

Reanimating the Archive: AI and the Afterlives of China's Early Images on Digital Platforms

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ABSTRACT

This paper examines the complexities and ethical dilemmas of applying AI-assisted restoration in archival films. It analyses a highly popular AI-restored film on a Chinese video-sharing platform, featuring original footage from Albert Kahn's *Les Archives de la Planète*. While praised for its ability to "bring history to life" through automated colorization, frame interpolation, and resolution enhancement, the project also raises fundamental questions about the authenticity of the restored version. When the very material traces of history, such as scratches, flickering, and grain, are erased, can the film still be considered the same historical document? In addition to providing an in-depth overview of the footage, drawn from early 20th-century travelogue documentaries and the *Les Archives de la Planète* project, this paper also explores the technical and ethical dilemmas of AI-assisted archival restoration. It compares these issues with classic restoration theories and considers the future role of generative AI in archival restoration.

KEYWORDS: digital archives; early Chinese cinema; AI remediation; platformization; Visual heritage

INTRODUCTION

In May 2020, Chinese artist and amateur archivist Hu Wengu, who also goes by @大谷 Spitzer on the Chinese internet, published a restored film entitled "I restored images of Beijing from 100 years ago using AI !!!!"¹ on the Chinese video sharing platform Bilibili. The footage used in the film originally came from the *Archives de la Planète* project (1908-1931), initiated by French banker Albert Kahn, which compiled photographs and films from over 50 countries for his archival collection (Okuefuna 2008; Amad 2010; Okuefuna and Schellenberg 2008). With Hu's efforts and the support of the artificial intelligence restoration tools, some of these early 20th-century films have

been restored through colorization, frame interpolation, and resolution optimisation. Upon its release, Hu's work gained widespread attention and became an internet sensation, amassing over twenty-five million views across multiple platforms. It was also reposted by some major news outlets, including Chinese state media such as People's Daily and CCTV News, accompanied by overly positive coverage that recognised his creative use of AI and the revival of historical footage showcasing the daily lives of the people from the past (Zhou 2021; Jiangsu Provincial Archives 2021).

The success of *Beijing 100 Years Ago* by Hu reflects a broader trend of AI-restored films produced by amateur restorers, not only within the Chinese context, where more content creators are following

1 Title translated by the author, original source see: <https://www.bilibili.com/video/BV1dQ4y1N73A/>

in Hu's footsteps, but also in a transnational context on global video platforms such as YouTube, which increasingly showcase the AI-restored work of amateur film restorers. This likely signals the emergence of a new video genre in our time, in which AI further permeates human experiences of time and space. While this paper does not aim to examine the phenomenon on a global scale, it focuses specifically on the pioneering case of the AI-restored archival film *Beijing 100 Years Ago*, and how the application of AI blurs the boundary between restoration and recreation, thereby raising urgent questions about the authenticity of such AI-restored films.

According to archive restorer Julia Wallmüller (2007: 80), "authentic restoration" requires the final product to retain "its presumed original characteristics," meaning for restorers to preserve any visual imperfections that, while potentially a result of the technological limitations of the time, are now perceived as crucial components contributing to the film's authenticity. However, as a restoration work, *Beijing 100 Years Ago* crosses this boundary by adding colour to buildings, clothing, and people, simultaneously eliminating imperfections, and incorporating music into the footage – all completed by someone who had no previous experience in archival restoration.

In addressing the authenticity and ethics issues of AI-restored films, this paper situates its discussion within the broader academic debate about colorization and automated image enhancement of archival footage (Das 2019; Bonnard 2016; Allison 2022; Wallmüller 2007; Li 2022). These discussions (on films such as *Hugo* (2011), *They Shall Not Grow Old* (2018), and *The Beatles: Get Back* (2021)), similarly to the case study *Beijing 100 Years Ago* examined here, revolve around the controversial compromises made in preserving the original work and maintaining historical accuracy in favour of popular appeal. For instance, as suggested by Wallmüller (2007), restoration can be understood as a practice that reduces damage and error, such as any scratches and decay as a

result of aging in the film, without distorting the creator's original intentions. Similarly, Tanine Allison (2022: 1263) criticised Peter Jackson's *They Shall Not Grow Old* for the film "radically modernise the archival footage," and as a result, "moves the film away from the perceived objectivity of analogue photography toward the malleability and plasticity of the digital image."

While acknowledging the existing tension in film restoration, where institutional standards are increasingly challenged and new practices are emerging (Li 2022; Marsh 2024), this paper examines *Beijing 100 Years Ago* to critically assess the contested authenticity of AI-restored film from both visual and discursive perspectives. Textual analysis will be used to assess the way particular frame elements are altered compared to original footage and to reveal the potentially deceptive nature of generative AI, which not only renders historical inconsistency within the frame but also exerts discursive power by making the presumed restoration appear more real to audiences.

This paper begins by introducing Albert Kahn's *Archives de la Planète* collection, situating it within the discussions surrounding the early 1900s travelogue film genre, which is often considered a contested product of colonialism and imperialism (Allison 2022; Forsgren 2019; Gustavsson 2021; Gunning 1997). Understanding this context is crucial for interpreting the film's construction in the subsequent visual analysis. The paper then progresses to a detailed visual analysis, examining the social and cultural implications of the case study. In the end, this paper argues that Hu's restoration does succeed in connecting wider audiences with archival footage and, to a certain extent, offers alternative interpretations that challenged institutional boundaries of restoration. However, it is far too early to entrust this work entirely to AI without addressing serious concerns, including the contentious nature of automated colorization and grain removal, as well as the lack of transparency in AI workflows. A more democratic future of restoration requires that non-specialist restorers

assume a degree of historical responsibility, and that AI technologies be demystified rather than treated as opaque black boxes. Only then can AI-restored films move beyond generating mere “wow” moments to contribute meaningfully to historical understanding.

THE EARLY TRAVELOGUES AND ARCHIVES DE LA PLANÈTE

The run time of *Beijing 100 Years Ago* is approximately 10 minutes and consists of several clips showcasing distinctive characteristics of the early 20th-century Beijing, including its residents, streets, local ceremonies, and people's interactions, offering a rare depiction of the late Qing dynasty's public space in the form of motion pictures. This specific framing of local cultural landscapes is not uncommon in Kahn's *Archives de la Planète* collection, and can be categorised within a border travelogue documentary genre that emerged in the 1890s. In this context of heightened economic, cultural, and social exchanges, the travelogue became a popular non-fiction genre in the West, showcasing the alleged cultures of the non-Western land (Gustavsson 2021). These films frequently depicted locals from an ethnographic perspective, highlighting their costumes, rituals, and social events. Film scholar Tom Gunning (1997: 14) referred to this genre of early non-fiction as “the view,” a concept that not only highlights its nature as the “cinema of attractions” that allures viewers with visual spectacle, but also the performative nature of observation. As Gunning further suggested, “the view” mimicked the act of watching and observing, with “the camera effectively acting as a tourist, spectator, or investigator” (15). Yet, without an intention to produce or convey ethnographic knowledge, these early travelogue films functioned primarily as an apparatus to satisfy curiosity and evoke awe (Ruoff 2006; Griffiths 1999). These symptoms of travelogue are aptly summarised by anthropologist David MacDougall's (1997: 289) observation that they “show a lot” but fail to “reveal” much. When considering the context in which this form

of filmmaking took place, one observes a clear imbalance of power between the filmmaker (or ethnographer) and the subjects of early travelogue productions. The act of mapping, classifying, and documenting local people and activities through the lens of a white, middle-class observer with a particular angle can often be argued to reflect a colonial desire (Blunt 1994; Thomas 1994), which, as Gunning (2006: 34) describes, seeks to “appropriate the world through images.” Those being displayed are often silenced, erased, or left without explanation, reduced instead to Edward Said's Orientalist constructions of ‘orientals’ who are incapable of describing themselves (Eileraas 2003; Said 2023).

When analysing the controversial travelogue documentary *Nanook of the North* (1922), Fatimah Rony (1996) compares director Robert J. Flaherty's aspiration to document the Inuit community's vanishing “primitive” cultural norms and social practices to the practice of taxidermy. She describes his attempt as “a desire to represent what was lost for present fulfilment,” simultaneously suggesting the role of the travelogues as comparable to a cultural repository for the disappearing way of life. Similarly, the *Les Archives de la Planète* project, started around the same period, can also be seen as comparable to a cultural repository. From 1908 to 1931, the project involved Albert Kahn and the photographers he hired documenting everyday life in over 50 countries across five continents (Okuefuna 2008; Werner 2015). Albert Kahn contended that the project's primary role is to “capture all the aspects, practices, and methods of human activity, whose absolute disappearance is merely a question of time” (Cuénot, Kahn, and Brunhes 1978: 102).

However, despite both of them aiming at documenting non-European cultures like other travelogues of the same period, such as *Nanook of the North*, *Les Archives de la Planète* represents a unique case that can be situated at the margins of the “cinema of attractions” (Gunning 1997). Unlike other travelogues driven by

commercial imperatives and public appeal, it was funded entirely by Kahn and preserved in his personal collection. Moreover, the project was claimed to be derived from his internationalist and pacifist beliefs, with the goal oriented towards the anthropological documentation of the diverse ways of life of people across the globe (Okuefuna 2008), thus giving it distinctive qualities of being “non-commercial, non-theatrical, and non-circulating” (Amad 2010: 154). Scholars often describe this project as ‘aberrant’ compared to other contemporary efforts to catalogue the world’s topography (Lundemo 2017: 221; Gunning 1997; Amad 2010). Its “lack of editing between film shots or a fixed order between autochromes and moving images” makes the footage rather unprocessed compared to other publicly screened films. More importantly, the fact that *Les Archives de la Planète* resembles a time capsule for documenting cultures also grants the archive a new sense of temporality, one in which its full value can only be realised at some future moment (Lundemo 2017). In other words, unlike conventional archives, which often accumulate materials retrospectively, Kahn’s project was explicitly conceived as an archival endeavour to preserve global cultures even before the filming itself took place. Indeed, as Amad (2010: 159) argues, “Kahn’s documents were never ‘put to sleep’ like the documents entering a conventional archive; they entered the world asleep.” As a result of these distinct organisational approaches, film scholar Trond Lundemo (2017: 221-222) argues that the project “simply eludes the representational ambitions of most other mapping projects at the time and proceeds according to a disjunctive logic,” further noting that it “removes it from the cartographic logic that informed the colonial and globalising projects of its time.” Castro (2008) further argues that, beyond Kahn’s ambition to archive the world, his initiative to film the original and even mundane lives from all corners of the globe transcended its purely archival nature, evolving into a cosmopolitan endeavour aimed at fostering intercultural understanding.

However, like most early 20th-century travelogue documentaries, *Les Archives de la Planète* is not free from the ambivalence inherent in projects created by white, middle-class men from colonial empires. Film scholar Kimberly Tarr (2012) reminds us that the invention of the camera occurred within the context of European colonial empires and was inherently tied to the 19th and 20th-century bourgeoisie ‘expeditions’ to unfamiliar lands. This association imbued the motion picture camera with a complex connection to imperialism from its very inception. The technologies of registration, aggregation, and classification, as Griffiths (1999: 283) suggests, transformed the camera into an apparatus of “the colonial gaze” and a tool for “Western-looking regimes” to exert its power. Using Marshall McLuhan’s (McLuhan et al. 1967) concept, the camera, as an extension of the human eye, projected the Western audience’s gaze onto foreign people and lands. Moreover, no matter how minimally it interfered with the locals’ daily lives, this unsolicited gaze is viewed by scholars as “a performance that orders, shapes, and classifies, rather than reflects the world” (Molz 2023: 112; Spurr 1993). The decision about where to direct this gaze was not merely an aesthetic choice but also ideologically driven. As John Urry (2002: 3) argues, “Places (or people) are chosen to be gazed upon because there is an anticipation,” therefore showcasing the role of preconceived expectations, or even bias, in determining what is included or excluded in the frame.

Flowing from the various academic contributions of the colonial gaze, the film itself offers moments where this tension becomes palpable on screen. The most striking example appears in the film’s longest segment, a two-and-a-half-minute sequence that mainly depicts a man’s interaction with a vendor and two acquaintances outside his home. The scene directly showcases Qing-era greetings and gestures, with the protagonist performing various bows that reflect sophisticated cultural etiquette. In the BCC TV program *The Wonderful World of Albert Kahn* (Okuefuna

and Schellenberg 2008), Historian Dorothy Ko has described this sequence as a “rich historical gold mine” of its detailed portrayal of social customs. However, much like the constructed sense of authenticity in *Nanook of the North*, this segment shows signs of a staged reenactment, which is most evident in the opening sequence.

The sequence starts with the camera framing at the entrance of a household, with a vendor positioned at the far right edge of the shot (**Figure 1**). Suddenly, the protagonist walks out of the door and immediately occupies the centre of the frame, a precision in composition that suggests the cinematographer may have choreographed the moment. Shortly after his appearance, the man soon encounters two acquaintances on the street walking towards him, to whom he responds with bows and greetings. As the men disappear from the screen, a different man and a woman move to the centre of the frame to exchange greetings once again. While there is no concrete evidence that this was a reenactment, the project’s aim to document as many cultural customs and rituals as possible would have given the cinematographer sufficient incentive to stage such a scene, and thus to capture rare and localised spectacles that contribute to the project’s vision of an ethnographic “World Expo.” Similarly, in the analysis of early travelogue literature, Mary Louise Pratt (1985, 127) highlights the frequent inclusion of dedicated “Manners and Customs” sections. These sections often abstract cultural practices from their spatial and temporal contexts, almost as if they are static artefacts to be “preserved, contained, studied, admired, detested, pitied, and mourned.” In this sequence, one can observe a similar ethnographic impulse characteristic of early Western ethnographers, an impulse reflected in a concrete framing choice that transforms the cultural practices into curated spectacles for the archive collection.

Although we may never fully know the exact intentions of the camera operators, we must not overlook the privileged

positions of the *Les Archives de la Planète* production team, which should be factored into our analysis of the documentary. The French cinematographer of *Beijing 100 Years Ago*, Albert Dutertre, was hired by Albert Kahn during his 1909 journey across China, Mongolia, and Japan (Musée Albert-Kahn, n.d.; Okuefuna 2008). Producing films in the early 20th century, particularly during travel, required advanced technical expertise. Photographers often underwent extensive training to perform their roles. As Hedling and Jönsson (2008) remind us, documentary filmmaking during this period was typically restricted to members of higher social classes who could afford this niche technology. It is therefore unsurprising that the *Les Archives de la Planète* project, carrying all its “imperialist baggage” (Tarr 2012: 106), in multiple ways, could inevitably be tied to the interests of a select group of elites within the French colonial empire. This connection became more apparent through Kahn’s employment of Léon Busy, an officer in the French colonial army, as one of his photographers, which reveals the ambivalent nature of the project, characterised by its entanglement with, and negotiation between, colonisation and scientific inquiry (Simonetti 2022).

Ultimately, *Les Archives de la Planète*’s non-commercial characteristics and its unique status of being “born as an archival” distanced itself to some extent from the overtly racist and spectacularised tendencies of other travelogues of its time. Yet, its production context, the backgrounds of its filming crew, and its framing choices still rendered it unable to escape an Orientalist perspective in documenting different societies. The following section will shed light on the technological dimension of the AI restoration, such as how AI enhances degraded footage: noise reduction, colorization, and frame interpolation, as well as the ethical dimension of the potential for AI to perpetuate biased historical interpretations in its restoration processes.

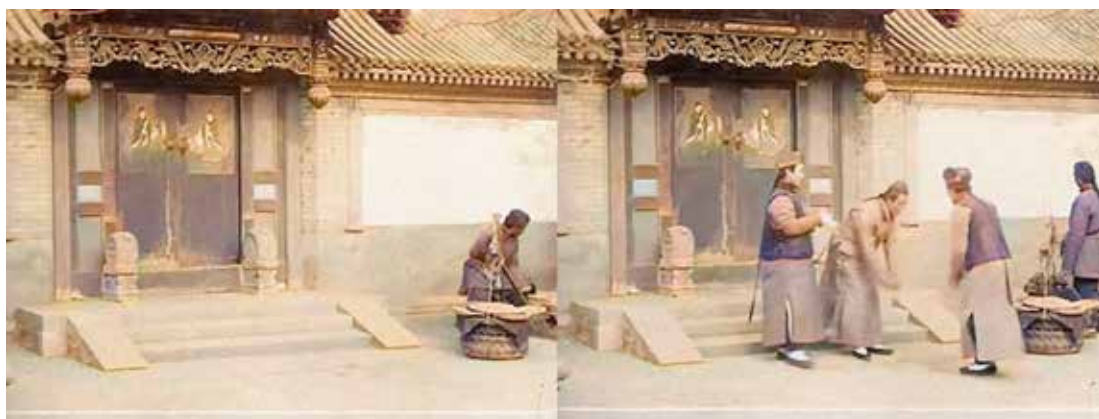


FIGURE 1. Manners and customs in
Beijing 100 Years Ago, Left 4:37, Right 5:37, Source: Bilibili

THE INTERPLAY OF AI, AUTHENTICITY, AND HISTORICAL ARCHIVE

The Chinese materials in the *Les Archives de la Planète* collection, taken in 1909 and later used in *Beijing 100 Years Ago*, serve as a historical archive that documents Chinese society during a period of intense political and social change, just three years before the fall of the Qing Empire and the establishment of the Republic. At the beginning of the video, Hu introduces his motivation for undertaking the project and briefly explains the technologies he utilised, including AI-powered colorization and frame restoration. In the video's comment section, he provides additional information about his workflow, which involved three open-source AI tools. Firstly, DAIN was used to interpolate frames, increasing the frame rate from 6–8 fps to 60 fps for smoother motion. It does this by predicting motion paths and generating entirely new frames. In other words, while it creates smoother video, it also introduces frames that are entirely new compared to the original footage. Secondly, ESRGAN was applied to enhance resolution; it uses a Generative Adversarial Network (GAN) to upscale low-res footage and sharpen details with machine-generated predictions. Thirdly, DeOldify added colour, converting the footage from black-and-white to colour based on learned colour patterns from the dataset. VirtualDub was also used to reduce the noise typical of old films.

The above-mentioned AI-driven tools pivot on machine learning models, such as GAN, to conduct automatic restoration and colorization (Li 2022). Put simply, machine deep learning is a computational approach that allows computers to acquire human knowledge and experience through a machine-processable way (Goodfellow et al. 2016). As a subset of machine learning, GANs are networks that employ unsupervised learning to simultaneously train a discriminator network, which is responsible for recognising different types of damage; and a generative network, whose responsibility

is to generate more realistic and natural restored images (Zhou et al. 2024)

In *Beijing 100 Years Ago*, to better showcase the result of the restored film, Hu inserts three clips with one side labelled “original” and the other “AI + frame restoration” (Figure 2). The original footage, in stark black and white, retains the raw qualities of the footage through its grayscale tones. These imperfections stem from limitations in early film development techniques, degradation over time (such as fading and wear), and the loss of detail during the digitisation process. In contrast, the restored footage on the right appears smoother and more colourful. Though the overall colour palette is dominated by a hazy dusty tone, the added colour and increased brightness make the visuals more engaging. Additionally, the higher frame rate renders movements smoother and more aligned with contemporary cinematic aesthetics, thus bridging the technical disparities between the two eras.

Under the published video, one viewer commented, “The restored video feels so much more lifelike!” This kind of sentiment was also echoed by many others in the comment sections. This paper uses this kind of viewing experience as a starting point to explore the relationship between AI restoration and authenticity. Does the addition of colour and the removal of noise bring the restored footage closer to our sensory expectations? The present research builds on Wallmüller's (2007) reappropriation of the classical restoration theory, which considers the authenticity from both material and immaterial aspects. Wallmüller proposes that the material aspect (authentic work) involves preserving the archival original without alteration, such as film reels, celluloid, and original scripts, while only correcting errors, decay, or damage in its copies. Her view corresponds with Walter Benjamin's (2018: 4) opinion on the conditions of authentic restoration, in which “the presence of the original is the prerequisite to the concept of authenticity.” Benjamin attributes the

uniqueness and authenticity of archival originals to the physical and chemical changes they undergo from their creation to their preservation. These elements constitute the archives' "historical testimony," which cannot be replicated by copies and directly underpins their authenticity. On the other hand, the immaterial aspect of authenticity (authentic restoration) refers to maintaining the "characteristic look of a moving image work and its presumed original characteristics" (Wallmüller 2007: 80). Wallmüller elaborates on this, saying that the restoration process should repair damage and errors while preserving defects. The distinction lies in the origins of these imperfections: defects (grain, scratches from filming) are inherent to the film's production, while damage and errors result from improper storage, natural aging, or mishandling after the film's creation (79).

Similarly, institutions that set industry standards on archive restoration have highlighted the need to preserve defects during the restoration process. This principle stands in direct opposition to the very essence of AI-assisted digital restoration, whose core objective lies in noise reduction and image sharpening (Wallmüller 2007). The International Federation of Film Archives (FIAF) Code of Ethics, under the "Rights of Collection," states: "When restoring materials, archives will endeavour only to complete what is incomplete and to remove the accretions of time, wear, and misinformation. They will not seek to change or distort the nature of the original materials or the intentions of their creators" (FIAF 2022). When assessing the consequence of using automated technology to restore archival footage in *They Shall Never Grow Old*, Allison (2022: 1270) argues that: 'Not only can these digital technologies remove scratches and dirt from archival footage – elements that were introduced during distribution or exhibition – but they also can eliminate elements that would be considered fundamental parts of the text, like film grain.' Her statement, together with the FIAF code of ethics, seems to struggle to find a common ground with Hu's practice

in *Beijing 100 Years Ago*, where the removal of characteristic elements in the original footage diminishes the overall authenticity of the restored film.

By institutional standards, in addition to preserving the original characteristics of the archive, respecting the creator's original intention is also considered a cornerstone of an authentic archival restoration (Wallmüller 2007; AMIA 2015; Allison 2022). In this regard, Hu's restoration process clearly alters, and even distorts, the visual style, tone, and inherent defects of the original footage. While audiences and mainstream media have embraced these changes (Zhou 2021), Wallmüller (2007: 87) firmly argues that such restorations, tailored to contemporary aesthetic preferences, amount to "falsification." A similar perspective is echoed by Cherchi Usai et al. (2008: 153), who assert that "...for the benefit of present and future generations, the curator must ensure that the work is experienced in a form as close as possible to the way it was intended to be seen and/or heard at the time of its creation." Such a statement further shows that by stripping film of its characteristics, the AI restorers not only risk violating the creator's intention but also jeopardise the value of the work for future generations. Moreover, according to film archivist Giovanna Fossati's (2018, 190) concept of 'restoration is simulation,' an AI restoration displayed on the Internet can hardly conform to the creator's original intention. She argues that digital films lack the physical traces of reality that analogue cameras possess (such as the interaction between light and the photosensitive emulsion on film stock), which directly connect the medium to the world it represents. As a result, without physical traces of reality, digital cameras can only *simulate* reality, rendering them non-indexical and incapable of directly representing the physical world.

But if Kahn's ambition was to establish a cultural repertoire and document human culture in as much detail, would he have objected to his collection being restored in colour? While we can only speculate



FIGURE 2. Captions in *Beijing 100 Years Ago* 0:22,
Source: Bilibili

about his intention, his evolving approach to building the *Les Archives de la Planète* collection may shed some light on his opinion on his films being colorized. Notably, beyond the 183,000 meters of film, Kahn's archive included 72,000 colour photographs by 1931 (Okuefuna 2008). In fact, before the project even began, Kahn had already recognised the potential of colour photography – allowing him to more faithfully recreate the “vanishing world” he sought to preserve – as early as 1908 through his participation in a presentation by travel photographer Jules Gervais-Courtellemont, who showcased colour autochromes taken during his travels in the East (De Luca 2021). Following this, not only were Gervais-Courtellemont's autochromes among the first colour works added to Kahn's archive, but by 1912, Kahn also replaced traditional black-and-white stereography techniques with the autochrome process for his project. Knowing Kahn's fascination with colour photography led the archivist Grace Linden (2024) to point out that in *Les Archives de la Planète*, “Colour, as such, was essential to the Archive's establishment.” Considering that the subtractive colour processes used for producing colour films had not yet emerged during the 1910–1930 period when the documentation of *Les Archives de la Planète* took place, it is reasonable to infer that Kahn would have embraced the possibility of shooting in colour if technological limitations had not constrained him.

Following the above arguments, film scholar Serge Bromberg (2012) has highlighted the new possibilities offered by advancements in automatic colorization technologies. Unlike classical restoration theory, which emphasised reproducing the experience of the film as it was during its first screenings, the modern approach aims to “free us from the physical celluloid medium and show directly what the camera operator saw” (15). By enhancing the image quality and colour fidelity in restored versions, this approach seeks to enact the gaze of the original camera operator, directly linking the refined visuals to the reality captured at the time of filming.

Furthermore, this use of digital technologies to reduce noise and add colour is described by Whissel (2002) as a way to offer audiences a familiar mode of engaging with “‘authentic’ representations of history as spectacle, seen from the (imaginary) position of a participant-observer on the scene” (233). Through automated noise reduction, the visual clarity makes archival footage more recognisable and allows viewers to immerse themselves in the experience, imagining themselves walking the streets, engaging with the people, and observing the landscapes of 1909 Beijing. This “fantasy of presence” aligns with Kahn's vision for his collection as a time capsule for future generations. In this sense, the unique nature of Kahn's project suggests that the distortions and colorizations often criticised in other restoration efforts for catering to contemporary aesthetics could be reconciled with Kahn's original objective and actively support preserving a “vanishing world” for future viewers (Rosen 2023).

In the film, the application of AI colorization is evident in various scenes. For instance, the city walls are rendered in a whitish-grey tone, simulating the brick colour used during the Qing Dynasty, while the streets are depicted with a dull grey cobblestone texture. However, discrepancies emerge in the restoration of clothing (**Figure 3**). Some garments are tinted in shades of reddish-purple, with hems appearing red or yellow, even though such dyes were strictly regulated and rarely available in late Qing and early Republican China (Jiangsu Provincial Archives 2021). Strikingly, most individuals in the restored footage were rendered wearing purple garments, with only a few donning white or grey, which seems inconsistent with the common historical background. In another scene with a bustling market as background, the crowd appears saturated with purple clothing, further creating a rather jarring and incongruous visual effect. Thus, the above AI colorization examples raise critical questions: does such colorization truly contribute to “vividly preserving a

vanishing world,” as suggested earlier, or does it merely overlay colour onto objects, simulating an ambiguous sense of reality when compared to the original black-and-white images, particularly in the case of circumstances that took place more than a century ago?

Beyond the inconsistencies in colour restoration, Hu has faced controversies over his own mastery of historical knowledge, and early 20th-century Chinese history in particular. At the beginning of the film, Hu identifies the footage as dating from 1920 and attributes it to “a Canadian filmmaker.” However, this assertion contains significant inaccuracies regarding both the date and authorship of the film. One obvious disparity concerning the date lies in the film’s depiction of the majority of adult males with the Manchu queue hairstyles that do not correspond to those of 1920. The queue hairstyle itself is the result of the “Tifayifu” (shaving hair and changing costume) policy, which is a cultural assimilation edict imposed by the Manchu rulers of the Qing Empire that required Han men to adopt the Manchu hairstyle (Wang 2022; Wang 2018). After the fall of the Qing Dynasty in 1912 and the establishment of the Republic of China, the unpopular policy was soon abolished, which marked the cessation of the queue tradition in society (Zhang 2013). However, the footage shows nearly all adult males still wearing queues, a detail that contradicts the 1920 dating of the film. Although this issue was pointed out by viewers in the comment section, as of 2025, five years after the video’s release, Hu continues to retain the disputed and misleading title. Furthermore, Hu’s claim that the filmmaker was Canadian has little solid ground. Although he provided a reference to the National Film Board of Canada, this institution merely accessioned part of the footage from *Les Archives de la Planète*; it was not shot by a Canadian. Moreover, even the reference page itself indicates that the production credit belongs to Albert Kahn. All other evidence indicates that the film was recorded in 1909 by Albert Duterre, who had been hired by Albert Kahn

(Okuefuna 2008; Okuefuna and Schellenberg 2008).

Beyond the contested AI-assisted noise reduction and automated colorization, the date and authorship controversies, the opacity of AI restoration workflows present one of the greatest challenges to the authenticity of Hu’s restoration efforts. For instance, although it is true that, regardless of whether *Beijing 100 Years Ago* was restored by a human restorer or a dataset-trained software, it remains difficult for both of them to determine which errors should be removed and which defects should be preserved as inherent to the original production (Wallmüller 2007). However, the key difference lies in the transparency of their respective workflows. According to Wallmüller, a professional human restorer typically follows a set of established protocols: First, a detailed pre-documentation that outlines the project’s background and restoration goals is often required. This documentation may also include the involvement of relevant institutions or individuals. When making subjective decisions, as Wallmüller suggests, restorers articulate their conceptual reasoning and record every intervention as part of the project log. Such workflows ensure that every decision is traceable. Additionally, the open sharing of restoration samples encourages peer discussions, ideally improving the overall restoration process.

By contrast, digital restoration tools, including AI, are often criticised for their lack of transparency due to the absence of a similar documentation pool (Meyer 1996; Purse 2013). This deficiency has led film historian Mark-Paul Meyer to describe it as a “magic box” where “a film or video is inserted at one end and pops out at the other end after having been treated in an unknown and inexplicable way” (33). In *Beijing 100 Years ago*, although Hu could experiment and adjust the input code to achieve different outcomes, the computational processes bridging the input and output remained opaque. Moreover, the lack of recorded decision-making weakens



FIGURE 3. Crowded market in *Beijing 100 Years Ago* 2:55,
Source: Bilibili

the connection between the original footage and the restored version. As observers, we cannot accurately identify what has been added or removed. For instance, while Hu's restoration clearly adds colour to the original film, AI cannot specify how many colours were added, why these particular colours were chosen, or what references informed these choices. The result is problematic, as archivist Lisa Purse aptly observes: "What these technologies really promise is an absolute control over the image, the extent of which – in any particular scene or film – is not fully discernible by the spectator." When the restored films cater to the aesthetic demands of viewers, it often comes at the cost of greater contextual absence.

In summary, a closer scrutiny of *Beijing 100 Years Ago* highlights how AI-assisted restoration complicates archival authenticity, especially considering the use of automated colorization and noise reduction, as well as the contested dating and authorship of the footage. Unlike human restorers who document each intervention, AI tools operate as a "magic box" (Meyer 1996), producing outputs without transparency or, more importantly, accountability. While Kahn's interest in colour photography suggests he might have welcomed colour film had it been available, restorations tailored to contemporary aesthetics without clear documentation risk, as Wallmüller (2007) warns, sliding into "falsification."

CLOSING THOUGHTS: RECONNECTING WITH THE PAST OR PAVING THE WAY FOR A DYSTOPIAN FUTURE?

At the beginning of the video, Hu explains that the motivation behind his restoration project stems from a desire to pursue something that is "charitable, socially meaningful, and simultaneously interesting." Indeed, the long-lasting popularity of *Beijing 100 Years Ago* on a number of platforms suggests that he did not stray far from these objectives. Moreover, his use of AI to restore the original footage resonates with archivist Eric Ketelaar's

(2001:137) concept of "activation." Ketelaar argues that any interaction with an archive, including reading, annotating, or reorganising, would "activate" it and transform the archive into a "membrane" through which tacit meanings and narratives are infused and exchanged (138). By "activating" the historical footage of Beijing recorded in *Les Archives de la Planète*, Hu breathes new life into the material and reactivates audiences' connection to the experience of earlier generations. His restoration draws renewed public attention to this archival fragment and opens a window into a bygone era. As one viewer observed on Bilibili: "A hundred years ago, they looked at the camera with fear and uncertainty. A hundred years later, we watch them with curiosity through our phones. That camera feels like a time tunnel, connecting both ends across a century. They were witnesses of history, while we are now witnessing history itself." To some extent, this evocative sense of temporal dialogue closely mirrors Kahn's original ambition to preserve vanishing cultures for future generations. In this light, Hu's AI-restored film can be seen as a continuation of Kahn's cosmopolitan project to bridge time.

However, as Ketelaar (2001b) stresses, it is crucial to consider the Semantic Genealogy of archival material by asking: "By whom, when, why, and how was the archive created? Where was the archive kept – was it in a safe or a bedroom? Who first accessed it, and who later engaged with it, when, why, and how? Who appraised it, and under what circumstances?" (140). In considering how the archive was engaged and under what circumstances, Hu's use of AI sits uneasily alongside the traditions of institutional restoration, especially when it comes to questions of authenticity. The tension is clear in the way defects are erased through noise reduction, in the historical inaccuracies of colorization, and in the absence of a transparent workflow. Of course, Hu's project is not the same as the carefully regulated work carried out by professional restorers, and perhaps it should not be judged by exactly the same

standards. Nevertheless, this cannot dismiss his responsibility toward the historical materials he works with, nor the impact his choices have on how millions of audiences understand the past; one tangible impact of Hu's controversial video title is that almost all news outlets reporting on the film also adopted the same title, which has contributed to the widespread misdating of the footage as 1920, even though it does not belong to that year.

While Hu presents a controversial example of combining AI with restoration, his work can nevertheless serve as an inspiration for more institutionalised restoration efforts, or as a possibility for a future in which restorations are conducted by non-specialist restorers. In fact, in addition to the growing number of more elaborate amateur restoration works on video platforms, we are already seeing the growing use of AI within professional contexts to improve efficiency. From a professional perspective, it will be crucial to see how these institutions address the issues encountered in Hu's case, such as transparency, accountability, and the justification of decisions. In this sense, Hu's project can be seen as a pioneering, if experimental, effort that signals the possibilities of this emerging practice.

Moreover, as previously mentioned, AI complicates our ability to trace the restoration process and the changes being made. This tension gives rise to new questions: just as colonial powers once controlled narratives by owning and manipulating archival records, does the AI restoration process risk reshaping history in ways that prioritise aesthetic appeal over historical accuracy? This brings us back to Derrida's (1995) argument that those who control the archive hold the power to dictate what is remembered and forgotten. Derrida's warning of a dystopian future seems prescient here: if AI restoration becomes the new norm, it may dominate not only how history is preserved but also how it is remembered. Such risks can only be mitigated if AI is guided by human expertise to support decisions rather than replace them. Restorers should not mythologise AI, as its outcome requires just as much effort in refinement and rigor as does manual restoration. Nor should it be reduced to a mere slogan of "magic box" for attracting audiences, thereby risking sidelining the complex realities of the past.

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