 3D and IMAX format listed for the release of *They Shall Not Grow Old*.[8]

The palette of *They Shall Not Grow Old* finds its references in the early color processes of still photographs (Autochromes, Paget Plates) contemporary to the First World War and the two-tone graphic designs of British propaganda posters that are used as mattes to form a border for sections of black-and-white film footage (Fig. 4). Composite photographs, tinted, and exhibited in art galleries as mural enlargements formed contentious, but effective dramatic illustrations during the First World War. Martyn Jolly's detailed study of "Composite Propaganda Photographs during the First World War" connects the "British Official War Photographs in Colour" exhibition 1918 to the work of the War Office Cinematographic Committee and the popular press (Jolly 2003).[9] Jackson's work echoes the dramatic assemblages of documentary photographs, yet the application of color is used as a mode

of enunciation. The voiced recollection of injured and contorted bodies is illustrated by an increase in red hues to signify blood, digitally painted to follow the curvature of the soldier's head. Color is used to highlight and diminish select details: a red line of digitally drawn color both signifies blood and delineates a body otherwise obfuscated by the quality of the film image and detritus of the trench (Fig. 5).

As the conflict intensifies, the mode of presentation alters: close-ups, magnified images that have been rendered and digitally reframed from the archive film, emphasize the facial expressions of soldiers near to the frontline. The close-ups, shown in slow-motion and intercut with images of the dead, are demonstrative of an editorial practice associated with the depiction of emotion in fiction film offering "an affective, visceral historical re-imagination" (Bronfen 2013, 218) that is configured to an immersive form of spectatorship.

The politics of nostalgia

The colorized section of film includes imagery of blue skies, children, interspersed with flowers amongst soldiers resting on the ground in a pastoral scene that has a disquieting effect in the representation of trench warfare (Fig. 6). The contradiction of peacefulness and conflict invokes the film-souvenir, postcard-like topics in the midst of an archive of the First World War that combines news reels and the industrial films of the War Office Cinematographic Committee.

Jackson's project purports to reconfigure the hues of the filmed space and photographed body, but constructs a nuanced interpretation of the archival materials as film narrative. Whilst Rosen suggests that the flecks and scratches of archive film are deictic, connecting indexicality to authenticity, Jackson

Fig. 4: Posters and lantern slides used as mattes to frame the
black-and-white film footage.

Fig. 5: Color underscores the recollections of conflict in the oral histories: brown hues conceal the body in mud, red highlights the injuries described in the voice-over. *They Shall Not Grow Old* (Peter Jackson, 2018).

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Fig. 6: Pastoral scenes of postcard-like topics. *They Shall Not Grow Old* (Peter Jackson, 2018).

seeks to make the past present, without critical acknowledgement of the political and material history of the film and its exhibition. The deployment of color effaces details that are integral to the indexicality of the photosensitive materials to create an illusion of "natural color," of cinematic realism, that references the hues of First World War magic lantern slides to imply the authenticity of colors selected, yet overlooks the specificity of orthochromatic film stock as a translation of the photographed space. The construction of a color image as "natural" or universal appears normalizing, but is ideologically complicit. The affectivity of this color scheme, like "the discursive power of the epic is not to be found in the specificity and accuracy of its historical detail," but the idea of "re-cognizing oneself as a historical subject of a particular kind" (Sobchack 1990, 28). The sensuous use of colors that Yumibe notes of early film intersect with Sobchack's study of the historical epic. The selection, digitization and colorization of the images in Jackson's film, which constructs a cohesive geographical tract from England to the Western Front and return to civilian life from fragments of archival film and oral histories, marginalizes contradictory social relations. The complexities of class, gender, and race are sublimated to facilitate the emotional ploy of editing and aesthetics, configuring a form of immersive spectatorship that like the historical epic aims to "experience – not think – that particular mode of temporality which constituted him or her as historical subject" (Sobchack 1990, 29). The construction of a "natural color" image that overlooks the role of soldiers from across the British Empire—in its selections and elisions—as Akomfrah states, must be acknowledged and questioned.

The transition from colorized to black-and-white footage, which signals the final section of the film, is visualized as the screen telescopes into an image that is projected on a wall (Fig. 7). The accompanying sound of an analogue film projector alludes to cinematic exhibition, a self-reflexive gesture, as though traversing a threshold through which the diegesis becomes the depiction of a film image. The shift from tableau to diegesis and vice versa sets the central colorized section of the film in parenthesis, a rhetorical ploy that Elisabeth Bronfen (2013, 229) finds to be defining of the Hollywood epic. The transition, from the silhouette of soldiers and artillery against the orange and pink hues of a sunset into a scene projected in the cinema, then, is a reflexive authorial gesture that configures an experiential field "that is in as well as about history" (Sobchack 1990, 27). The subjectivizing effects of color and editing imply a particularized relation to the film, yet the potential of utilizing the narrative to formulate a critical historical context for viewing the War Office Cinematographic Committee records is overlooked. Yet, the film is resonant of Frank Hurley's photograph of infantry moving forward to take up front line positions at Hooge October 1917 (Hurley 1917). The editing of the IWM archive echoes Rosen's notes on the way that "socialized understanding of the other, of the distant in time and space, has been built in the very conversions between document and diegesis" (Rosen 2001, 197).

The interpretation of the IWM archive into the audio-visual form of Jackson's *They Shall Not Grow Old*, which is tailored to a spectatorship contemporary to the centenary of the First World War, perpetuates the revanchism of white British historiography. The response of the spectator is not dependent

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Fig. 7: The transition from the colorized footage into an image on the wall.
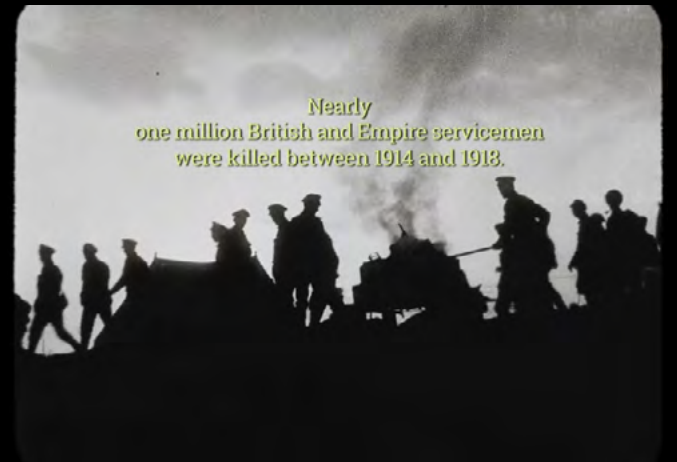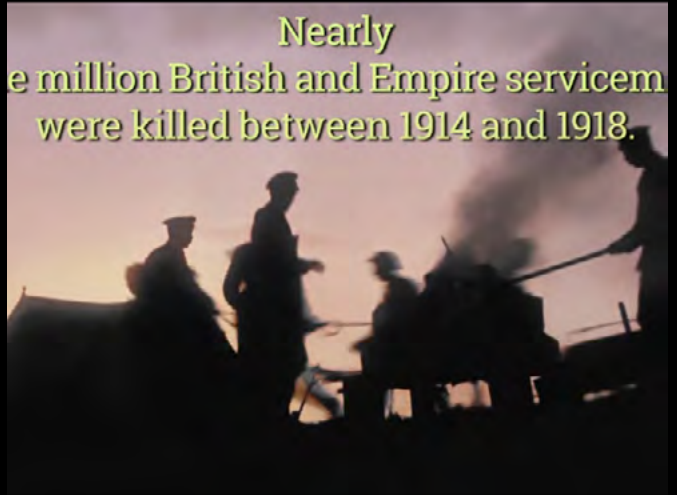
on recognition of an individual on screen, but as Hammond writes "on recognizing and empathizing with his plight and resigning him to his destiny" (2011, 35). The colorization and editing of *They Shall Not Grow Old* elicits a private response in public mourning—the commemorative aspect of the film is effective—yet acts through the reiteration of propaganda and elisions in the narrative form of the film. Jackson's approach to color enacts a politics of nostalgia, employing an attendant rhetoric of lack that "posits a decline that appeals" (Grainge 1999, 622) to the restoration of a politically serviceable idealized past at a time of uncertainty. The title of Jackson's film, which is a reiteration of Laurence Binyon's 1914 poem *For the Fallen* (Binyon 1914) was employed as a cultural reference in the political rhetoric of the British prime minister, Boris Johnson, in the wake of the 2016 referendum on membership of the European Union.[10] Johnson's 2020 invocation of Binyon's poem sublimated its historical specificity to the affective aspects of nostalgia in the economy of information and populist politics (BBC 2020).[11]

The IWM First World War exhibit "Life on the Line" does include footage from Peter Jackson's *They Shall Not Grow Old* alongside film from the First World War archives that have been digitized, but not colorized. The exhibition forms part of the Big Picture Show at the IWM North and embeds the images in an "immersive surround sound and 360 degree, 27 foot tall, projection that brings personal experiences of conflict to life" (Imperial War Museums n.d.b.). The invocation of spectator experience remains in the marketing and format of the exhibition, yet the critical historical context offered by the museum differs from the artificiality of space that is articulated in the colorized cinematic image. Colorization is an effective form of public engagement and commemorative practice. However, the prioritization of historicity, emotion, and the subjective response of a spectator to the historiographic form of *They Shall Not Grow Old* contemporary to the centenary of the First World War is problematic. It overwrites the history of conflict, labor and the politics of cinema exhibition that were integral to the formation of the War Office Cinematographic Committee and their work. In Jackson's film the disparate battles and social complexity of allied forces and their combatants are sublimated to a coherent and concise narrative that elides the work and death of women, and the soldiers and carriers noted in Akomfrah's multiscreen installation. The characteristics of photochemical filmstock as a material record of the First World War and in the context of a film that is enunciated by color forms a "junction of desire and politics" (Rosen 2001, 176) that has the potential to become a site of resistance, to provoke the critical thinking that Sobchack demands. It is this particular use of colorization that Jackson's film does not explore, preferring to set it aside, in favor of a tract of nostalgia that is determined to close historical distance.

1/ The online forum Reddit includes a subreddit called r/Colorization that has seen an increase in membership from 82,454 members on 7 July 2019 to 311,836 members on 21 March 2021. The membership of a second subreddit, called r/ColorizedHistory has increased from 482,944 members on 7th July 2019 to 611,755 members on 21 March 2021.

2/ *The Maltese Falcon* was colorized by Color Systems Technology Inc/TBS in 1986 and marketed as part of the Color Classic Network of 85 TV stations.

3/ Research for Jackson's film included consultation of oral history projects at the Imperial War Museum and a collection of BBC interviews with servicemen, which Jackson and Park Road Post Production selected, re-recorded and edited.

4/ Arnold, as editor of the *British Journal of Photography*, is writing about the work of "camera artist" H.G. Ponting for the British Antarctic Expedition 1910–13, using orthochromatic film and photographic materials and filters, in the years immediately prior to the First World War.

5/ Napper (2018c) notes that the film footage used in *They Shall Not Grow Old* had been the subject of conversation and the production of 4K digital scans prior to the production of Jackson's film.

6/ "*They Shall Not Grow Old* by Peter Jackson Toolkit" (Imperial War Museums, n.d.c.) includes sections on "Friendship," "Impact," "Reconciliation" for Key Stage 3 (S1 & S2) subjects including English and History. See also Ward 2018.

7/ The oral histories of the First World War were archived by the IWM and BBC in the 1960s.

8/ The film was converted to 3D by Stereo D.

9/ Jolly writes that Beaverbrook was Chair of the British War Office Cinematographic Committee, owner of the *Daily Mail* and the first Minister of Information in Britain (1918).

10/ This poem includes the line "They shall grow not old, as we that are left grow old." The syntax of Jackson's film title is different. The line in Binyon's poem suggests loss and remembrance as those that survived, later, recall the death of their comrades and combatants, whilst Jackson's film seeks to diminish historical distance, to make the past present.

11/ The phrase "they shall not grow old" was utilized by Johnson in a remembrance service speech marking the 75th year since the end of conflict with Japan in 1945.

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Chantal
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Wilson, M. Blake, and Christopher Turner, eds. 2020. *The Philosophy of Werner Herzog.* Lanham, MD: Lexington Books. 288 pp.

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Most books about Werner Herzog include a warning: they have been written against the will of the filmmaker. *The Philosophy of Werner Herzog* is no exception, and so it begins with a note from Herzog's most influential connoisseur, Paul Cronin, on the difficulty of this venture. "Fortunately, we are not writing this book for Werner Herzog" (xv), editors M. Blake Wilson and Christopher Turner clarify in their introduction. What Herzog says doesn't matter; we've long understood that any artistic production exceeds its creator. Have we? Interestingly, what we find after this is that the vast majority of articles begin by quoting words from the director. Words that are part of the "provocative interviews, which have arguably revealed more of his work than the works themselves" (xiii) that raised the editors' suspicions in the introduction.

Throughout the book, one of the most debated ideas is that of "ecstatic truth"—an invention of the filmmaker that is not very different from what is generally called "poetic truth"—and the issues that surround it: reality, perception, fiction. Three chapters explore the topic in depth: "Fake News and Ecstatic Truths: Alternative Facts in Lessons of Darkness" by Kyle Novak, "The Great Ecstasy of Werner Herzog: Truth, Heidegger, Apocalypse" by Ian Alexander Moore and "Werner Herzog and the Documentary as a Revelatory Practice" by Antony Fredriksson. All three have a special focus on the blurring of limits of what is true in Herzog's production and on his words—principally on his words. Beyond Novak and Moore's disquisitions on concepts such as truth or post-truth—appealing to Baudrillard or Heidegger among others—Fredriksson's critique of Herzog's usual utterances against the so-called cinéma vérité appears

interesting. The author reminds us in a well-known comparison that while Dziga Vertov wrote that the camera recorded life and therefore led to a "cinema of truth," Jean Rouch, the most famous representative of cinéma vérité, believed that the camera conditioned the behavior of those in front of it, resulting in a "truth of cinema." Any Herzog aficionado can see which of the two statements is closest to the filmmaker's view.

Two chapters appear refreshingly far from the general interests of the book. Daniele Dottorini's "The Conquest of Uselessness as a Practice of Film and Thought" is a brief philosophical quest for the nature of film, keeping a welcome detachment from Herzog's words and producing new metaphors for his cinema such as that of the tightrope walker Philippe Petit. In a simple remark, Dottorini sums up all of Herzog's philosophy: "There is a profound idea that runs through the cinematic way of looking, an idea that sees the image as a borderline image, as an image that does not reveal an a priori preexisting world, but that seeks and creates new connections" (51). Elsewhere, Will Lehman provokes an interesting debate with the chapter "Herzog's Philosophy of Masculinism." Lehman conducts a brief search throughout Herzog's oeuvre for "those traits associated with masculinity that currently pervade western culture and which Herzog unabashedly champions: courage, strength, independence, rationality, and the ability to control emotion" (203), and offers a much-needed critique of a filmmaker who seems to have answers to all sorts of questions related to his films except those about gender.

Having in mind the contradiction at the core of the book—this is, do we look into Herzog's films or listen to his words?—David LaRocca's chapter "'I Am What My Films Are': Listening to Herzog's Ecstatic, Essayistic Pronouncements" stands out as a text that considers precisely what to do with the filmmaker's obstructionism if we want to think his films philosophically. By making this question central, by overtly revolving around Herzog's figure and not that much around his films—LaRocca analyzes only Herzog's autobiographical films or pieces that other creators have made about him—this chapter becomes one of the most interesting ones in the book. LaRocca quotes Herzog's intervention: "documentaries should always make a personal note felt in them. Because the films I made were not commissioned by someone, but were made because of my own deep fascination with the subject" (11). The line between author and production is a thin one in Herzog's case. *The Philosophy of Werner Herzog* takes this blurry line as a starting point. As Christopher Turner brilliantly writes in "The Film Artist as Discoverer of the Marvels of Everyday Life: a Kracauerian Reading of Werner Herzog," Herzog proposes a false dichotomy:

> either practical experimentation or theoretical pre-fabrication by the filmmaker, and either open-minded engagement by the viewer, unencumbered by scholarly comparisons or citations, or a rigid imposition of fashionable, though vacuous, intellectual categories

by the critic. [...] Likewise, in interpreting his work, I neither need be illiterate nor an academic specialist on film theory, but can fall somewhere between these two extremes. (155)

In the same manner, this book is not about Werner Herzog's films, nor is it about his declared philosophical positions. For a film studies book, there is little reflection on particular scenes. For a philosophy book, the central concepts may seem shallow. But in examining the thought both behind his films and his words, this becomes a fascinating Werner Herzog book.

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COLOR

CONTRAST

chromatic connections in cinema

—original texts

Chantal
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Wilson, M. Blake, i Christopher Turner, eds. 2020. *The Philosophy of Werner Herzog.* Lanham, MD: Lexington Books. 288 pp.

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La majoria de llibres sobre Werner Herzog inclouen un avís: han estat escrits contra la voluntat del cineasta. Aquest no és una excepció i, així, comença amb una nota del coneixedor de Herzog més influent, Paul Cronin, sobre la dificultat d'aquesta empresa. "Afortunadament, no escrivim aquest llibre per a Werner Herzog" (xv), aclareixen els editors Blake M. Wilson i Christopher Turner a la seva introducció. El que digui Herzog no importa, fa temps que hem entès que una obra sempre excedeix el seu creador. O no? Curiosament, el que ens trobem a continuació és que la gran majoria dels articles comencen citant paraules del director. D'aquestes que formen part de les "entrevistes provocadores, que potser han revelat més de les seves obres que les obres per si soles" (xiii) que aixecaven les sospites dels editors a la introducció.

Al llarg del llibre, una de les idees que més centra l'atenció dels col·laboradors és la de "veritat extàtica" −una invenció del cineasta que no és gaire diferent de la generalment anomenada "veritat poètica"− i les qüestions que la voregen: realitat, percepció, ficció. Tres capítols s'hi dediquen en profunditat: "Fake News and Ecstatic Truths: Alternative Facts in Lessons of Darkness" de Kyle Novak, "The Great Ecstasy of Werner Herzog: Truth, Heidegger, Apocalypse" d'Ian Alexander Moore i "Werner Herzog and the Documentary as a Revelatory Practice" d'Antony Fredriksson. Els tres incideixen especialment en l'esborrament dels límits del que és vertader en l'obra i en el discurs −sobretot en el discurs− de Herzog. Més enllà de les disquisicions sobre conceptes com la veritat o la post-veritat −invocant entre d'altres a Baudrillard o Heidegger− que fan Novak i Moore, és interessant la crítica de Fredriksson a les

paraules que Herzog profereix habitualment contra l'anomenat *cinéma vérité*. Fredriksson ens recorda en una ben trobada comparació que mentre que Dziga Vertov escrivia que la càmera enregistrava la vida i per tant resultava en un "cinema de la veritat", Jean Rouch, el més cèlebre representant del *cinéma vérité*, creia que la càmera condicionava el comportament dels qui es trobaven davant d'ella, resultant en una "veritat del cinema". Qualsevol aficionat a Herzog pot veure quina de les dues afirmacions és més pròxima al seu tarannà.

Dos capítols es distancien dels interessos generals del llibre, i ho fan per a bé. "The Conquest of Uselesness as a Practice of Film and Thought", de Daniele Dottorini, és una breu recerca filosòfica al voltant de la natura del cinema, mantenint una benvinguda distància amb les paraules de Herzog i produint noves metàfores sobre la seva producció com la del funàmbul Philippe Petit. Amb una senzilla observació, Dottorini resumeix tota la filosofia de Herzog: "Hi ha una idea profunda que recorre la manera cinemàtica de mirar, una idea que veu la imatge com a una imatge límit, una imatge que no revela un món preexistent a priori, sinó que busca i crea noves connexions" (51). Per la seva banda, Will Lehman provoca un interessant debat amb el capítol "Herzog's Philosophy of Masculinism". Lehman fa una breu recerca en l'obra de Herzog de "aquells trets associats a la masculinitat que actualment impregnen la cultura occidental i que Herzog reivindica obertament: coratge, força, independència, racionalitat, i l'habilitat de controlar les emocions" (203), i ofereix una necessària crítica a un cineasta que sembla tenir respostes per a tota mena de preguntes sobre els seus films excepte per a aquelles sobre qüestions de gènere.

Tenint en compte la contradicció que hi ha al nucli del llibre –és a dir, mirem les pel·lícules de Herzog o n'escoltem les paraules?–, el capítol de David LaRocca "'I Am What My Films Are': Listening to Herzog's Ecstatic, Essayistic Pronouncements" destaca com a text que precisament planteja què fer amb l'obstruccionisme del cineasta si volem pensar els seus films filosòficament. Fent aquesta qüestió central, girant obertament al voltant de la figura de Herzog i no tant al voltant dels seus films –LaRocca analitza només les peces autobiogràfiques de Herzog o aquelles que altres creadors han fet sobre ell–, aquest capítol esdevé un dels més interessants del llibre. LaRocca cita una intervenció del cineasta: "els documentals sempre haurien de fer sentir un toc personal. Perquè les pel·lícules que he fet no me les ha encarregades ningú, sinó que van ser fetes per la meva fascinació personal i profunda pel tema" (11). La línia entre autor i producció és ben prima en el cas de Herzog. *The Philosophy of Werner Herzog* pren aquesta línia borrosa com a punt de partida. Tal com Christopher Turner escriu brillantment a "The Film Artist as Discoverer of the Marvels of Everyday Life: a Kracauerian Reading of Werner Herzog", Herzog proposa una dicotomia falsa:

o experimentació pràctica o prefabricació teòrica del cineasta, i
o compromís de ment oberta de l'espectador, no corromput per
comparacions o cites teòriques, o una rígida imposició de categories
intel·lectuals de moda però superficials per part del crític. [...] De la
mateixa manera, en interpretar la seva obra, no haig de ser un il·literat
ni un especialista acadèmic en teoria del cinema, sinó que puc situar-
me en algun punt entre aquests dos extrems. (155)

Així mateix, aquest llibre no és sobre els films de Werner Herzog ni sobre
les seves posicions filosòfiques declarades. Com a llibre sobre cinema,
hi ha poques reflexions entorn d'escenes concretes. Com a llibre sobre
filosofia, els seus conceptes centrals poden resultar superflus. Però en
examinar el pensament tant darrere els seus films com darrere les seves
paraules, aquest es converteix en un fascinant llibre sobre Werner Herzog.

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