Research Article

Katharina Fackler*

Of Stereoscopes and Instagram: Materiality, Affect, and the Senses from Analog to Digital Photography

https://doi.org/10.1515/culture-2019-0045 Received September 29, 2018; accepted June 27, 2019

Abstract: This article addresses popular claims that photography has been "dematerialized" in the digital era. It engages a wide range of critical writings about photography from the early 19th to the 21st century to demonstrate that different versions of these claims have always formed an important part of photography criticism. However, rather than doing justice to photographs' materiality or their complex entanglements with what has been considered material and immaterial, human and nonhuman, they have tended to somewhat limit our understanding of the medium's material, sensory, and affective valences. This article argues that a sustained engagement between visual culture studies, sensory studies, and the new materialisms can help us understand more fully both analog and digital photography's contingent position within the material world, varying sensory ideologies, and different subjectivities.

Keywords: digital photography, materiality, photography and the senses

"Digital [photography] involves coded signifiers, data that can be easily played with, abstracted from their source; analog emanates from wind and wood and trees, the world of the palpable." (Fred Ritchin, *After Photography* 17)

Introduction

In this epigraph, Fred Ritchin expresses a widely shared feeling about the shift from analog to digital photography. Since its invention, photography has been believed to be more intimately linked with material reality than other forms of representation. Quite regularly, these feelings have been connected with photographs' sensory qualities. In the last few decades, however, this belief has come under intense scrutiny as, to many, the digital appears to have "dematerialized" photography and thus made it less trustworthy as a trace of the material reality before the camera lens. Together with their "palpable," tactile qualities, photographs seem to have lost their claim to the real. As photographs can no longer be handled as before, they appear to evade human observers' grip on the material world. Digital photographs now exist in codes rather than as solid objects, leading some to believe that the ease of their manipulation undermines any potential as a document of reality. In other words, photography may have been doubly dematerialized. Along these lines, artists, journalists, and critics have surmised that we may be finding ourselves in an era

^{*}Corresponding author: Katharina Fackler, Department of American Studies, University of Graz, Austria, E-mail: katharina.fackler@uni-graz.at.

of "post-photography," a term that evidently reverberates with even more recent debates about the "post-truth" era.¹

This article looks into the development of photography criticism to complicate this popular perception of photography's materiality. It seeks to demonstrate that the dematerialization claim that followed the digital turn is, at least partly, based on a certain disregard of the longstanding precarity of photography's place within different dimensions of materiality. In particular, it highlights how photography's "materiality effect" has been worked out through evolving understandings of the human sensory apparatus. After all, the senses not only mediate the perception of material reality, they are an important site where subjects negotiate their relation to and position in the world. This article suggests that, while the impact of the digital should not be underestimated, many fears about photography's supposed digital dematerialization may be grounded in a nostalgia for a bygone era of clear and simple relations between photography, human observers, and "the real world" that never existed. Frequently, this nostalgia has been entangled with an ocularcentric world view that understands sight as a source of truth, reason, and human agency—a combination that has tended to solidify the position of the privileged. This article argues that a close conversation between visual culture studies, sensory studies, and what has been called the new materialisms can help avoid such simplifications. Hence, rather than loosening the relationship between photography studies and material culture studies, the digital era solicits an even closer engagement between these fields. Together, they can complicate both analog and digital photography's contingent position between materialities, the senses, and different subjects' position in the world. Among others, we find that, instead of dematerializing photography, the digital has added new variants to an already wide range of photographic materialities, which, in turn, can also further our understanding of analog photography.

The new materialisms challenge scholars to move beyond the focus on representation that has characterized the so-called cultural turn. Instead, critics are called on to take into consideration a wide range of aspects pertaining to "the nature of matter and the place of embodied humans within a material world" ("Introducing the New Materialisms" 3). This includes not only the analysis of the material properties of things, but also a reinvigoration and updating of materialist approaches in the (post-)Marxist tradition. Inspired by the increased appreciation of complexity in the new physics and biology, the new materialisms seek to break with easy categorizations and simple determinisms in order to account for the intricacy of interactions with the material world. Thereby, materiality is never defined as stable, pre-defined, or purely physical, but always as coming into being through sensory contact with a perceiving subject. In Bill Brown's words, "the thing really names less an object than a particular subject-object relation" ("Thing Theory" 4). Quoting Cornelius Castoriadis, Brown therefore describes a "materiality-effect" by which "each society' imposes itself on the subject's senses, on the 'corporeal imagination' by which materiality as such is apprehended" ("Thing Theory" 9).

The study of sense perceptions, in turn, is not confined to biology and the neurosciences. On the contrary, the fields of sensory history and sensory studies proceed from the assumption that sensory perception is a both cultural and physical act and that the senses therefore are "historically and culturally generated ways of knowing and understanding" (Smith, *Sensory History 3*). As sensory perception is deeply shaped by and expressive of collective cultural beliefs and structures of feeling, it begs cultural, literary, and historical analysis. The ways in which different cultures attribute varying functions and meanings to the senses impacts how they imagine their access to and grasp of the material world. As Walter Ong and Marshall McLuhan have famously argued, cultures' valuation of different senses and their interplay changes over time, also through the development of new media, such as print and photography (McLuhan; Ong, *Orality and Literacy*; Ong, "The Shifting Sensorium"). The understanding of photographs and their

¹ For an early usage of the term, see W.J.T. Mitchell's 1992 *The Reconfigured Eye: Visual Truth in the Post-Photographic Era*. Among more recent artistic work, the catalog *La condition post-photographique* stands out. It accompanied the 2015 "Mois de la Photo" ("Month of the Photograph") in Montreal, gathering works that explore, among others, the transmission of visual data in cyberspace and the implications of virtual reality to gauge how the digital has changed photographic practice (Fontcuberta et al.). Robert Shore's *Post-Photography: The Artist with a Camera* (2014) brings together creative work that responds to the massive archive of images available online. The 2018 Helsinki Photomedia Conference, in turn, focused on the question of post-truth via photography.

materialities is thus entangled not only with the (im-)material dimensions of the medium but also with certain sensory ideologies.

Photography, Materiality, and the Separation of the Senses in the 19th Century

What fascinated critics most in the first decades after the invention of photography was the medium's ability to represent what they perceived as objective reality outside the picture frame. Many were convinced that photography provided access to the material world while freeing viewers from most of the restrictions that this world imposed on the human body and its senses. The medium thus seemed to increase human mastery of the physical world. The influence of human agents on the photographic process, in contrast, was downplayed. For the photography pioneer Henry Fox Talbot, photography was, as he titled one of his books, "The Pencil of Nature." Among the numerous functions he foresaw for the new medium was the role of "evidence of a novel kind" that could be used against criminals in court (qtd. in Sekula 344): In his view, a photograph of a stolen object alone was enough to help incriminate a defendant. The physician and poet Oliver Wendell Holmes also described the early photograph as a "mirror with a memory" that provides "a copy of Nature in all her sweet gradations and harmonies and contrasts" in his oft-cited 1859 article "The Stereoscope and the Stereograph." Photography, he contended, registered the traces of sunlight that had been reflected by the objects and subjects of the real world. In this vein, photography was often understood as a neutral tool to further human knowledge and control of the material world.

When Holmes famously claimed that "[f]orm is henceforth divorced from matter," he laid the foundation for a long tradition of criticism that opposed the realm of matter to dematerialized visual representation. This line of thinking placed the medium's function as a representation of the real at the center while paying only scant attention to stereographs' own material lives. For Holmes and many of his contemporaries, photographic technology allowed humans to experience the world through sight alone. He provocatively went as far as to state that "matter as a visible object is of no great use any longer, except as the mould on which form is shaped. Give us a few negatives of a thing worth seeing, taken from different points of view, and that is all we want of it." In other words, photography could substitute for things by capturing their visual appearance.

This early conception of photographic access to the material environment is closely connected with the rise of sight as the sense for knowing the world. In contrast to the supposedly messier, more subjective senses, such as touch and smell, sight was increasingly associated with objectivity, rationality, and (human) knowledge throughout the nineteenth century (Smith, "Producing Sense" 850-51). Quite fittingly, Wendell Holmes surmised that sight might be able to substitute for subjects' non-visual sensory interactions with the material world. "There is good reason to believe," he stated, "that the appreciation of solidity by the eye is purely a matter of education." He cited two medical cases to make the point that "everything is seen only as a superficial extension, until the other senses have taught the eye to recognize depth, or the third dimension, which gives solidity, by converging outlines, distribution of light and shade, change of size, and of the texture of surfaces." Sight is thus intimately connected with the other senses and, at first, relies on their input. However, once it has learned to absorb non-visual sensory information, it can take over the functions and capacities of the non-visual senses. Eyesight seems so superior that a multisensory materiality effect can be created through the eyes alone. The rise of sight thus went along with what Jonathan Crary has described as the "dissociation of sight from touch" and a concomitant "unloosening of the eye from the network of referentiality incarnated in tactility and its subjective relation to perceived space" (19). This process of dissociation from the non-visual senses also involved photography's affective valences.

Photographs' own agential capacities only appeared as a footnote in Holmes's writing. His certainty that stereographs visualize what the human observer would identify as a truthful depiction of reality wavered somewhat when he implicitly acknowledged that photographs' ability to frame may lead to more than neutral, immaterial reproductions of reality. He proposed that camera angles and distances be reined in with the help of "a stereographic metre or fixed standard of focal length for the camera lens" to enable a comparison between depicted objects. By standardizing photographic procedures, he surmised, it would be possible "[t]o render comparison of similar objects, or of any that we may wish to see side by side, easy." In other words, Holmes hoped to impose rules onto the photographic process to assure human mastery over both nature and technology. Neither photography's material properties nor its agential capacities or photographers' creative decisions figured prominently in his reasoning. This understanding of photography would change considerably.

Shifting Sensibilities: From the Postmodern Critique to the Return to Photographic Materiality

In the first half of the twentieth century, modernist photographers and critics strove to establish photography as an art form. It is here that we find the first sustained engagements with photography's creative, affective, and material dimensions. Where Holmes had presented photographs as reproductions of an external reality, modernists highlighted photographers' often sensual creative processes, seeking to "exhibit the photographic print as a hand-made object" (Orvell 84). For Edward Weston, "man, himself, is the actual medium of expression, not the tool he elects to use" ("Leaflet, Written for the Los Angeles Museum, 1934" 318). While eyesight and camera-work had been associated with neutrality in the nineteenth century, modernists counted on artistic vision to expose a deeper truth about material reality. "I want the *greater mystery of things revealed more clearly than the eyes see*," Weston wrote in his daybooks (312). Photography could capture this deeper truth through form, rhythms, and textures, because "[f]eeling and recording are simultaneous" ("Daybooks, 1923–1930" 313).

In the second half of the twentieth century, however, critical thinking on photography at first veered into a different direction. The so-called postmodern critique of photography (cf. Linfield 2–31) reflects elements of Holmes's line of thinking on stereographs. Prominent scholars of photography, ranging from Susan Sontag to Alan Sekula and John Tagg, were more interested in the content of visual representation than in photographs' material and non-visual sensory qualities. Many postmodern critics highlighted photographs' status as a commodity, as "a set of meanings or ideologies that take the image as their pretext" (Edwards and Hart, "Introduction" 1). They often assumed that "photographs are apprehended in one visual act, absorbing image and object together, yet privileging the former" (Edwards and Hart, "Introduction" 2). As photographs thus became "detached from their physical properties" (2), their material form was often understood as neutral support rather than an active factor in the creation and circulation of photographic meanings and feelings. As John Tagg argued, rather than look for material traces of the real, one should "raise the question of the determining level of the material apparatus and of the social practices within which photography takes place" (Tagg 2). These theories are materialist in the (post-)Marxist sense, as they offered analytical tools for broader political, social, and economic structures.

In contrast to Holmes, however, postmodern critics had less faith that either sight or photography would act on behalf of the wider humanity. Influenced by (post-)Marxism and postmodern theories that highlighted the pervasiveness of (state) power, regulation, and surveillance in knowledge production and practices of representation, they concentrated on the ways in which the increasing number of photographs that circulated in the public sphere tended to perpetuate existing ideologies and consolidate exploitative power structures. Sight and photography became more associated with surveillance than with a more democratic human mastery of the material world. For example, the myth of the so-called compassion fatigue claims that the mass circulation of photographs in the public sphere impeded rather than facilitated intersubjective empathy, identification, or resistance (Campbell 99). The titles of John Tagg's *The Burden of Representation* and Victor Burgin's *Thinking Photography* bespeak this postmodern approach to photography. In their emphasis on photography's tendency to consolidate existing power structures, these critics highlighted photographs' intervention on behalf of the state while neglecting the impact of other elements of photographic practices, including, their multisensoriality, ambivalent structures of feeling, and, as Ariella Azoulay has pointed out, the civic responsibilities of the viewer.

Only much more recently, when the digital transformation was already in full swing, did critics

more systematically analyze photographs' material properties. In their seminal 2004 edited collection Photographs Objects Histories: On the Materiality of Images, Elizabeth Edwards and Janice Hart emphasize the "need to break, conceptually, the dominance of image content and look at the physical attributes of the photograph" (2). This does not mean that they discourage scholars from considering image content. Rather, they argue that photographs' "meanings as images and meanings as objects" are "inextricably linked," forming "an indissoluble, yet ambiguous, melding of image and form, both of which are direct products of intention" (2). While certain sub-fields of visual culture studies, including art history, may already have a tradition of considering visuals' materiality, Edwards and Hart encourage a broader and more systematic engagement with materialist analysis, including the arrangement and projection of digital images. After all, photographs as objects "occupy spaces, move into different spaces, following lines of passage and usage that project them through the world" (Edwards and Hart 1).²

Edwards and Hart propose that scholars consider two different forms of photographic materiality. Firstly, materiality pertains to "the plasticity of the image itself, its chemistry, the paper it is printed on, the toning, the resulting surface variations" (3). For instance, printing a photograph is not merely an act of reproduction and representation, but it involves creative choices pertaining to the kind of paper, its size, format, and so on. These choices at the same time shape the photograph's materiality and its meanings and possible uses. A smaller print will likely make viewers move closer and invite haptic interaction, while large prints tend to be hung on walls and inspected from a distance. Secondly, photographic materiality relates to photographs' presentational forms, such as cartes de visite, cabinet cards, albums, mounts, and frames (3), which, in turn, engender distinct forms of plasticity and interaction. In the vein of the new materialisms, Edwards and Hart carefully avoid overemphasizing human eyesight, reason, and agency. They assert that photographs' material and presentational forms stand in "a complex and fluid relationship between people, images and things" (3).

In this context, certain classic writings on photography that had been dismissed by postmodern critics have been newly considered and valued. Among them is Roland Barthes's encounter of a photograph of his deceased mother, which he describes as follows:

There I was, alone in the apartment where she had died, looking at these pictures of my mother, one by one, under the lamp, gradually moving back in time with her, looking for the truth of the face I had loved. And I found it. The photograph was very old. The corners were blunted from having been pasted into an album, the sepia print had faded, and the picture just managed to show two children standing together at the end of a little wooden bridge in a glassed-in conservatory, what was called a Winter Garden in those days. (67)

Scholars like Victor Burgin had rejected Barthes's focus on "personal thoughts and feelings of the critic" (Burgin 3). Postmodern approaches, centered on the content and ideological valence of the image rather than its material form, had often displayed a preference for privileging both the eye and human reason. For Barthes and for researchers turning to the material and sensory dimensions of the medium, photographs are not just visual content that makes people think, they are material objects that are experienced in specific situations in which they trigger both cognitive and affective responses that often are not easily categorized or even integrated into clear-cut ideological critiques. In other words, what Barthes describes in Camera Lucida is an embodied sense of visuality that is closely entwined with other sense impressions, most notably the tactile, and complex emotions (Edwards; Brown and Phu, Introduction).

Theories that approach photographs as material objects that possess "volume, opacity, tactility and a physical presence in the world" (Geoffrey Batchen qtd. in Edwards and Hart 1), in contrast, have inspired a deeper engagement with the non-visual sensory qualities of photographs. As Susan Buck-Morss argues, "[o]ne needs all of one's senses to do justice to material reality" (328, also see Rose and Tolia-Kelly 3). Distancing itself from its previous ocularcentrism, visual culture studies has taken what Sarah Pink calls a "sensory turn" (4). This sensory turn is corroborated by insights from sensory studies, according to which

² Gillian Rose and Divya P. Tolia-Kelly's 2012 edited collection Visuality/Materiality: Images, Objects and Practices explores the ways in which materialities are represented visually. They propose a "visual materialism" that emphasizes the "co-constitution of visuality and materiality" (4).

the paradigmatic Western five-sense model, which partitions the human sensory apparatus into sight, sound, smell, touch, and taste, is a construct that occludes the multidirectional interactions between the senses (Howes, "Introduction" 9).³ Rather than through five senses, one may legitimately argue that "people relate to the world through a single sense organ, the body, in which all the senses are united" (James 525). Mieke Bal has therefore criticized the "visual essentialism" that methodically isolates the object of visual culture and fails to reckon with the fact that the act of looking is "profoundly 'impure'" (9). Alois Riegl's idea of the "optical-haptic," in contrast, describes the shift that occurs as one's attention moves "from a thing being represented to an awareness of the texture of that thing [...], until a point is reached where we identify this with the very texture of the photograph itself" (Edwards and Hart, "Introduction" 9). With the material turn, photography became a matter of bodies and all the senses.

For a number of scholars, the non-visual dimensions of photographs have served as theoretical and methodological entry points for a critique that complements and counters various forms of subjection and domination that have been largely legitimized through the eye. For instance, the social constructs of both race and gender have been naturalized predominantly, albeit not exclusively, through the presumed visibility of bodily difference. The supposed objectivity of photographs has played an essential role in this process, which has all too often turned human subjects into objects deprived of agency. As Tina Campt states in the introduction to Image Matters: Archive, Photography, and the African Diaspora in Europe: "The visuality of race and the indexicality of the photograph have been powerful twin forces in the deployment of the racialized index to produce subjects to be seen, read, touched, and consumed as available and abjected flesh objects and commodities, rather than as individual bodies, agents, or actors" (33). It seems only logical that numerous scholars have turned towards photographs' non-visual dimensions to fill the voids and erasures created by ocularcentric "scopic regimes" (Jay). In this context, photographs' appeal to the non-visual senses does not necessarily have to emanate from their qualities as material objects, which are the focus of Edwards and Hart's edited collection. Rather, as photographs are embedded in media ecologies that seek to account for differences among producers and consumers, they begin to resonate multisensorially beyond the material object. This kind of critique often highlights photographs' intimate entanglement with affects and emotions, moving analysis beyond purely semiotic notions of meaning.

Fred Moten's celebrated monograph *In the Break: The Aesthetics of the Black Radical Tradition* provides a prime example. It opens with a reference to the "hypervisibility" of blackness, which correlates with "a certain musical obscurity" (1). This musical, or rather acoustic, obscurity is particularly devastating as it erases the importance of music and sounds, such as the scream, moaning, and mourning in black culture, which he traces back to, among others, the fact that speech was forbidden to the slave. For Moten, the ocular lends itself to an overly easy humanist universalism that "excludes the [phonic] difference of accent" (205). Moreover, sounds cannot and should not be reduced to mere meaning in the act of interpretation. Nor should live performance be strictly opposed to mechanical reproduction (197–98). In his chapter on the 1955 photographs depicting Emmett Till's battered and lynched body, which was on public display after Till's mother insisted on an open-casket funeral, Moten uncovers the "convergence of blackness and the irreducible sound of necessarily visual performance at the scene of objection" (1). In his reading, the photograph is suffused with black "mo'nin'," which blends moaning and mourning with the hope for a new morning in the form of the Civil Rights Movement. At the same time, it resonates with the sounds of Emmett Till's last day alive and his alleged whistling after a white woman:

the aesthetic and philosophical arrangements of the photograph—some organizations of and for light—anticipate a looking that cannot be sustained as unalloyed looking but must be accompanied by listening and this, even though what is listened to—echo of a whistle or a phrase, moaning, mourning, desperate testimony and flight—is also unbearable. These are the complex musics of the photograph. This is the sound before the photograph: Scream. (200)

In order to end "the suppression of difference in the name of (a false) universality" (205), Moten argues,

³ Constance Classen, for instance, has argued that the "traditional notion of there being five senses [...] has been shattered by sensory scientists" (4–5). To corroborate her point, she uses scientists' breaking down of the sense of touch "into a multitude of specialized senses including kinaesthesia—the sense of movement—perception of temperature and perception of pain" (5).

we must go beyond racialized practices of looking at photographs and consider their sonic resonances. In other words, photography's valence as a medium of resistance depends on audiences' multisensory awareness and engagement.

Tina Campt's work on family photographs of black Europeans in the twentieth century takes a similarly nuanced approach to "the photographic image as both an object and a site of affective attachments" (31). Her methodology combines the "tactile" approach towards photographs as material objects proposed by Edwards and Hart with a focus on what she calls "the haptic." The haptic, for Campt, is "a tactile and affective register," which "serves as a direct link to a third sensory level through which [...] images register: the sonic" (19).

As they move scholarly thought on photography even further beyond the supposedly rational and cognitive and beyond an overemphasis on human agency, such works stand in a productive exchange with the new materialisms. Focusing on subaltern modes of sensing and feeling, their conceptions of the human discard the idea of the rational agent that controls the world through the eye. Instead, they often spotlight the porous boundaries between the human and the nonhuman. As Moten puts it succinctly: "The history of blackness is testament to the fact that objects can and do resist" (Moten 1). Moreover, they put forth pluralistic, processual, and fluid notions of subjects and their affective and emotional lives. In other words, scholarly attention to these multisensory, affective, and "embodied modes of perception" (Campt 31) helps open up the critique of photography to racialized and queer experiences that defy easy categorizations, simplified causalities, and a dematerializing ocularcentrism.

Photography and Materiality in the Digital Age

The turn towards the materiality, multisensoriality, and radical potential of print photographs in photography criticism roughly coincided with the emergence of profound concerns about photography's dematerialization through digitalization. As Fred Ritchin points out, digital photographs cannot be touched and handled in the same way as print photographs. He and many others have emphasized that, in the digital era, photographs are no longer print objects whose material history is registered in the stains, greases, markings, smells, and fading of photographic paper. Rather, the core of a photograph seems to be a digital code which is stored as an electromagnetic pattern that is inaccessible to the human senses. As photographs' material and sensory properties are changing, their connection with the material world has come under renewed scrutiny. Much critical writing has therefore cautioned against a kind of double dematerialization, i.e. against the presumed loss of photographs' tactility and, concomitantly, the loss of their connection with the real. These claims seem to be based on the belief that, just like objects' status as material, photographs' connection with the real is related to the tangibility of photographic reproductions. Fred Ritchin poignantly summarizes the wide-spread feeling that digital photography, because we cannot feel it the way we can feel photographic prints, has also been further removed from those objects that once may or may not have been present before the camera lens. He writes in the passage partly cited in the epigraph to this article:

Sections, segments, and steps are the stuff of the digital; analog media reference (are analogous to) continuity and flow. Digital involves coded signifiers, data that can be easily played with, abstracted from their source; analog emanates from wind and wood and trees, the world of the palpable. Digital is based on an architecture of infinitely repeatable abstractions in which the original and its copy are the same; analog ages and rots, diminishing over generations, changing its sound, its look, its smell. In the analog world the photograph of the photograph is always one generation removed, fuzzier, not the same; the digital copy of the digital photograph is indistinguishable so that "original" loses its meaning. (17)

As digital photographs, in their untouchability, seem to slip through viewers' fingers, their meanings,

⁴ In her analysis of prison photography, Nicole Fleetwood demonstrates how the taking of photographs as a social act has a special place and sensory texture in U.S.-American prisons. As, within prison facilities, the taking of family photographs often is the only occasion where family members are allowed to touch one another, photographic practice acquires a special sense of tactile intimacy.

too, are experienced as shifting and elusive. In the 19th century, the untouchability of the stereoscopic image only fueled Oliver Wendell Holmes's trust in sight and visuality. In the twenty-first century, in contrast, photographs' palpability, together with the sense of touch, appears to have re-acquired a kind of authenticating force in debates about digital photography. Rather than with Holmes's, Ritchin's thoughts thus strikingly reverberate with Walter Benjamin's early twentieth-century claim that art lost its "aura" through technical reproduction (13). The digital revolution thus, on the one hand, appears to have inspired a re-appreciation for the material lives of print photographs while at the same time driving visual culture studies and material culture studies apart when it comes to the analysis of the digital.

Only recently has this trend shown signs of reversal. Thus, one set of recent studies suggests that the connection between indexicality and materiality may be more "congruent with the pluralist, contingent rhythms of materialization noted within new materialism[s]" (Coole and Frost, "Introducing the New Materialisms" 25) than it seemed at first glance. To many of its early critics, digital photography did not appear to fulfill Charles Sanders Peirce's definition of an index as a "fragment torn away from the Object" that "necessarily has some quality in common" with this object (qtd. in Seppänen 117). Thus, writing about "computational photography" Daniel Rubinstein and Katrina Sluis argued that "when the photograph became digital information, it not only became malleable and non-indexical, it became computational and programmable" (qtd. in Seppänen 118–19). Concurrently, Fred Ritchin summarized his growing distrust of photography as follows: "The question for me was not whether the image had adequately and accurately interpreted the person or the scene depicted but whether in fact the person or the scene had even existed" (31).

However, the logic that opposes supposedly trustworthy analog photography to allegedly non-indexical digital images "relies on an inaccurate assessment of traditional camera technology" (Cram et al.) and is based on a too narrow, materialist notion of indexicality. Tom Gunning points out how this logic underestimates the impact of non-digital forms of image manipulation: "The mediation of lens, film stock, exposure rate, type of shutter, processes of developing and of printing become magically whisked away if one considers the photograph as a direct imprint of reality" (40). Moreover, photographs have been manipulated since their invention. Mia Fineman's *Faking It: Manipulated Photography before Photoshop* (2012) gathers a wealth of examples.

With regard to the materiality of the notion of indexicality, Janne Seppänen has pointed out that cultural studies' frequent definition of materiality as anchored in the tactile never cohered with the photochemical processes through which the "traces" of light emanating from objects are transformed through and into photography. The idea that photography is created by a touch of nature works, if at all, metaphorically. In terms of digital photography, Seppänen engages physicists', such as Richard Feynman's, work to highlight that, "[f]rom the point of view of quantum electrodynamics [...] there is no generally accepted definition of matter. On the contrary, physical reality is to be understood in terms of complex interactions between different forces and energies (electromagnetic, gravitational and magnetic) and more or less solid bodies, which may be detectable by our sensory systems" (115). That indexicality is material and immaterial at the same time, however, does not warrant the claim that digital photography is non-indexical. Rather, a broad public debate about the nuances of photography's indexicality can help raise awareness of the fact that "[t]he photograph has always been an assemblage of different kinds of algorithms and protocols and a construction produced by certain practices and technologies" (121). Yet this does not imply that there ever existed an age in which the photographic process was "material" to the core or in which photographs were true to whatever viewers may have considered an objective reality before the lens.

The dematerialization claim also needs to be complicated with regard to the materiality of presentation and consumption. While electromagnetic signals and binary codes on computer chips may not be directly perceptible for the human sensory apparatus, photographic practices remain bent on making things and subjects visible with the help of projection devices. These projection devices, ranging from computers to smartphones, ought to be analyzed through Edwards and Hart's categories of photographic materiality, i.e. plasticity and their presentational forms. ⁵ While early versions of these devices appealed mainly to

⁵ See, for instance, Joanna Sassoon's article on the digitization of photographs by custodial institutions.

sight, Fred Ritchin's complaint (expressed in 2009) that terms like "apple, mouse, web, blackberry, windows, lap top, desk top, word, personal assistant, fire fox" are "misnomers" because they "describe an environment that has, as of yet, no taste, no smell, and where touch is reduced to clicking and typing and sight is continually framed by yet another rectangle" (15) is no longer tenable today. Touch screens now invite new forms of intimate tactile engagements with photographs. As they, for instance, allow users to haptically enlarge photographs, they simulate and go well beyond the sense of proximity generated by the handling of a print photograph. In the realm of the museum, a digital technology called haptics combines three-dimensional images of artifacts with simulated sensations to enrich museum goers' interactions with exhibitions (Howes, "Introduction to Sensory Museology" 263-64). Clearly, photography retains a "material substratum" (Fischer-Westhauser and Schögl 1).

Moreover, the logic that opposes digital to analog photography often fails to address the fact that photographic print products, including photobooks and exhibitions, continue to thrive. In fact, analog and digital photography are now thoroughly entangled. Print photographs are routinely scanned and digitized. Digital photographs are not only printed out but also manipulated with filters that seek to imitate the analog, e.g. through creases and faded colors (Schrey). Rather than dematerializing photography, the digital era has enlarged the range of photography's "manifold materialities" (Seppänen 114; Gerling et al. 14).

As visual culture scholars are laying aside their qualms about digital photography's materiality and indexicality, they are increasingly concluding that the digital revolution may lie less in photography's dematerialization than in another key concern of the new materialisms, namely "[c]irculations, sequences, transfers, translations, displacements, crystallisations" (Latour 10). The new forms of photographic circulation enabled by online infrastructures, such as Facebook, Flickr, and Instagram, may have an (even) more far-reaching impact on photographic practices than digitalization alone. Winfried Gerling, Susanne Holschbach, and Petra Löffler conclude in their 2018 monograph on digital photography that "the decisive difference to analog photography may [...] not primarily lie in the technological change from grain to pixel, from film to image file, but in the practices that have emerged as these were embedded in digital infrastructures—more precisely in the cross-linking and distribution of photographs and films" (8). While the creation, circulation, and display of photographs in the 19th century often required elaborate apparatuses and considerable amounts of time and expertise, digital cameras have now been integrated into the so-called quick media, which are "cheap, easily accessible, and omnipresent tools of communication which allow us to connect to each other spontaneously and effortlessly" (Friedman and Schultermandl 4).

Quick media increasingly entangle the roles of image producers and consumers as well as the agency of humans, technology, software, and objects. In her book on what she calls "nonhuman photography," Joanna Zylinska therefore encourages scholars to "see the photographic image as first of all a node in the networked sequence of human-nonhuman processes of connection, identification, translation, and last but not least, invention" (199, italics in the original). This notion of the photograph as a "node" in a larger network of human and nonhuman processes takes us far beyond Holmes's 19th-century ocularcentrism and faith in human agency over both photography and the material world. It also complicates postmodern critics' emphasis on (human-made) ideological apparatuses. Importantly Zylinska stresses that this understanding of photography is not limited to digital photography. The digital rather helps us rethink photography by and large by highlighting the medium's "original nonhuman entanglement and kinship [...]. Photography based on algorithms, computers, and networks merely intensifies this condition, while also opening up some new questions and new possibilities" (Zylinska 199). In other words, digital photography may help us to appreciate more fully and consistently the concoction of human and nonhuman influences in networked photographic processes throughout the history of photography. Yet, Zylinska is quick to point out the fact that photography (or part of it) is classified as nonhuman does not free humans from social and civic responsibilities: "nonhuman visuality turns into a human-centric responsibility" (199).

⁶ Current projects are set to explore this interface between analog and digital photography more comprehensively. See, for instance, the panel on "Photographic Materiality beyond Analog and Digital" being organized by Maria Männig and Dominik Schrey for the 2019 annual meeting of the "Gesellschaft für Medienwissenschaft," the society for media studies in Germanspeaking countries.

⁷ Translated from German by the author.

This seems all the more important as online forms of visual circulation and communication, including those enabled by Instagram, Twitter, or Facebook Live, have engendered new and resistant practices of seeing, sensing, documenting, and witnessing. Emergent practices of visual online communication have shaped protest movements as diverse as the uprisings of the Arab spring, Occupy Wall Street, the Black Lives Matter movement, and the recent surge of white nationalist backlash. Most of these practices retain a solid sense of digital quick photography as indexical. For Cram, Loehwing, and Lucaites, the "context of mobilization, circulation, media flow, and spectatorship [...] resituates the hermeneutics of suspicion that characterizes digital photography, foregrounding instead how digital photography in social protest actively generates new norms of publicity" that highlight the "emerging civic potential for spectatorship" (Cram et al.). Nicholas Mirzoeff thus argues that online protest photography can create a "copresence between physical and digital spaces," i.e. "a sense of 'being there' for each other across distance" that provides resources for new forms of "abolition democracy." If we re-center the analysis of digital photography towards circulation, "human-centric responsibility," and democracy, one of the central challenges ahead will be to reckon with the nuances of human and nonhuman difference and its sensory and material implications.

Conclusion

Dematerialization claims are not unique to the digital era but have a long and varied history in photography criticism. From its invention onward, photography has been alleged to reduce the importance and influence of the material world in one way or another, which has often diminished the scholarly understanding of both photographs' material properties and photography's multivalent entanglements in material and immaterial networks of circulation and exchange. Yet, to understand photography, its materialities, and its agential capacities means reckoning with pluralistic and contingent practices. Materialist and multisensory approaches to analog photography have been instrumental in opening up new methodologies that eschew racialized, gendered, or technological universalisms, and they may well help us to do the same when applied to digital photography. If visual culture studies are put into conversation with the new materialisms, sensory studies, and affect theory, they add depth and nuance to claims about both analog and digital photography. The new materialisms' "antipathy toward oppositional ways of thinking" and their focus on "forces, energies, and intensities (rather than substances) and complex, even random, processes (rather than simple, predictable states)" (Coole and Frost, "Introducing the New Materialisms" 8, 13) is well suited to complicate notions of photographs' materiality, indexicality, and sensoriality and thus provide a sense of the challenges that lie ahead.

Works Cited

Azoulay, Ariella. The Civil Contract of Photography, Zone Books, 2008.

Bal, Mieke. "Visual Essentialism and the Object of Visual Culture." Journal of Visual Culture 2.1 (2003): 5-32. Print.

Barthes, Roland. Camera Lucida: Reflections on Photography. 1980, Vintage, 2000.

Batchen, Geoffrey. Burning with Desire: The Conception of Photography. 1997, MIT Press, 1999.

Benjamin, Walter. "Das Kunstwerk im Zeitalter seiner technischen Reproduzierbarkeit." 1936/1955. Das Kunstwerk im Zeitalter seiner technischen Reproduzierbarkeit: Drei Studien zur Kunstsoziologie, Suhrkamp, 1977, pp. 7–44.

Brown, Bill. "Thing Theory." Critical Inquiry, vol. 28, no. 1, 2001, pp. 1–22.

Brown, Elspeth H., and Thy Phu, editors. Feeling Photography, Duke University Press, 2014.

---. Introduction. Feeling Photography, edited by Elspeth H. Brown and Thy Phu, Duke University Press, 2014.

Buck-Morss, Susan. "Globalization, Cosmopolitanism, Politics, and the Citizen." *Journal of Visual Culture*, vol. 1, no. 3, 2002, pp. 325–40.

Burgin, Victor. Introduction. Thinking Photography, edited by Victor Burgin, Macmillan, 1982, pp. 1-14.

Campbell, David. "The Myth of Compassion Fatigue." *The Violence of the Image: Photography and International Conflict*, edited by Liam Kennedy and Caitlin Patrick, I.B. Tauris, 2014, pp. 97–124. International Library of Visual Culture 15.

Campt, Tina. Image Matters: Archive, Photography, and the African Diaspora in Europe, Duke University Press, 2012.

Classen, Constance. Worlds of Sense: Exploring the Senses in History and Across Cultures, Routledge, 1993.

Coole, Diana, and Samantha Frost. "Introducing the New Materialisms." New Materialisms: Ontology, Agency, and Politics, edited by Diana Coole and Samantha Frost, Duke University Press, 2010, pp. 1-43.

---, editors. New Materialisms: Ontology, Agency, and Politics, Duke University Press, 2010.

Cram, E., Melanie Loehwing, and John Louis Lucaites. "Protest Photography in a 'Post-Occupy' World: Keywords for a Digital Visual Rhetoric of Public Discourse." Enculturation: A Journal of Rhetoric, Writing, and Culture, no. 23, 22 Nov. 2016, http://enculturation.net/protest-photography-in-a-post-occupy-world.

Crary, Jonathan. Techniques of the Observer: On Vision and Modernity in the Nineteenth Century. 1990. Rev. ed., MIT Press, 2005. October Books.

Edwards, Elizabeth. "Objects of Affect: Photography Beyond the Image." Annual Review of Anthropology, vol. 41, 2012, pp. 221-34

Edwards, Elizabeth, and Janice Hart. "Introduction: Photographs as Objects." Photographs Objects Histories, edited by Elizabeth Edwards and Janice Hart, Routledge, 2004, pp. 1-15. Material Cultures.

---, editors. Photographs Objects Histories: On the Materiality of Images. Routledge, 2004. Material Cultures.

Fischer-Westhauser, Ulla, and Uwe Schögl. Editorial. Photoresearcher, vol. 19, 2013, p. 1.

Fleetwood, Nicole R. "Posing in Prison: Family Photographs, Emotional Labor, and Carceral Intimacy." Public Culture, vol. 27, no. 3, 2015, pp. 487-511.

Fontcuberta, Joan, et al., editors. La condition post-photographique. Kerber, 2015. Kerber Photo Art.

Friedman, May, and Silvia Schultermandl. Introduction. Click and Kin: Transnational Identity and Quick Media, edited by May Friedman and Silvia Schultermandl, University of Toronto Press, 2016, pp. 3–24.

Gerling, Winfried, et al. Bilder verteilen: Fotografische Praktiken in der digitalen Kultur, Transcript, 2018. Digitale Gesellschaft

Goldberg, Vicki, editor. Photography in Print: Writings from 1816 to the Present. 1981, University of New Mexico Press, 1988.

Gunning, Tom. "What's the Point of an Index? or, Faking Photographs." Nordicom Review, vol. 25, no. 1-2, 2004, pp. 39-49.

Holmes, Oliver Wendell. "The Stereoscope and the Stereograph." The Atlantic, 1 June 1859, https://www.theatlantic.com/ magazine/archive/1859/06/the-stereoscope-and-the-stereograph/303361/.

Howes, David. "Introduction: Empires of the Senses." Empire of the Senses: The Sensual Culture Reader, edited by David Howes, Berg, 2005, pp. 1-17. Sensory Formations.

---. "Introduction to Sensory Museology." The Senses and Society, vol. 9, no. 3, 2015, pp. 259-67.

James, Liz. "Senses and Sensibility in Byzantium." Art History, vol. 27, no. 4, 2004, pp. 522-37.

Jay, Martin. "Scopic Regimes of Modernity." Vision and Visuality, edited by Hal Foster, Bay, 1988, pp. 3-23.

Latour, Bruno. "The Berlin Key or How to Do Words with Things." 1993. Matter, Materiality and Modern Culture, edited by Paul M. Graves-Brown, Routledge, 2000, 10-21.

Linfield, Susie. The Cruel Radiance: Photography and Political Violence, University of Chicago Press, 2010.

McLuhan, Marshall. The Gutenberg Galaxy: The Making of Typographic Man. 1962, University of Toronto Press, 2011.

Mirzoeff, Nicholas. "Tactics of Appearance for Abolition Democracy #BlackLivesMatter." Critical Inquiry, 2018, criticalinquiry. uchicago.edu/tactics_of_appearance/.

Mitchell, William J. The Reconfigured Eye: Visual Truth in the Post-Photographic Era. MIT Press, 1992.

Moten, Fred. In the Break: The Aesthetics of the Black Radical Tradition, University of Minnesota Press, 2003.

Ong, Walter J. "The Shifting Sensorium." The Varieties of Sensory Experience: A Sourcebook in the Anthropology of the Senses, edited by David Howes, University of Toronto Press, 1991, pp. 25-30.

---. Orality and Literacy: The Technologizing of the Word. 1982. 3rd ed., Routledge, 2012.

Orvell, Miles. American Photography, Oxford University Press, 2003.

Pink, Sarah. "Sensory Digital Photography: Re-Thinking 'Moving' and the Image." Visual Studies, vol. 26, no. 1, 2011, pp.

Ritchin, Fred. After Photography, Norton, 2009.

Rose, Gillian, and Divya P. Tolia-Kelly. "Visuality/Materiality: Introducing a Manifesto for Practice." Visuality/Materiality: Images, Objects and Practices, edited by Gillian Rose and Divya P. Tolia-Kelly, Routledge, 2012, pp. 1-11.

Sassoon, Joanna. "Photographic Materiality in the Age of Digital Reproduction." Photographs Objects Histories, edited by Elizabeth Edwards and Janice Hart, Routledge, 2010.

Schrey, Dominik. Analoge Nostalgie in der digitalen Medienkultur, Kulturverlag Kadmos, 2017. Kaleidogramme 147.

Sekula, Allan. "The Body and the Archive." 1986. The Contest of Meaning: Critical Histories of Photography, edited by Richard Bolton, 4th pr., MIT Press, 1993, pp. 344-89.

Seppänen, Janne. "Unruly Representation: Materiality, Indexicality and Agency of the Photographic Trace." Photographies, vol. 10, no. 1, 2017, pp. 113-28.

Shore, Robert, editor. Post-Photography: The Artist with a Camera, Laurence King, 2014.

Smith, Mark M. Sensory History. Berg, 2007.

---. "Producing Sense, Consuming Sense, Making Sense: Perils and Prospects for Sensory History." Journal of Social History, vol. 40, no. 4, Summer 2007, pp. 841-58.

Tagg, John. The Burden of Representation: Essays on Photographies and Histories, Macmillan, 1988. Communications and Culture.

Weston, Edwards. "Daybooks, 1923–1930: An Excerpt." *Photography in Print*, edited by Vicki Goldberg, University of New Mexico Press, 1988, pp. 303–14.

---. "Leaflet, Written for the Los Angeles Museum, 1934: An Excerpt." *Photography in Print*, edited by Vicki Goldberg, University of New Mexico Press, 1988, pp. 315–18.

Zylinska, Joanna. *Nonhuman Photography*, MIT Press, 2017.