The photographic surface: between substances and spaces

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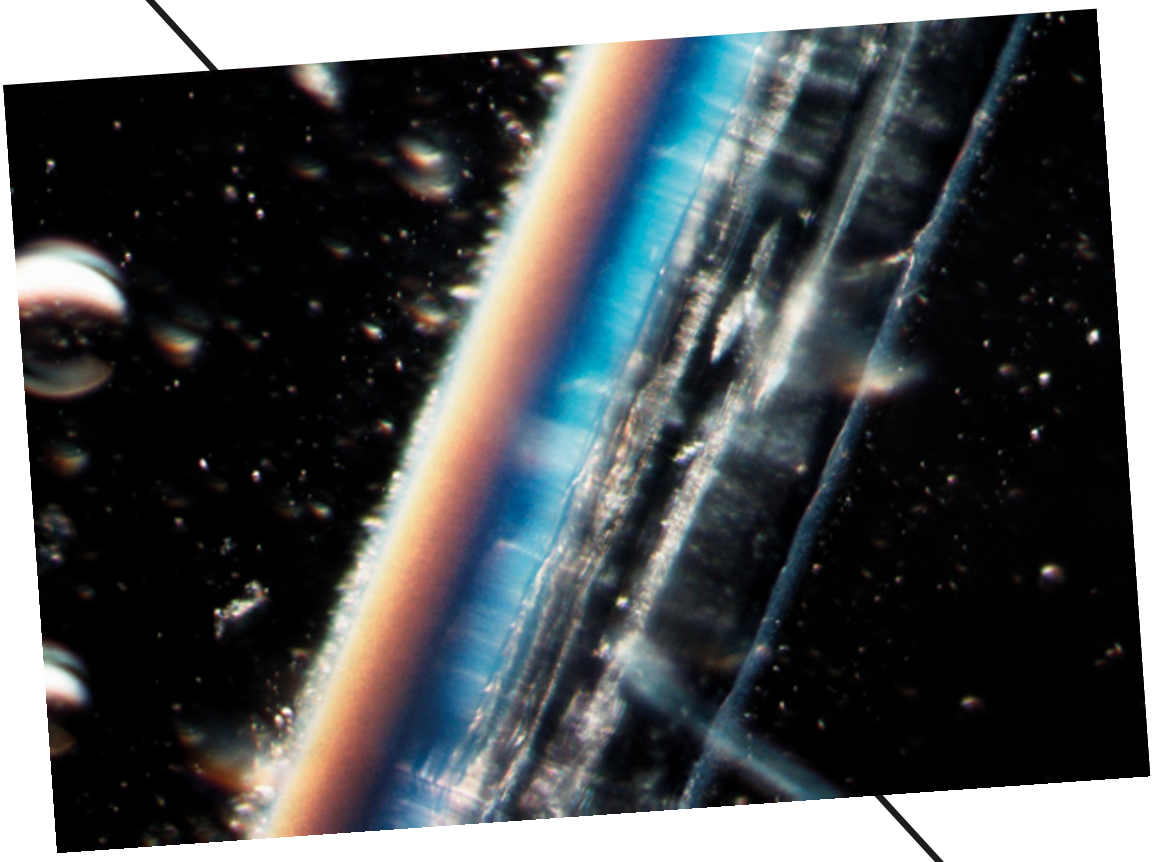
The PHOTOGRAPHIC SURFACE



Between SUBSTANCES *and* SPACES

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Joris Jansen, *10 x 0.5D* from the series *Kosmos*, 2011.
C-print, 24 x 32 cm.

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PROMOTIECOMMISSIE
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PREFACE

"Images are significant surfaces" (2005 [1983], 8). Not long after I had decided to research the material and theoretical nature of the photographic surface, I encountered this opening statement of Vilém Flusser's book *Towards a Philosophy of Photography* (original title *Für eine Philosophie der Fotografie*, 1983) – and it struck me anew. Is not photography but one big surface? Does this mean that our engagements with photographs are solely surficial? How are surfaces significant to images? Many paths of thought unfolded from Flusser's sentence; some are pursued on the pages of this dissertation.

The extent and significance of surfaces as an approach to images was, back then in 2012, at an early point in my research, beyond my imagination. Having worked as curator and editor for various photography institutions in The Netherlands, and with an academic background in Visual Culture (BA) and Photographic Studies (MA), I was focussed foremost on the visible aspects of photography. The context of this research was provided by the NWO-Science4Arts program that funded a joint research project in which I had participated: 'Photographs & Preservation. How to save photographic artworks for the future?' (2012–2017). This context was refined under the attentive gaze of my peer researchers Monica Marchesi (PhD, and paper conservator at the Stedelijk Museum Amsterdam) and Bas Reijers (PhD in analytical organic chemistry) to a focus on the smallest indications of material interaction in photographic artworks. That subject made me curious about what shapes our photographic understanding before and after an image rises from surface. Hands-on (or, more accurately, gloves-on) examinations of several photoworks (hybrid photographic works of art) from the collections of the Stedelijk Museum Amsterdam, the Van Abbemuseum in Eindhoven, De Pont in Tilburg, and the Kröller-Müller Museum in Otterlo, led by the wonderful, all-knowing expert in photography conservation Clara von Waldthausen, transformed me into a material thinker.

The initial subjects of this research project were photoworks that showed signs of material photographic degradation, due to their hybrid composition with other superimposed or mounted materials. This soon evolved to concern other photoworks that did not (yet) reveal their interactions with their environment through such visible indicators of photographic deterioration. Because of this, my argumentation extends to general and ontological reflections on the photographic surface as a porous plane that absorbs and repels during its genesis and over its lifespan. Despite the fact that it did not yet show visible signs of deterioration, I argued that Tacita Dean's photowork *Crowhurst II* (2007) should be one of the case studies. This huge and impressive photowork was undergoing treatment by Von Waldthausen in her Fotorestauratie Atelier in 2012, during the time that I was taking her 'Identification of Modern Photographic Processes' course. It was my second encounter with this photowork, which had left a different trace years earlier, in 2009, when it blew me away in an exhibition at the Museum De Pont in Tilburg. Strokes of photographic paper depict, at an almost life-sized scale, a centuries-old tree in black-and-

white. Dean painted the hinterland white to 'sculpt' the tree out of its surroundings. Pinned directly to the wall without frame or glass, its imposing materiality has a mesmerizing effect beyond the purely visible. Its surface shapes our primary encounter. It hits us viewers, ourselves bodies of surfaces, through the palette of surficial senses that connect with inner sensations. For the human body as for the body of a photowork, the surface is the pivotal point of elemental duality: inner and outer, back and front, visible and invisible. It is explored and taken in by our whole body, and so my elaborations and philosophical investigations are heavily influenced by the phenomenological tradition.

My point of departure is always the photowork's being in continual relation with people, environments, and time. I soon learned that chemical reactions are the main causes of changes to the photograph, throughout its existence. They eventually become visible on its surface. Changes to unstable photographic prints are a serious threat to the photowork for the museum curators and conservators with whom I collaborated. I needed to acquire a profound understanding of the material condition of photography in the light of the shifts of the twenty-first century. Today, photography is omnipresent, but far less rooted in actual chemical and material creation. Ultimately, I sought answers as to how the changes of the photographic surface are inherent to the condition of the medium. Should they be taken into account in this approach to photography?

Changes to the print do not take place solely on the surface of the print. They can also arise within the print, which is why its literal depths became as important to this study as the print surface. My analysis of photographic layers takes the reader on a journey into the cosmos of photographic materiality, hoping to emerge with shifted ideas and new horizons. I dedicate this dissertation to anyone who has fallen for the intriguing (and sometimes unpredictable) magic that surrounds chemical and material photography: the viewer in the exhibition space, the photographer, the artist, the darkroom specialist and hobbyist, the curator, the conservator, the critic, or the academic.

Introduction

PHOTOGRAPHS ARE SIGNIFICANT SURFACES

My research's central focus is how photographic surfaces become significant and the processes through which they pass. When Vilém Flusser opened his book *Towards a Philosophy of Photography* with "Images are significant surfaces" (2005 [1983], 8), he did not take note of the multidimensionality of the processes that bring images into being. Flusser was concerned with the translation of a three-dimensional world into the two dimensions of the image, but he ignored the dimensionality of the actual process of translation. What are these photographic surfaces made of? Which materials, gestures, and other forms of interactions are (at) the core of their shape and significance? I opened this dissertation with one of the canonical works of photography theory because Flusser's text epitomizes the approach of many phototheoretical texts that neglect the materiality of photographs, and place emphasis on their surface as the carrier of meanings. The translation of Flusser's text refers to "images". In this context of a philosophy of photography, written at a time when the world knew only chemically created photographs, I am able to read this as saying that photographs are significant surfaces. Are they?

The photographic surface, a concept that was rooted in the photograph's material constitution, soon revealed its complexities. The simple question – what is the photographic surface? – appeared more complicated than one would initially guess. Roughly stated, the photograph's surface is the edge of its outer layer. But is this affected by the revelation that the image of a photograph is actually situated neither *on* nor *in* its surface, but is created in gelatin layers *beneath* the surface? Can we then state that the photograph is still a significant surface? While photographic processes can vary, so too can the physical sites of the active substances, ranging from a single subsurface-layer to multiple subsurface-layers. It is only in an exceptional (historic) technique, carbon print, where gelatin relief actually makes the image *on* the surface. The character of the photographic surface is inherently complex, both materially and conceptually. Because of this, I move back and forth between different approaches from the disciplines of (art and photo) philosophy, phenomenology, conservation, and natural sciences, combined with visual analyses, in order to contribute to my own discipline of photo theory. Within this theoretical framework I analyse case studies by combining insights from different disciplines. There is no such thing as one single definition of the photographic surface in this dissertation, instead, there are plenty of interpretations.

Understanding how the photographic surface interacts with its surroundings enables us to acknowledge that it is necessary to take fundamentally different theoretical approaches to the chemically created photograph and its digital contemporaries. Now, in the twenty-first century, a short-lived appreciation of shared photographic images forms the basis of our experience of photography. We are very much in need of a profound ontological clarification regarding what determines the chemically created photograph as an object, in opposition to its digital counterpart. As relics of personal memories, as objects of cultural, political or sociological significance, or as artworks, chemically created photographs require this differentiated thinking and handling. My fundamental claim is that a digitally generated photographic print simulates an analogue photograph, but as objects they are worlds apart.

From the moment of exposure, an analogue photograph passes through many processes and hands: development, 'destruction' through chemical degradation, ripping gestures, or simply falling into oblivion. Hence my central claim: that the truly photographic surface acts as an interface between the substances (which physically and chemically shape the photograph), the times, and the spaces, that it inhabits. 'Substances' here refer to particular materials that enter into the composition of the photograph and determine its characteristic properties and appearance. While, for instance, paper and gelatin are the constituent materials of the analogue photograph, its substances are the silver particles in the gelatin layer, which create the image, together with the water used in the developing process. A more profound specification of the substances, materials, and matters in the photograph's realm will be explained in a separate section on substances.

My focus on the photographic surface has its roots in the Science4Arts research project 'Photographs & Preservation. How to save photographic artworks for the future?' which was initiated out of an urgency to conserve some visibly degrading photographs and photographic artworks that were held in various Dutch art collections. Funded by the Netherlands Organization for Scientific Research (NWO) and supported by the universities of Leiden and Utrecht, the Stedelijk Museum Amsterdam, the Kröller-Müller Museum in Otterlo, the De Pont Museum in Tilburg, the Van Abbemuseum in Eindhoven, and the Cultural Heritage Agency (RCE) of the Netherlands, this 2012–2017 collaborative research project aimed to identify and examine undesirable material interactions in photoworks.

Photoworks can be as diverse as any other form of art. *Photowork* as descriptive term involves a photographic form and refers to certain photographic aesthetics and media. The photoworks studied in our Science4Arts research project are characterized by their uniqueness as artistic objects due to the superposition of other materials in addition to analogue photographs. As a research team we chose a handful of case studies from various Dutch art collections. We wanted photoworks that pose challenging questions for conservation (science and practice), chemistry, and photo theory, in accordance with the three main researchers' fields of expertise. In order to delimit the corpus, we decided to focus on post-1960s photographs with surface applications such as paint, tape, or paper, as a defined starting point for the vast and varied area of photoworks. Organic chemist Bas Reijers (PhD) investigated and diagnosed the chemical and physical interactions taking place in these works, exploring the implications for future conservation. The dissertation 'Forever Young. The Reproduction of Photographic Artworks as a Conservation Strategy' (University of Leiden, 2017) by Monica Marchesi (PhD, and paper conservator at the Stedelijk

Museum Amsterdam) looks at photoworks by Jan Dibbets and John Baldessari and two by Gerald van der Kaap. Marchesi questions and analyses the methods used over the past two decades, by conservators at the Stedelijk Museum Amsterdam and at the Van Abbemuseum in Eindhoven, in collaboration with the artists, to reproduce these photoworks.

All our case studies highlight photographic materiality and the medium's specificity, through the works' confrontation with other physicalities – added paint, in Bas Reijers's and my research. The photographic surface takes on an interfacial character here, and this is where it becomes the pivot of my dissertation. It is the site of encounter between the substances belonging to the photograph and to the paints, between the moments of the photograph's creation and the moments of painting over them, and between all the different spaces involved in these processes. We have two layers, each with their own referential, visual, and chemical content, which encounter a further visual and chemical interaction that happens on the photograph's surface. The layers' hybrid nature brings up new theoretical challenges and offers new insights on analogue photographs in general, and overpainted photoworks in particular.

My three case studies, *Crowhurst II* (2007) by Tacita Dean, and two photoworks by Ger van Elk, *Dutch Grey* (1983–84) and *Russian Diplomacy* (1974), originate from three different decades (fig. 1.1, fig. 3.1, fig. 4.1). I selected these three photographs because they represent the two most common photographic processes: the black-and-white silver gelatin process in the first two and the chromogenic colour process in the latter. But their degree of photographic deterioration is also significant. This ranges from almost no deterioration in *Crowhurst II*, to unintended apparitions on the surface of *Dutch Grey*, and a disruptive, unacceptable colour shift for *Russian Diplomacy*.

My analysis of these three photoworks 'thinks' methodologically along with their materiality and subject matter, rather than reflecting on them theoretically. In this manner, the three case studies are addressed equally as objects of analysis and as "theoretical objects".[1] Their hybrid nature raises theoretical questions that suggest the possibility not only of applying theories exegetically, but also of showing existing theories under a new light. Therefore my method is characterized by close reading of the three case studies, using visual analysis and conservational, technical, and material insights. These approaches form the basis for an interdisciplinary literature study, which is especially attentive to photo theory and to publications from the discipline of philosophy. By oscillating back and forth between the photowork, the auxiliary disciplines of phenomenology, (photo) philosophy, conservation, and natural sciences, and my main discipline of photo theory, I hope to establish a more holistic understanding of (mutative) photographic materiality in an artistic and theoretical context.

Taking the smallest actants in the photographic process – such as photons, (light-sensitive) particles, gelatin, water, or other chemicals – as the analytical starting point enables a profound and critical examination of existing photography theories and some of their key notions. Following the photograph's interactions throughout its existence sensitizes us to aspects that have been either overlooked or simplified by those theories. There is one exception: Henri Van Lier's *Philosophy of Photography* (original title *Philosophie de la Photographie,* 1983). I would like to pay tribute to this small but exceptional book, in which the Belgian author extracts theoretical meanings from photographic materialities and behaviours in an exemplary way. I use it as my guideline throughout this dissertation. However, even Van Lier's concepts cannot elude some shifts after they have been drawn into dialogue with my case studies, particularly in the first chapter.

The overall purpose of this dissertation is to find a theoretical foothold on the ground of the mutative photographic materiality that literally shapes these photoworks. And also – the flipside – to discover how this mutation challenges theoretical conceptions such as photographic indexicality or photography's relation with death. This expansive scope aims at an awareness and acceptance of mutative photographic materiality in the context of a practical and theoretical engagement with photographs. The changing nature of (artistic) analogue photographs has hardly been represented or discussed in any form of visual record. Artist books, exhibition catalogues, (online) databases, (digital) reprints are, functionally, the places where we preserve and store canonical images in our consciousness. As our points of reference, they withhold awareness of the transmutability (and vulnerability) of any 'original' photograph or photographic artwork that we admire on the exhibition wall. Institutions tend to be quiet about visual changes, while photographers and artists are rarely fond of the photograph that stubbornly follows its inner material logic and changes its outer palette of colours. These are stories that my case studies will tell. The celebrated beginnings of photography (for instance, Joseph Nicéphore Niépce's well-known window view photograph) have long ago vanished in chemical oblivion. As plates (or paper) covered with abstract patterns, these historic objects are hidden in dark, cooled storage drawers, away from public display. Other, newer photographs, such as chromogenic colour photoworks from the 1970s on, have been reproduced, or, in some cases (when the originals are discoloured) permanently destroyed. Institutional decision-making (in collaboration with artists where they are still alive) shapes the ways we perceive photographs and photoworks.

I have written this dissertation for a broad readership: for curators who seek deeper knowledge of and respect for photographic materiality; for photographers who seek to acknowledge their 'felt' craft and to give a theoretical voice to their intuitive choices and gestures; for academics and critics who wish to nourish future theoretical engagements with material insights; and for conservators who are already aware of many of the material aspects discussed here, but who may not yet guess at their far-reaching consequences for theory. I will now introduce the conceptual pillars of this dissertation, the five key words of the title: *photographic, surface, interface, substances,* and *spaces.*

NOT EVERY *photographic* IMAGE IS A PHOTOGRAPH, BUT EVERY PHOTOGRAPH CARRIES A PHOTOGRAPHIC IMAGE

There is still no precise etymological differentiation between the photograph, the photo, and the photographic image. This is understandable, given that many key texts in photography theory were written in the period before the advent of digital photography. Today, as we deal with very different processes that generate photographic images in incomparable ways, how can we differentiate etymologically between the two most prominent versions? I suggest the following:

A photo or a photographic image does not presuppose a particular material appearance. The 'photographic' refers to the way the image was generated: through the 'writing of light'. Deriving from the Greek *phōs* (φῶς) or *phōtos* (φωτός) for light, and the verb *gráphein* (γράφειν) for writing, 'photography', as a term, pays tribute to light as the essential element for producing a photographic image. The resulting 'photograph' is the actual physical imprint. Hereafter, when mentioning the photograph, my argumentation builds on this idea of a material object that is physically generated, inscribed, and changed through light. By contrast, the photographic image is and remains foremost a description of an image and not of a physical object. Not every photographic image is a photograph, but every photograph carries a photographic image. The same logic applies to the abbreviation 'photo': it refers to an image that has been created through the working of light. In the very few cases where I use the word 'photo', these are not material objects but (digital) image files. When 'photo-' appears as prefix, it is as an abbreviation of photography, and characterizes a certain area dealing with photography (such as photo theory, photo history, photo journalism), or as a technical object description such as photomontage, photo collage and, throughout this study, photoworks. Photoworks, like artworks in general, do not refer etymologically to any specific material constitution. The three photoworks I write about all shed light on the ontological meanings of photographs.

Before the inception of the digital, the medium of photography was determined by chemical reactions, which occurred at the moment of taking the photograph and also during the development of the print in the darkroom. Weightless photons, emitted and reflected by the objects in front of the camera, physically change the light-sensitive film inside it. They materialize from immateriality. Or more precisely, the bodiless light transfers or even translates the materiality of the photographed objects into the appearance of the exposed film.

Image sensors have superseded film in the digital camera. These sensors 'read' the intensity of light, and store the extracted information on the digital memory device, and so the weightless photons are no longer made material in the direct way that they are on film. In a digital practice, the body of the storage device determines the material existence of the image, or, a carrier object can bear a printed image. The image file itself is bodiless and stable, but dependent on the precision and physical qualities of the carrier. This means that the digital image in any form has no physical link to the photographed objects from which it originates. By briefly specifying this physical relation between the photograph and the photographed objects, I will now introduce one of the fundamental disparities between the chemical-based photograph and the digital photo.

Chemical reactions are the main causes of changes to the photograph, during its genesis and throughout its lifespan. This means that the analogue photo exists in a process of becoming rather than in a state of being (as its digital counterpart does). It is very likely that the appearance of any given photograph will change over time. We need to distinguish between the short-term chemical reaction (light hits the negative film or sensitized paper) and the long-term reactions (the lifetime condition of the photograph). Every chemically created photograph is made through a material, substantive process, and retains a certain receptiveness towards outer and inner influences that can change its visual appearance over time. There is no such thing as a permanently fixed photograph.

For the photoworks studied here, the photograph's instability can be a serious threat to the artwork. To understand the changes in and to these hybrid photoworks, it is first necessary to acquire a full understanding of the material conditions of photography. But another question arises: are these changes inherent to the medium? How far do eventual changes belong to the characteristics of photography, and should they therefore be taken into account in our thinking on photography? Changes to the print take place not only on its surface – where they eventually become visible – but also 'within' the print. Depending on the condition of the image carrier, but also on the framing, the encounter of the photographic print with other materials can lead to a surface change that comes from within the print. This explains why the literal depth of the photograph is as important as its surface.

Surfaces ARE THE WARDROBE OF BEING

Photographic images pull viewers immediately into the depicted scenes. The material surface of a photograph is often transparent to vision, when compared with the texture of handmade pictures. As James Elkins rightly states in his book *What Photography Is* (2011), most theoretical writings on photography overlook the "optical feel of a photograph's surface" (Elkins 2011, 26). The surface of the image was (as Joel Snyder elaborates in his essay 'Picturing Vision', 1980) and still is supposed to open up as a window onto the view of the subject. Only contemplation can allow us to rest for a moment on its surface, photography's window glass. Strictly speaking, it is this surface that we encounter. Our perception and interpretation automatically and immediately transcend it in order to perceive the (imaginary and imaged) space 'behind'. This makes the photographic surface a physical manifestation of mediation *par excellence*. Sean Cubitt, in the preface of his genealogy of visual techniques *The Practice of Light* (2014), describes mediation as "the ground of relationship, the relationship that precedes and constructs subjects and objects" (Cubitt 2014, 2). As the term mediation knows many definitions, I will refer only to authors whose publications will appear in the course of this dissertation, to establish a common understanding of certain key ideas and concepts. By putting the photographic material under the magnifier, the material characteristics and behaviours will appear more clearly, but the relationship we

have with photographs – that which Cubitt describes as mediation in its most basic form – will also stand out. What are the consequences of this variable condition, and of the constraints of photographic materiality, for the relationships we have with the medium and its artefacts? How can we engage with changing photographs whose surfaces are the "wardrobe" of photography?

Joseph A. Amato uses this description of surfaces as the "wardrobe of things" while approaching all kinds of surfaces in his book *Surfaces: A History* (2013). Many of his general reflections emphasize the importance of studying (photographic) surfaces, and I will draw attention to a couple of these reflections as particularly relevant. Surfaces, he argues, "furnish our primary encounters with the outer and the inner layers of things" (Amato 2013, xv). As outer layers he names cover, epidermis, membrane, bark, rind, hide, and skin. My first case study *Crowhurst II* by the English born artist Tacita Dean (b. 1965) very prominently features and celebrates the gnarled bark of an ancient yew tree (fig. 1.1). Dean's gigantic black-and-white portrait of this tree uses very delicate paintwork around the outer edges to efface the background. The depiction, the texture of the monotone white brushstrokes, and the undulated photographic paper, all enhance our sensitivity to the epidermis of both tree and photowork. *Crowhurst II* awakens our awareness of texture and haptics in the photographic realm. Seeing ourselves as bodies of surfaces, and thinking of Amato's argument that surfaces "are taken in by eye, mind, and hand" (2013, 3), reveals that an exploration of photoworks which approaches them as purely visual artworks underestimates our full perceptual capacity.

By giving rise to elemental pairings such as up and down, back and front, inner and outer, visible and invisible, surfaces form and are organized, as Amato writes, into a series of "scapes" – just as there are bodyscapes, sensescapes or landscapes (2013, xv). My second case study *Dutch Grey* – a landscape view with a flat horizon by the Dutch conceptual artist Ger van Elk (1941–2014) (fig. 3.1.) – draws attention to some of these pairings. When we change perspective or viewing angle, horizons of expectations towards a photowork shift accordingly. That which is usually obscured by the (photographic) surface – the down, back, inner or invisible – becomes as important as the 'landscape' we primarily perceive – the up, front, outer, or visible part of the artwork. This isn't news to science or technology: pure surface observations are often shallow, and verifiable truths can be found in subsurface theories (2013, 10). Amato refers to interior body expeditions through x-ray technologies, CT scans or magnetic resonance imaging. Only recently, conservation scientists have deployed x-ray fluorescence analysis (XRF) to explore the internal make-up of photographs. An XRF-analysis of the photograph's subsurface, combined with a thorough surface analysis through enhanced photomicrography and polynomial texture mapping, can deliver individual data-sets giving information on a photograph's material composition. The photographic surface is only a fraction of what we (think we can) perceive when looking at a photograph. This is why my methodological approach is influenced by phenomenology in the work of Martin Heidegger and Maurice Merleau-Ponty.

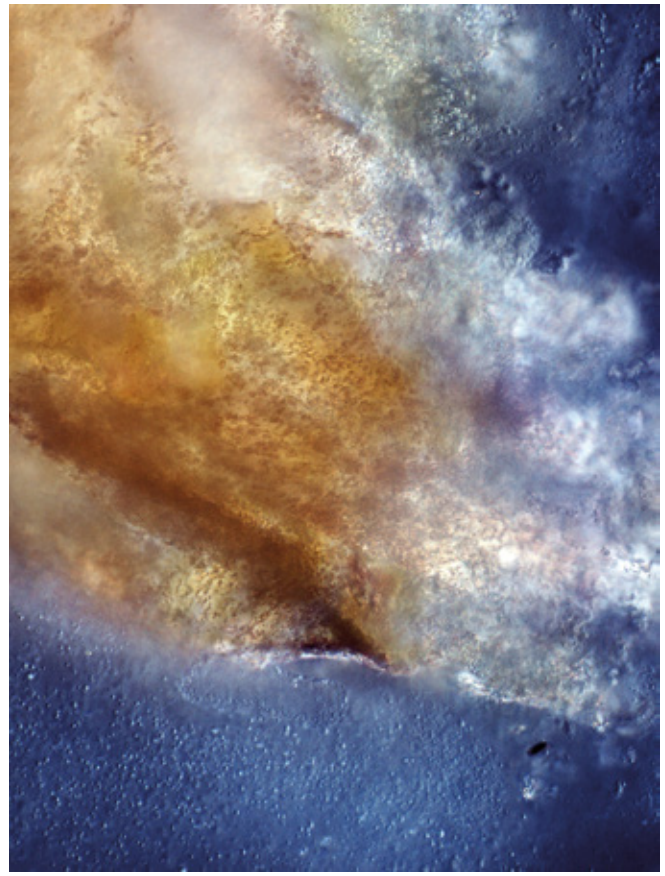


FIGURE X.1. Joris Jansen, *stelsel* 8 from the series *Kosmos*, 2011.
C-print, 90×120cm.

My first encounter with the material universe of an analogue colour photograph was through Dutch photographer Joris Jansen's (b. 1980) series *Kosmos* (2011). It delves into the microcosmic dimensions of one simple photograph – Jansen purposefully deployed an estranging use of photomicrography (fig. X.1.). *Kosmos* changed my perspective on photographs profoundly. I might even admit that it caused an ontological shift: it belongs in this introduction less as a visual demonstration of photographic materiality than as a theoretical object as such. *Kosmos* reveals almost organic (image) particles, colour clouds, and other topographic surface appearances. These *photoscapes*, which can linger in a simple chromogenic colour photograph, resemble fragments of stellar constellations. The visual and titular reference to the cosmic triggers alternative understandings of a photograph's spatialities and therewith temporalities.

One way to make sense of the photograph's changing appearance is to revalue its material mutability so as to see it as one whose constellations can shift. The overall change of colour in the photographs, a deteriorating process that forms the basis of *Russian Diplomac*y (1974), my third case study, is another example of this (fig. 4.1.). The blue dye of the chromogenic prints has lost its density, causing the photographs to take on a red-tinted appearance. The photo-

graphic depiction no longer corresponds with its overpaintings: the colour photograph's wardrobe has changed.

THE PHOTOGRAPH IS AN INTERFACE EFFECT

Applying the concept of the 'interface', as it derives from screen-based and device-driven digital culture, to the physical photograph, as a remnant of analogue culture, could be surprising. My central account of 'the photographic surface as interface' therefore needs an elaboration of this term and a delimitation of my usage. My interpretative tools here come from Johanna Drucker's article, 'Humanities Approaches to Interface Theory' (2011), and Alexander R. Galloway's book *The Interface Effect* (2012). The overall argument behind my characterization of the photographic surface as interface is that such interface theory, as Drucker briefly explains, takes "[…] into account the user/viewer, as a situated and embodied subject, and the affordances of a graphical environment that mediates intellectual and cognitive activities" (Drucker 2011, 8). The photograph is in a co-dependent network of relations between all kinds of actors, human and non-human. It is more than just this material thing. Or, as Galloway phrases it, "an interface is always an effect. It is always a process or a translation" (Galloway 2012, 33).

When interpreting the photographic surface as interface, it was, at first, in the classic sense of this two-dimensional plane which was apparently transparent to the photographic image because it was actually being shaped by the processes and logics of the material 'behind'. In this interpretation, the surface as interface is embedded with meanings, or, in Galloway's words, meanings are delivered "through" it (2012, 30). Here again, the recurring challenge is that the image is paradoxically situated *in* the photograph and not (as in drawings, paintings or (inkjet) prints) *on* the object's surface. Like a window, the surface as interface separates and mixes two worlds at once. The effect of this mixing seems optically identical between window and photograph. But in contrast to the window, the 'transparent' surface of the photograph holds a direct physical and partially visible relation with the layers beneath. This means that determining how 'deep' the surface's materiality reaches into the multi-layered sandwich of the photograph is a complex challenge. To do so, we need to consider each subsurface layer as an equal part of the photograph's interface. Comparing the photographic surface with a kind of landscape – as I do in Chapter 3 – aligns with this proposal that what lingers in the 'invisible' subsurface is what ultimately shapes the visible and therewith determines the horizon of our vision.

The photograph's invisible interior, another (material) form of interface, is experienced as an impermeable threshold. Something is evoked on the outside, while something (else) takes place in this interior threshold. In our case: the photographic image is evoked, while the photograph takes place. Of course Galloway hints at a far wider scope for his interface analysis, but when introducing the subject matter limited to the threshold-interface-idea of digital media, he admits that "[…] there are complex things that take place inside that threshold; the interface is not simple and transparent but a 'fertile nexus'" (2012, 32). This leads him to questioning what counts as an edge of that threshold and what as a centre, questions that are applicable both to the photograph's surface and inside. And we may not forget that every photograph also has a *backface*. This (physical) interpretation of an interface focuses on what exists between the transparent surface layer and the backface through the photograph's lifespan. It concludes that the photograph as interface is embedded in a network of relations, and therefore requires a multi-angled approach.

The photograph, interfacing with many persons in different spaces and times, triggers different engagements. The photographer deals with it one way, the viewer another, the printer, the curator, or the conservator, are all distinct too. This is to name only a few and in a solely artistic context. Drucker proposes that the "[i]nterface and its relation to reading has to be theorized as an environment in which varied behaviours of embodied and situated persons will be enabled differently according to its many affordances" (Drucker 2011, 12). The second chapter, in particular, sheds light on the various (tactile) engagements a photograph can have or evoke.

The thesis culminates with my proposal, in the final chapter, that we conceptualize the intended and unintended alterations of a photograph in a spatiotemporal framework as photographic interface effects. Galloway's conception was that interfaces are not objects but effects that "bring about transformations in material states" (Galloway 2012, vii). In line with this, I want to demonstrate how the photographic surface as interface embodies the effects of many circumstances and "thus tell the story of the larger forces that engender them" (ibid.). As Galloway generalizes for interface theory, I also advocate for the transgression, ultimately, of the window or threshold metaphor that marks the classic idea of interfaces and of photographs. At the end "[a] window testifies that it imposes no mode of representation on that which passes through it" (2012, 39–40). As we differentiate the stages that the photographic surface passes through, it becomes apparent that the window-analogy does not work out for photographs. Every phase can leave marks on its appearance – from the very beginning right up to the present moment, as we stand before a photograph. Conceptualized as a *processual interface*, the photograph accumulates possible layers of interaction in which its transforming nature comes to the fore.

THE PHOTOWORK IS *spaced* INTO BEING

Although a photograph does not stand out as spatial object at first sight (because it is flat), this only makes it more important to highlight its relation with the spaces that it inhabits or travels through. I refer here to the photograph's spaces of production, exhibition, and preservation. In a literal and basic sense, the list of spaces can include the inside of the camera during first exposure, the dark room during development, the artist studio (for our photoworks), exhibition spaces, and (archival) storage rooms. These five core spaces are investigated through the human and non-human interactions with the photographic material that take place within them. The physical photograph thereby always 'inter-faces' between the place of its depiction and its current space. This ontological tension holds centre stage in the volume *Take Place: Photography and Place from Multiple Perspectives* (2009), edited by Helen Westgeest. My own theoretical engagement with the ways in

which spaces shape and influence the photowork was stimulated by the theoretical approaches of the essays in this book.

The first two case studies *Crowhurst II* and *Dutch Grey* deal and play with a particular sense of place. While the first is the name of a village in East Sussex, England, and the second refers to the Dutch landscape in general, both photoworks are characterised by their lack of photographic spatiality because they have paint added to them, somehow obscuring the image. The artists' interventions on the photographs' surfaces become part of the space the viewer inhabits later, in an exhibition context. Although these interventions took place earlier, in the artists' studios, and then dried, the paint adds another layer to the photograph's own spatial dialectic tension between here and there, now and then: all the temporal and spatial dimensions of the photowork. The spaces are not only tied to specific times, they also automatically involve and encompass many actions, acting codes and forces. The space of the photowork, as a crucial focus of this dissertation, can be a capsule in which the physical, temporal, social, and mental engagement with that photowork comes as much to the fore as the spaces' specificities. The 'boundaries' between these spaces are more fluid than we might assume, however, and the photowork, like the photograph in general, exists in a continuous state of formation, transformation, and deformation.

I am leaning here on the contribution to *Take Place* by Barbara Hooper, a human geographer who explores photography's relation to place and space. Hooper argues that matter, time, and space are always inextricably connected. That which we habitually call time and space is rather "formed matter spaced/timed into being" (Hooper 2009, 204). The photograph needs to be regarded through its transition through multiple stages and spaces, interacting and acting and thereby transforming as a part of its nature. Hooper rolls this up:

> The photograph itself [...] both gathers together and disperses the event photographed, the photographer, and all subsequent spectators into a single becoming. [...] We are now unable to say, with certainty, where and when the photograph begins and ends, who and what acted, who and what were acted upon (2009, 210).

Russian Diplomacy (1974) very clearly testifies to its own journey through darkened and lightened spaces. The dramatic colouration of its chromogenic photographs can derive from the time that the photowork spent in sunlight or in spaces illuminated by standard fluorescent lights (both are strong sources of destructive UV light), and/or also from spaces in which the humidity and temperature were so high that they sped up deterioration, causing the colour dyes to shift and fade. Stored in the presence of paintings, this photowork has certainly been exposed to temperatures far too high for colour photographs to withstand for a long period. The recommended temperature for chromogenic prints is around 2–4 degrees Celsius, which differs by more than 10 degrees with common art storage conditions. This is just one possible explanation of how *Russian Diplomacy*, as it is today, has been shaped through its storage in an environment, which was too warm for chromogenic prints.

Enlarging on the physical and technical characteristics of a photograph's most prominent spaces enables us to perceive it more precisely as a spatial multidimensional object. I will now give a brief introduction to each of these spaces. Starting with the inside of the camera. Shrouded in total darkness, an image comes into being when a glimpse of light is very briefly admitted during exposure. It is formed as it materialises on photographic film (and later paper). Intentional, mechanical, and physiochemical actions have the lead. The camera is like the darkroom or a camera obscura: a space constructed for artificial darkness. Indeed, any space – the artist's studio, or even a storage room or archive – can be darkened and turned into the black box that is needed to control the photograph's interaction with light. In order to shed light on what takes place in these usually enclosed spaces, in the second chapter I introduce some strategies developed by contemporary artists, including Danica Chappell (b. 1972) and Gwenneth Boelens (b. 1980), who engage actively with photographic material in darkened spaces, and who exaggerate the workings and characteristics of these various darkened spaces. An historical reflection on darkened spaces is offered to me by Noam Elcott, who uses artificial darkness as the dispositive for laying bare the media circuit between photography, cinema, and theatre in his dissertation *Artificial Darkness: An Obscure History of Modern Art and Media* (2016). Although the camera, the darkroom, the artist studio, and even the storage space can share common ground – they are all spaces dominated by darkness (in which light is admitted intentionally and only for a very brief moment) – they differ in the actions and intentions that take place inside each one. These physiochemical interactions are discussed intermittently throughout the dissertation, whereas the human engagement with the photograph in darkened spaces is explored most fully in the second chapter's subsection on tactile interaction.

There are also spaces in which a clear code of conduct sets the parameters for our engagement with photographs and photoworks: the exhibition space, and also the storage room or, more generally, the archive. I will return to the latter later in this introduction. Considering a haptic perception of photographs and photoworks in exhibition spaces, it becomes apparent that both viewer and photograph are commonly treated as 'disembodied' beings. Only a careful and deliberate orchestration of a variety of photographic prints on exhibition walls, like those we encounter in the curatorial and artistic practice of Wolfgang Tillmans, can unravel the established codes of spectatorial engagement.

Substances AND THEIR RELATIONAL PROPERTIES SHAPE THE PHOTOGRAPH

Light reflections 'write' the photograph's image. The image that is created in this way leans on the transformation of and by substances through multiple processes. How can we understand these substances within the relational field of a photograph's existence? The relational field represents the environments whose heart is the photograph, with its partial receptiveness to interaction with all kind of actors and actants, humans, animals, substances, or other beings. My use of the term 'substances' refers to a particular range of materials that enter into the composition of the photograph during its manufacture, exposure, and development, and over the course of its existence. 'Material' as synonym for 'substance' applies only when it concerns a constituent of the phys-

ical, made thing of the photograph. Therefore I focus on substances as they encompass both the substances that are already *in* the manufactured photograph (its materials), and also those that are entering from the outside *into* the photograph. In brief, every material of the photograph is or consists of substances, but not every substance involved in the photographic process is part of the photograph's material.

Van Lier calls for a careful consideration of the physiochemical event that gives rise to every photograph. He argues that "[a]ll the inexactitudes in theories of photography can be attributed to the rash overlooking of the strange status of those very direct and physical luminous photonic imprints, which are but the very indirect and abstract imprints of objects" (Van Lier 2007 [1983], 11). His aim is therefore "to enumerate and describe the characteristics as scrupulously as possible, while keeping in mind that this is *the place where everything is played out*" (ibid., emphasis added). For me this sentence resonated with another quote from James Gibson's book *The Ecological Approach to Visual Perception* (1979). In his statement that "the surface is where most of the action is" (Gibson 2015 [1979], 19), Gibson explains the importance of surfaces within the triad of medium, substances, and surfaces that he establishes in order to describe the physical visual world and its reception by the perceiver. Amato's book on surfaces characterizes Gibson's approach as follows: he "[…] declares that human perception and vision are rooted in man himself as an ambulant and ambient being" (Amato 2013, 2). This creature perceives and examines its environment. I will delve deeper in Gibson's approach in Chapter 1, exploring photographic textures. For now, I want to establish a common understanding of substances in the context of this research, through reference to his conception.

Gibson defines substances in a solid or semisolid state as more or less resistant to deformation. They can be distinguished by relative hardness, cohesiveness, elasticity, plasticity, and viscosity (Gibson 2015 [1979], 15–16). His basic examples of environmental substances are soil, sand, oil, wood, minerals, metal, and, above all, the various tissues of plants and animals. This list already includes the main substances of a manufactured silver gelatin print: wood (or plant tissues) in the paper carrier, animal protein in the gelatin layer, and metal in the silver particles. During the long process of a photograph's creation, from the shoot, to the developing of the exposed film and print, liquid chemical solutions and water come into play. Although Gibson initially describes substances as more or less resistant to deformation, he affirms that substances in the environment can change both structurally and chemically. Accordingly, they also need to be also distinguished by how susceptible they are to chemical reactions. This susceptibility includes their degree of solubility in water, their relative volatility in air, and the degree to which they absorb light (2015 [1979], 16). The degree to which the substance permits chemical transformation is influenced by the landscape of its surface.

I came across Gibson's remark that "the surface is where most of the action is" in the article 'Materials against materiality' (2007) by British anthropologist Tim Ingold. Ingold's main critique here holds that the subjects of materiality and material culture studies can tell us little about materials and their properties, or the other way round. I propose a similar critique for the theory of photography, which rarely brings the material quality of the photographic print into close focus or into direct relation with conceptual notions. Ingold criticizes an approach, which focuses on the materiality of objects at the expense of understanding the properties of the material, properties which to him are not fixed attributes of matters but are processed and therefore relational. In order to gain a full understanding of photographs, the relevant substances must be explicated in-depth, with mention of their properties including their (possible) agency. More specifically, I assess which inherent qualities of the photograph's materials are consciously expressed, and which suppressed, in the studied photoworks. This should indicate whether the changes are inherent to the condition (and the flux) of the medium and can, in consequence, be accepted as matters of fact. Differentiating between the material, the substances, and the materiality, and the significance of each, for both the artwork and the perception (behaviour) of the viewer, brings me finally to new materialism studies.

Attending a lecture by Diane Coole on new materialisms in Munich (Akademie der Bildenden Künste, October 25, 2012) shifted my understanding of the nature of the photographic print, and especially of the qualities of its changes. New materialism studies aim to retrace and to re-engage with matter. One of Coole's starting points was the material change caused by shifting relations between matters. Encounters between matters and the constellation of matter – in its broadest sense including human, animal, mineral, and others – can be understood by focusing on material changes. Coole underlined the simultaneity of touching and being touched, which relates directly to Ingold's argument. One fragment caught my attention in the introduction to the *New Materialisms* (2010) reader edited by Coole and Samantha Frost. They explain their approach to matter as

> […] returning to the most fundamental questions about the nature of matter and the place of embodied humans within a material world; it means taking heed of developments in the natural sciences as well as attending to transformations in the ways we currently produce, reproduce, and consume our material environment (Coole and Frost 2010, 3).

In the context of my research on photoworks, this can be applied as a call to return to "the most fundamental questions about the nature of analogue photographs", taking into account new insights from conservation and preservation studies that emerge through advanced chemical research and an increased awareness of the behaviour and perception of the viewer in contemporary encounters with photographic prints.

OUTLINE

The photographic surface is the pivotal point that we confront when facing a photograph. The ensembles of paint and photograph in the studied photoworks further draw attention to its crucial role. A key question arises: how does this surface actually interface between substances and the spaces that surround it? The first two chapters of *The Photographic Surface* explore and map the physical and material

characteristics of *Crowhurst II* by Tacita Dean, of other photoworks and photographs in general. *Crowhurst II*, the case study in both chapters, speaks through its distinct textural and haptic qualities. In this work, overpainting precipitates a departure from the smooth undulation of the glossy photographic paper. Chapter 1 interrogates the photowork's material mimesis of the depicted yew tree through the texture of its surface. How can the surface's texture relate to the photograph's subject? Physical analogies drawn with the photograph in ontological writings are assessed in light of the photograph's actual physiognomy. What does the surface texture tell us about the photowork, beyond depiction? Conversely, how do the surface and make-up of the photograph's structure ultimately determine the depiction? To respond to these questions, material surface textures (of various image carriers) are considered as much as visual textures (of grains, clouds, and pixels). My first theoretical text here is the first part of Belgian philosopher Henri Van Lier's *Philosophy of Photography* (original title *Philosophie de la Photographie,* 1983), concerning the texture and structure of the photograph. Van Lier considers the various elements that bring a photograph into existence, both literally and philosophically. My second theoretical text is *The Ecological Approach to Visual Perception* (1979), a canon of the discipline written by the American psychologist James Gibson. Gibson's book has influenced my own terminology and characterisation of substances, textures, and surfaces.

In the second chapter, the idea of affordance that Gibson pioneered in the same book is used to approach the photograph as a tangible object, which can be understood in terms of what it "affords". During the exposure of a photosensitive paper in an analogue process, light does change the photograph's physiognomy on a molecular level. But rather than 'moulding' the photograph's surface, as the frequently drawn analogy with a footprint suggests, the light only touches this surface, which is the vantage point of the second chapter. And given that this is a physical phenomenon on molecular level, what other tactile qualities of the photographic surface can be understood via the concept of touch? A closer investigation of tactile and haptic encounters with photographs attends to our physical engagement with photographs. We start from the moment of development in the darkroom and move through the lifetime of photographs, either as (untouchable) photoworks on an exhibition wall, or as cherished (and touched) personal objects. The chapter opens with the fingerprint as a visible and physical remnant of interaction that is as much a sign of affection as a conservational threat. Developing a photograph in the darkroom means, beside chemical processes, a choreography of controlled gestures to place and lift the photographic paper in and out of solutions and light. The encompassing darkness of such darkrooms enhances the importance put into the developer's hands. An essay on photograms, 'Contact Images' (1997), by French philosopher and art historian Georges Didi-Huberman, is a useful theoretical starting point, for it examines physical origin and effect at once.

Chapter 2 culminates with an exploration of the reciprocal effect between physically touching a photograph, and being touched emotionally by found photographs such as those used by Tacita Dean in her book project *Floh* (2001). If a photowork like *Crowhurst II* does *not* allow direct cutaneous contact, how can it evoke to emotionally affect a viewer? The affective qualities of a photowork can be either pronounced or neglected by the way it is presented, framed or hung – all curatorial and artistic measures that determine the viewer's sensory apprehension of a photowork's haptic qualities, as considered towards the end of this chapter. The book *The Senses of Touch: Haptics, Affects and Technologies* (2007) by sociologist Mark Paterson is of particular help here. More generally, *The Senses of Touch* is a guide throughout the second chapter, helping me to finding a way through the multiple present forms of a tactile, haptic, and tangible perception, and its position within the longstanding debate concerning the optic and the haptic within art historical tradition.

The first two chapters pursue an ontological exploration of the photographic surface in terms of its materiality and our engagement with it. The final two chapters advance this ontology by bringing into focus the times and spaces that environ the photographic surface. The surface appears in its interfacial character, formed by its surroundings and by the inner material logics of its 'subsurface'. Chapter 3 seeks to understand the workings and meanings of the photograph's invisible 'inside', which separates and mediates between different spaces. How does the material thickness of the photowork shape the photographic surface? And what are the consequences, for our perception of the photowork, of the surface's acting as an interface between substances and spaces, between the visible and the invisible? French phenomenologist Maurice Merleau-Ponty's posthumous *The Visible and the Invisible* (original title *Le Visible et l'Invisible*, 1964) will shape my own answers, as will Martin Heidegger's philosophical inquiry, *The Origin of the Work of Art* (original title *Der Ursprung des Kunstwerkes*, 1935–36).

The chapter begins by taking up the metaphor of landscape to help us understand what the photographic surface conjures, what is beneath or behind it. In the case study for this chapter, *Dutch Grey* by Ger van Elk, the photographic surface is mostly hidden under multiple layers of alkyd paint. Its landscape depiction rises out of painted abstraction on a photographic ground that is dominated by a horizontal line in the middle of the photowork. *Representing Place: Landscape Painting and Maps* (2002) by the American philosopher Edward S. Casey sheds light on the representation of landscape in general. I take up Casey's ideas to guide my metaphorical re-visioning of the surface and the depths of Van Elk's photowork as another form of landscape.

Van Elk's horizon motif gives ground to my theoretical elaboration of the photographic surface as a horizon-interface. In landscape, the horizon separates the visible and invisible; it is subject to the position of the person who perceives it, or the other way round: a person's view is determined (and framed) by the horizon, as elaborated by Merleau-Ponty in his account of the "see-er" who is always encompassed by the horizon. Behind or beneath the horizon of the photographic surface there is a sandwich of multiple layers. My third chapter goes on to consider how to find a theoretical foothold in this invisible subsurface. I look deeper into material constitutions and behaviours in

order to develop a method for actually relating to the invisible thickness of photoworks. An awareness of a photograph's thickness enables a new understanding of the surface as determined also from 'within' the print. This has consequences for existing theories and for the extension of what we define as the surface into deeper layers. What we assume to be invisible to us – the interior horizon of *Dutch Grey* – forms the exterior horizon of the photowork to such an extent that we cannot characterize it as merely invisible, but as a matter of our own visual limits: an unawareness of a photograph as an inherently multi-layered object.

The last part of Chapter 3 covers the intra-action between the inside and outside of the photowork and the extension of this intra-action through the spaces and times of the 'extra-face' – that which encircles the photographic surface. In what ways does the photographic surface mediate between different extra-facial spaces and timeframes? How can we understand its *intra-action*? The term was coined by the feminist scientist and philosopher Karen Barad, a prominent figure in new materialisms studies who was trained in theoretical physics. Barad's book *Meeting the Universe Halfway: Quantum Physics and the Entanglement of Matter and Meaning* (2007) appears intermittently as theoretical guideline.

While the photographic depiction refers to a specific time and space in the past – Roland Barthes's *noeme* of photography as the *ça a été*, the *that-has-been* – the physicality of Van Elk's overpaintings also leads to the artist's past action as well as remaining physically in the present moment, as the viewer faces the photowork. Hybrid additions to photographs in photoworks trigger awareness of other temporalities that can always be linked to spaces in which the photowork's biography is written. As an example, the backface of photoworks and photographs offers insight into their history. It can expose the network of changing collection and conservation strategies a photowork is always bound to, with which the chapter closes.

The purpose of the last chapter is to understand the processual character of photographic material through different periods of its existence. How does the photographic surface transform through processes with and without the intervention of human actors? Covering the whole lifespan of photographs through processes of creation, of conservation, and of (unintentional) destruction, Chapter 4 demonstrates how the photographic surface relates and how it acts as processual interface in each encounter and circumstance. *The Interface Effect* (2012), by media theorist and programmer Alexander Galloway, characterizes interfaces as effects that cause "transformations in material states" (Galloway 2012, vii), rather than as things. Galloway's definition offers a more precise understanding of the photographic surface as interface. Are there particular processes that reveal the photographic surface to be an active force (and interface) when it comes to its appearance and our resulting viewing experience?

Intentional gestures as well as unintended effects are 'recorded' by the photograph's appearance. Chapter 4 opens with an analysis of various imaging phases through which photographs can come into existence with the help of chemical processes and human gestures. The disturbing colour shift in this chapter's case study, *Russian Diplomacy* (1974) by Ger van Elk, leads me to question whether such instability is inherent to the photograph's material logics, rather than a result of unfortunate conservation measures. How can a changing photographic surface ultimately ontologically shift our understanding and engagement with photographs? The materialist ontology of the work of art put forward by Australian artist and art theorist Barbara Bolt in *Art Beyond Representation: The Performative Power of the Image* (2004) serves as a theoretical guideline for me here. Bolt's conception of the work of art as a performative process, rather than merely a representational practice, can assist in my opening new ways of understanding photographs. In the final part of the chapter, I evaluate this analysis of the photographic surface as an active interface processing both inner and outer influences. The argument culminates by discovering a new imperative to acknowledge the transformative nature of each photograph, and of our photoworks specifically. This is one of the dissertation's key arguments and one that has murmured, intermittently, throughout the text.

ENDNOTES

1
Based on the tradition of Mieke Bal and Hubert Damisch as outlined by Marcel Finke in his article 'Denken (mit) der Kunst oder: Was ist ein theoretisches Objekt?' (2014) ('Thinking (with) art or: What is a theoretical object?').

Chapter 1

PHOTOGRAPHIC TEXTURES

FIGURE 1.1. Tacita Dean, *Crowhurst II*, 2007.
White gouache paint on four silver gelatin DOP prints lined onto double weight fibre-based paper, total size 300×380cm, all bands are measuring a length of 380 cm with a width that varies between 90 and 100 cm. De Pont Museum, Tilburg, The Netherlands.

Coming close, bending over, taking in Tacita Dean's *Crowhurst II* (figs. 1.1 and 1.2) askew, its photographic surface reveals tensions. The paper rises and flattens, gliding away in countless heights and lows. Then, white paint strands the bark-like wave of the English yew tree (*taxus baccata*), which bestows an unexpected tactility on the black-and-white trunk. The tree's surroundings are concealed beneath a layer of white gouache paint, which causes the photographic paper to bulge in places where no paint covers it. This effect makes the yew's bole stand out of the image as if it were sculptured. Sidelong views make it possible not only to discern but also to rethink the meaning of the undulation of Dean's photowork.

It is this impressive corporeality that makes *Crowhurst II* (2007) magnetic to the eye. A photowork by the English-born artist Tacita Dean (b. 1965), *Crowhurst II* measures three by four metres. It is made up of four large-scale strokes of gelatin silver prints, each one metre wide and three metres high, mounted next to each other on the exhibition wall. No frame around, no glass in front; the materiality of this huge photowork immediately imposes itself. On each of these four silver gelatin strokes, Dean has neatly painted around the branches of the giant yew tree, eliminating any indications of its surroundings. Her overpainting greatly enhances the pictorial and sculptural qualities of the photograph. The subject of *Crowhurst II* – a likely-pre-Christian yew tree in St. George's churchyard in Crowhurst, Sussex – becomes entangled in the form and the materials the artist used. For scholars, it is tempting to analyse the materiality and the subject of the photograph separately. But both need to be considered in their interrelatedness. Taking *Crowhurst II* as the case study for a wider theory of photoworks that are composed of analogue photographs which have been partly overpainted, I want to evaluate the material quality of the photograph's texture in relation to its subject matter. It reveals itself at the photographic surface, an area which has been often overlooked in photo theory.

As the main question of this research concerns the photographic surface and how it acts as interface between substances and spaces, this first chapter addresses the various substances that are involved in the photographic process and shape the photowork's appearance. For example, in the process of creating a gelatin silver print, it is the porous surface and texture of the light-sensitized emulsion that hosts and facilitates the chemical reaction and interaction between immaterial photons and silver salts. But which agents, precisely, are involved in the photographic act? And how do these agents relate to the photographic surface, determining or changing its shape and meaning? Can we allocate meaning to their agency, with respect to the final photograph and its subject? How does the texture of the photographic surface contribute to a photograph's subject? The answers to these questions will shape an understanding of the substance(s) of the photographic surface. In *Crowhurst II,* added paint highlights the material

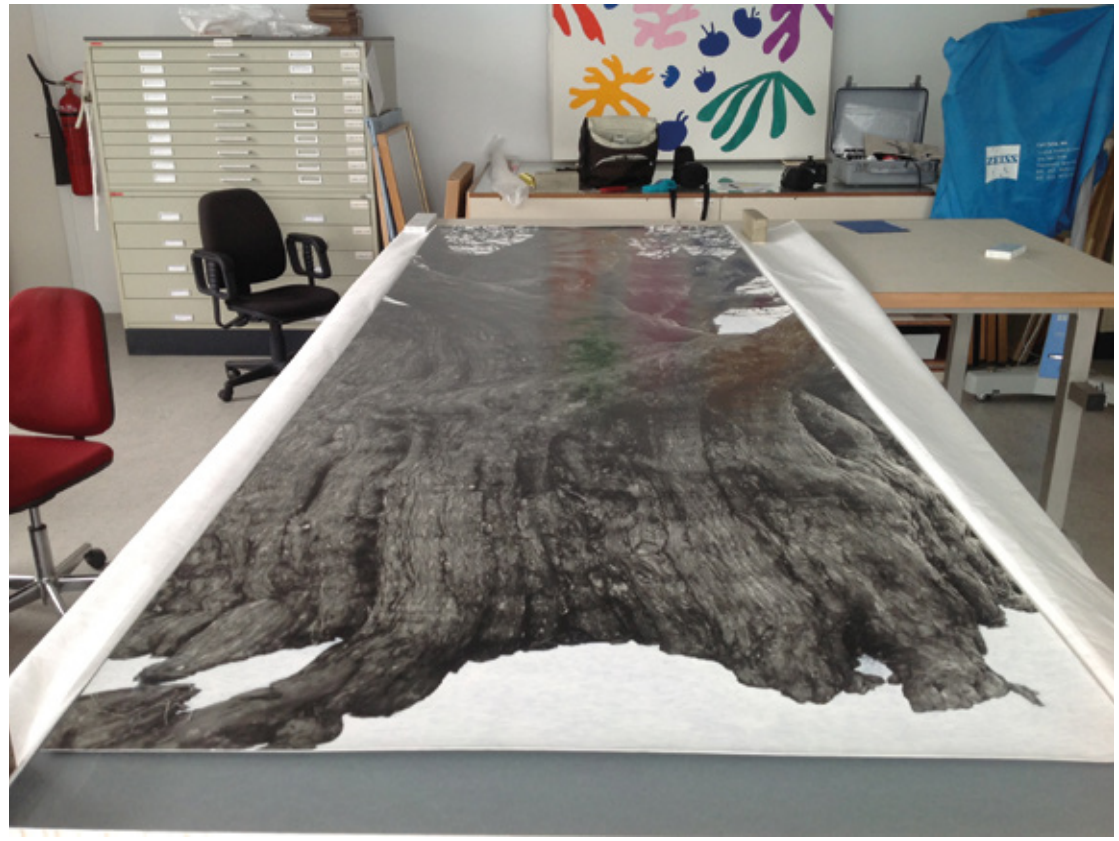


FIGURE 1.2. One of four vertical bands of *Crowhurst II* lying on a table in the restoration studio of the Stedelijk Museum in Amsterdam during the condition mapping process, August 15, 2013.

properties of the photographic surface. The contiguity of these two materialities – paint and photographic paper – provokes distinct questions on the photograph's material properties. Examining the notion and the appearance of texture in the photographic context should lead to a basic understanding of the material constitution of the surface, how it was created, and how it changes. Applying that knowledge will bring the tactile qualities of the surface to the fore. These qualities arise from the surface's textural composition, which I address in the second chapter.

The theoretical framework for this chapter builds on Henri Van Lier´s *Philosophy of Photography* (2007 [1983]), in which he clearly distinguishes the various elements that bring a photograph into existence. The first of the three parts of Van Lier's book, on the texture and structure of the photograph, are particularly relevant to this chapter. He takes physical photonic imprints as the vantage point for an enumeration and description of the characteristics of photography. To analyse the specifics and the perceptual positioning of these photonic imprints, I use terminology from James Gibson's *The Ecological Approach to Visual Perception* (1979): *substances, textures*, and *surfaces.* Gibson uses these definitions within his study of the natural environment to explain how human visual perception orientates and relies on their particular forms of information. Although Gibson's argument was

conceived within and for a different field of study (the psychological aspects of human perception behaviour), his terms and descriptions are helpful to me as theoretical vehicles for encountering the photographic surface and its material characteristics from another angle.

I open this chapter by questioning the relationship between the textures of the photograph and of the subject that it represents. This questioning will create a broad and varied understanding of photographic textures. A kneejerk response might insist that there is no relation between the photographic surface and the matter depicted. My intention is to achieve a 'textural' awareness in both. By the end, we will have a greater understanding: there appears to be more than one relation between the two. In the next part, I dive into different material textures of photographic surfaces, and look in greater detail at visual photographic textures, which have their roots in the photograph's material surface, but are also shaped by external phenomena.

I would like to end this introduction with a quote that struck me at the very beginning of my research for this chapter. It beautifully reflects the ambition and intention I have in the writing that follows. I borrow it from the article 'The Touch of Meaning: Researching Art between Text and Texture' (2016) by philosopher Gerald Cipriani.

> The relationship between the textual and the textural, we shall argue, must be necessary and complementary. Meaning in art is not the exclusive privilege of the textual, the verb and the word. At the same time, meaning in art is not mere materiality, physicality or gesture. Meaning in art carries a sense of touch at the crossroad between the textual and the textural (Cipriani 2016, 161).

1.1. TEXTURAL REFLECTION OF THE PHOTOGRAPHED BY THE *Photographic Surface*

At the beginning of his essay 'Photography, Or the Writing of Light' (2000), Jean Baudrillard discusses the effect of the *trompe l'oeil* in relation to photography. He writes:

> The technique of photography takes us beyond the replica into the domain of the *trompe l'oeil*. Through its unrealistic play of visual techniques, its slicing of reality, its immobility, its silence, and its phenomenological reduction of movements, photography affirms itself as both the purest and the most artificial exposition of the image (Baudrillard 2000, unpaged).

Baudrillard's notion of an "unrealistic play of visual techniques" invokes photography's mimetic capacity to represent texture. The textural quality of the photographed subject appears to be impeccably represented in the photographic image. This is valid, as a visual mimesis of photographed textures. However, the material surface of a photographic print appears at first glance to be flat and congruent. What can be stated about the photograph's material mimesis as it materializes in the texture of its surface? The aim of this section is to draw out and discuss the unique material relation between the analogue photograph and the photographed scenery – by focusing on the textures of both their surfaces. My points of departure here are *Crowhurst II*'s chemically created black-and-white photographs, the silver gelatin prints.[1]

PHYSICAL ANALOGIES: THE PHOTOGRAPH AS REPLICA, AS TRACE, AS IMPRINT, AS CHARGE

Although the physical link between a photograph and the photographed object appears rather abstract and minimal, it is worth moving across the image's micro and macro scales by studying both the surface of the photograph and the surfaces of the photographed. The photographic process mainly concerns two surfaces: the negative film and the paper print. Making silver gelatin prints comprises two phases of exposures and therewith two material objects. The first exposure takes place when the light emissions reflected by the photographed objects react with light sensitive film in the camera. The second is when light sensitive paper is exposed to the (enlarged) film. The (already quite abstracted) physical confrontation between the yew tree and the photographs becomes even more complex through the multiple stages (a minimum of two) with which a photograph comes into existence. Though this transfer is physically and temporally more elaborate than perhaps initially expected, there is nonetheless a literal analogue material continuation present in the final print. The question is, can we decipher this from the print's texture?

The texture of the photograph's surface comes explicitly to the fore when juxtaposed with other materials as in *Crowhurst II*. Fundamentally, it is the surface that separates the silver gelatin photograph from the gouache paint. Therefore it is all the more important to understand the meaning and the materiality of this surface (most significantly the gelatin layer), but also of surfaces in general. James Gibson characterizes surfaces in *The Ecological Approach to Visual Perception* as follows: "the surface is where most of the action is" (Gibson 2015 [1979], 19). Van Lier, in turn, highlights the pivotal encounter between photons and light sensitive film from the outset as "the place where everything is played out" (Van Lier 2007 [1983], 11). He criticizes "inexactitudes" in theories of photography that result from an insufficient scholarly attention to this "strange status of those very direct and physical luminous photonic imprints which are but the very indirect and abstract imprints of objects" (ibid.).

On a physical level, a material dialectic is inherent to the relation between the photographed and the photographic film, or, between the negative film and its photographic print. Whatever area emitted the most photons (by reflecting light while being photographed, or by filtering light through the negative film), will materialise as accumulations of metallic silver in the gelatin. Silver halides (salts), when exposed to light, change into metallic silver particles. Non-exposed silver halides are converted into a water-soluble complex in the developing tank or the fixing bath, and are finally washed away with water. A small fragment of any developed silver gelatin film or print will manifest as an image which, on magnification, has dark

areas hosting a fairly high density of the silver particles that are dispersed throughout the gelatin, and light parts (which were not lit at all) and are 'empty'. I place 'empty' between quotation marks because this emptiness or density does not determine the physical nature of the photograph's surface. This is formed by the gelatin's appearance and by not the corporeality of the silver (halides). Their size and mass is so marginal that it does not affect the gelatin's body. However, the composition of the gelatin – the dispersal of silver particles within the emulsion – does vary after exposure and development. In this respect, a material dialectic between the photographed and the photograph is traceable, though on a magnified scale and only when reversed in colour, but not in texture.

During the first stage of the photographic act, the camera translates the textures of photographed objects from three dimensions into two. These textures become dematerialized, subsequently reappearing in a wholly different materiality. Reference to the original textures (and objects) can be re-established only by means of interpretation. This re-presentation of textures is not embodied in the textural shape of the surface of the film, or, eventually, of the photograph. Throughout life, we learn to use our eyes as extensions of our hands, assuming and assigning certain tactile qualities to the things we see. This habitual way of seeing can have the effect of causing us to overlook the intrinsic materiality of this double-rendered appearance. A number of theoretical comparisons have been drawn to other physical objects or phenomena, as attempts to grasp the nature of a photograph. I would like to evaluate and reread at least some of the more prominent and repeated analogies that are used to invoke the photograph's actual texture in relation to its visual source.

Returning to Baudrillard's quote on photography as the purest and most artificial exposition of the image: what does his argument reveal about the physicality of the image? Does this characterization of photography change when an additional texture comes into play next to the photograph's surface, as in *Crowhurst II*? This photowork not only reflects the texture of the yew tree's bark, it also mimics it. This diminishes the artificiality of the image as described by Baudrillard.[2] In this context, one striking detail is Dean's technique for applying the gouache paint to the photograph: short and small brushstrokes of a maximum of five centimetres length and one centimetre width make up the huge white areas (fig. 1.3). The texture of this painted surface refers texturally to the flakes of gnarled bark. Although the photographic surface does not itself replicate the texture of the tree, the gouache paint around the tree suggests its structure. So, while Baudrillard states that the photographic technique takes us beyond the replica, a work like *Crowhurst II* rather plays between the *trompe l'oeil* and the replica, through the contiguity of photograph and paint. The photowork's scale, as a nearly life-size depiction of a huge tree, refers to the scale of the centuries-old yew. Approaching this work theoretically as a 'replica' of the original tree, we become aware of the limitations of photography when it comes to the resemblance of textures. However, in *Crowhurst II*, gouache paint literally adds a new layer to the texturality of this photowork. The term replica is usually not applied in the realm

FIGURE 1.3. Detail of *Crowhurst II*, 2007.
Short, regular brush strokes of white gouache paint on silver gelatin photograph, measuring approximately 7 mm in width and 5 cm in length.

of the photographic because a photograph lacks more than one important feature that is associated with this word. Replica tends to mean an exact copy or reproduction of an artwork produced by the artist or under their supervision. It is also assumed to hold the same surface structure as the original, even when reconstructed in another material. Indeed, the replica is considered to be identical to the original, with the single exception that it does not possess the same spatiotemporal qualities: it is removed from the specific placement in space and time of the original. So, what other physical analogies are used to describe the nature of the photograph?

In theoretical writings, an analogue photograph has most significantly been aligned with the concept of the trace.[3] The German art and photo historian Peter Geimer examined this link between the notion of the trace and photography in his essay 'Image as Trace: Speculations about an Undead Paradigm' (2007). Geimer looks through the literature of the relation between photography and the trace-concept, and quotes writers including Rosalind Krauss, Susan Sontag, and Roland Barthes, comparing the photograph and different forms of traces. One of these is the footprint, which Rosalind Krauss develops in relation to photograms. Geimer sees this particular trace as one that results from a *direct* physical contact. The thing (literally the foot) was

there and it has its existence fixed in the form of a mark in the ground before it disappears again. The brief moment of contact, which leaves lasting visible evidence, is the pivotal moment for this encounter between foot and impressionable ground (Geimer 2007, 10). For photograms, it may be true that objects 'leave their mark on the photographic paper' at a scale of 1:1, but to clarify: these forms reveal the contours, not the material textures, of their source. The concept of the trace is only compatible when it indicates a shape in reverse, like the footprint in the ground. However, this blurs the conception of the photograph for two reasons. First, the light's 'marks' are left *within* the gelatin. They change its inner composition but not the outer form of the emulsion layer (as has been explained in the beginning of this section). Hence, we cannot accurately speak of a trace *on* the photographic surface. Second, a direct physical link between the photograph and the photographed is in the negative-positive process between the two stages of exposure – it is not a transferred physicality.

The footprint as figure of comparison, although widely used, appears to be misleading as its literal meaning invokes a change in surface texture. As Hilde Van Gelder and Helen Westgeest have pointed out in their book *Photography Theory in Historical Perspective* (2011), many theorists used the term "trace" for its indexical connotation, due to the causal relationship between the photograph and what it represents (Van Gelder and Westgeest 2011, 34). In general, a trace refers to something physical and visual, but not necessarily textural, it conjures an image like smoke or a shadow or the silver particles in the gelatin. However, the term equally implies a change in surface texture, just as a footprint does, so too a fingerprint, a scratch, an undulation, and so on. This section's concern for texture draws attention to the ambiguousness of the term trace.

Van Lier uses the "imprint" as a physical analogy to the photograph. 'Print', in itself, suggests a physical change to a surface, a printed mark that is left *on* that surface. The prefix *im-* further emphasizes this image of something printed *in* or *into* something, and so it tends towards a similar textural connotation as the foot*print* or the trace. Before jumping off from Van Lier's considered characterization of the photograph as "the abstractive imprint", we need to have a fuller sense of texture and structure, as he formulates them, with eight qualities, at the beginning of the book (Van Lier 2007 [1983], 14–16). Van Lier's first quality is 'The Photonic Imprint: Weightlessness'. Here, he distinguishes the photon from other materials that have a physical impact on the majority of imprints. The photon alters the silver halide, but it cannot be considered a substance and it does not have impact (2007 [1983], 14). With this distinction, Van Lier admits that the term imprint, when used in this photographic context, is an abstraction. The photograph as abstractive imprint is first and foremost an imprint that has already been abstracted: "[t]he weightlessness of photons endows their inscriptions with a striking weightlessness, almost an immateriality" (ibid.).

In the second and the sixth qualities, '2. The Distant Imprint: Superficiality of Field.' and '6. The Positive-Negative Imprint: Pulsation', we can read a few definitions that refer to the photograph's texture. These qualities concern the alteration of the silver halides by the photons, and the corollary abstraction that comes with this process. Van Lier writes, for example, of the photons "impregnating" the film (ibid.), and he describes "lacing and engraving [as] the photographic themes par excellence" (2007 [1983], 15). Again, such phrasing can trigger a material misunderstanding of the photograph's texture.

If the photograph's material surface cannot be fully described by notions such as 'replica', 'trace', or 'imprint', what alternative term would then nourish a better understanding of the physicality of the photograph and its surface? I suggest the term *charge*. 'Charge' is the closest approximation of the physical state of a photograph during and after its creation through the interaction between photons and photosensitive silver halides. Without changing its outer appearance materially or texturally, the notion of a photograph as an embodied charge is visually loaded, invoking the image after exposure (and even in its latent stage before it has been developed). A scientific paper, 'Photoinduced Charge Transfer: From Photography to Solar Energy' (2017), affirms my characterization here. The paper is a survey study published by five (photo-)chemists, exploring the research and application of photoinduced charge transfer through the past 150 years. It elaborates on the invention of various nineteenth-century photographic techniques, the first forms of photoinduced charge transfer. A charge transfer, here, is a "transfer of energy, charge, electrons and/or ions" (De Castro et al. 2017, 214). The photons, which have zero mass, are pure energy. Applied with this perspective to my discussion of materiality, they feel more abstract and intangible than ever. In order to measure the numbers of photons in a light beam, the authors use a mechanism called a chemical actinometre, which focuses on the chemical reaction that the beam produces (2017, 218). The ferrioxalate actinometre that they recommend works in a similar way to an early photographic process, the blue cyanotype (invented by Sir John F. W. Herschel in 1842), which is based on the light sensitivity of an iron complex (ferric citrate and potassium ferricyanide). This study on photoinduced charge transfer proposes an understanding of a photograph as a physical charge, one that renders weightless photons tangible and (for the authors' purposes) measurable.

The photochemists also argue that the scientific understanding of photography (like other commercial technologies) lagged behind its development and practical usage. Insights into the science of silver halide photography arose as a contingency of an understanding of the structure and photoelectronic properties of dyes and silver halides (as semiconductors) during the interbellum period (2017, 216). Perhaps the material understanding of the photograph for theoretical purposes still lags behind its invention and practice. Hitherto absent from the photo-theoretical context, the *photograph as charge* therefore merits some introduction. The photograph as charge encompasses, first of all, indices which signal their causes as physical effects. If we imagine the image plane as this field of either darkened or non-darkened image spots (which collectively make up the image), the darkened spots are silver halides which have been 'charged' by photons and transformed physically and chemically into silver grains. Each cell was either

activated, or not. Fundamentally, this is a yes/no binary choice, which is why Van Lier concludes that every analogical imprint is mutually digital: it is calculable as a choice which governed every single grain, to be darkened or non-darkened, activated or negated, 1 or 0 (Van Lier 2007 [1983], 16). These stains as indices are in that sense fully physical and non-intentional.

This argument relates to his seventh quality of texture and structure ('7. Analogical and Digital Imprints'). The other four not-mentioned qualities (namely '3. The Centered Imprint'; '4. Isomorphic Imprints'; '5. The Synchronous Imprint'; and '8. Surcharged and Subcharged Imprints') do not entail statements on the photographic texture, though the last and eighth subtitle refers to "(sub)charged imprints" but which Van Lier does not develop within his argument. Still, all qualities except the first (in which Van Lier indirectly mentions the misleading implication of imprint) would theoretically retain their sense even if his term 'imprint' was replaced with my term 'charge'.

If we consider the charge's physical indices as indexes that indicate (like the index finger) something outside the material photograph (Van Lier describes these indications as "intentional, conventional, and systematic signals" (2007 [1983], 17)), the photograph becomes *charged* with references. These indexes then might elicit certain emotions or interpretations. For example, in *Doing Family Photography: The Domestic, The Public and The Politics of Sentiment* (2010), Gillian Rose describes how "family snaps can carry a very powerful charge" (Rose 2010, 21), and speaks of the "emotional charge" of certain photographs (2010, 10). While the trace inevitably refers to a past action and places emphasis on the photograph's indexical power, the charge extends into the present, opening up many possible pathways for the photograph's perception and interpretation. The charge reaches even into the future, as something which can be characterized as an affordance. I will discuss this more thoroughly in the second chapter, where I will also introduce an index of personal identification.

The drawback of the term 'charge' is that, while it reflects more accurately the material and textural state of the photograph, it does not directly correspond to a figurative representation as does the trace in the form of, for example, a footprint. Van Lier can offer a solution to this problem. In the conclusion to his eightfold characterisation of the photograph's properties, he states that each quality reflects two apparently opposed poles, each of which is related to the photograph (Van Lier 2007 [1983], 16). Perhaps then the most apt characterization of the photograph would come through the polarity of the (figurative) trace by taking the charge as material and textural metaphor.

Surfaces AND *Substances* IN NATURE AND IN PHOTOGRAPHS

A fissured surface – trunk and branches – is all that is presented to the viewer who stands in front of Dean's yew tree photowork. The visible periderm of this ancient tree, which has resided for centuries in the little parish of Crowhurst in Southern England, has protected it and enabled it to span the ages. What we cannot see is that this particular yew tree is actually hollow (many of these very old trees rot from the centre; figs. 1.5a & b). Because the yew wood is exceptionally strong

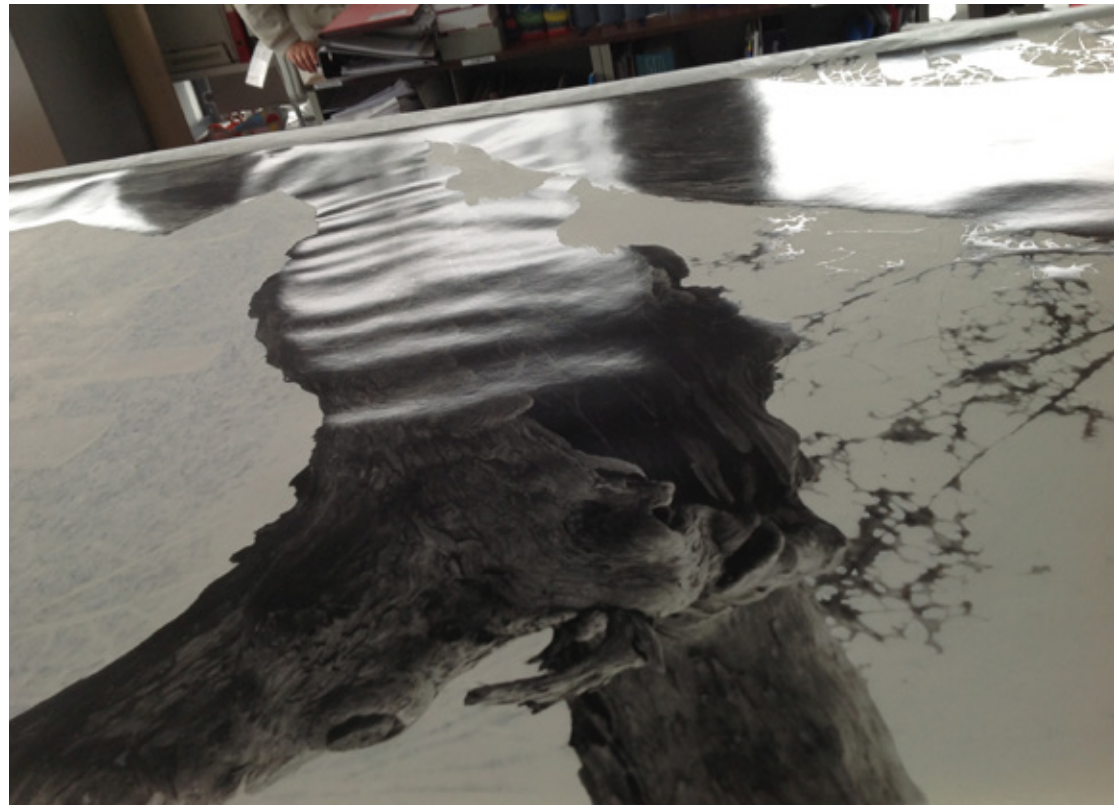


FIGURE 1.4. Sideview of the undulated photographic surface of *Crowhurst II*, 2007.

and flexible at once, this rotting does not harm the living parts of the tree's bark.[4] The three-dimensional trunk is therefore almost a two-dimensional ligneous surface. If walking around the tree in Crowhurst, we might soon discover its hollowness, but facing the tree in the photowork with only one perspective, this angle is kept hidden. What we witness are the two surfaces, of the tree and of the photowork. In the following passages I extend Gibson's observations and characterizations of substances and surfaces in the natural environment to the realm of photography, to apprehend the surfaces and substances of Dean's photowork in a spatial as well as theoretical context.

In *The Ecological Approach to Visual Perception* (1979), Gibson expounds on the significance of surfaces in the triad of medium, substances and surfaces.

> The surface is where light is reflected or absorbed, not the interior of the substance. The surface is what touches the animal, not the interior. The surface is where chemical reaction mostly takes place. The surface is where vaporization or diffusion of substances into the medium occurs (Gibson 2015 [1979], 19).

This description can also be applied to this yew bark: the bark is involved with the process of photosynthesis through which the tree absorbs light energy and converts it into chemical energy to fuel its activities. It releases oxygen as a 'waste' product, which contributes to the production and maintenance of the gaseous composition of

FIGURES 1.5A & 1.5B. Darren Pepe. 'The Crowhurst yew tree in St George's churchyard.' September 27, 2019.

Earth's atmosphere. The bark also has physical and chemical properties, which protect the tree from temperature extremes, diseases, herbivore mammals, birds, and insects (Lev-Yadun 2011, unpaged).

Gibson describes the surface as the place "where light is reflected or absorbed", "where chemical reaction mostly takes place", and "where vaporization or diffusion of substances into the medium occurs" (Gibson 2015 [1979], 19). As a photograph is called into existence, a multitude of photons are reflected and emitted by the photographed objects, and these photons, radiant energy, are absorbed by the light sensitive gelatin surface of the film. (This is a very simplified account of the process.) The first phase of the chemical reaction takes place in the surface layer of the photosensitive film where light rays react with silver salts. What can we say about the other substances and their diffusion into the medium, or vice versa? Before we can formulate an answer, it will be necessary to distinguish between substances and insubstantial matter. Gibson defines substances as matters in a solid or semisolid state. He characterises them as more or less resistant to deformation and usually opaque to light (with the exception of translucent solid materials such as glass). As Gibson elaborates his environmental description of physicality, he compares substances with the soil, and insubstantial matter with the air and water (matter in a liquid state which lingers between extremes (2015 [1979], 15)). Interestingly, the Earth and the Earth's "furniture" are seen as heterogeneous mixtures of chemical elements, whereas air or water, as partially insubstantial matters, are homogeneous. In a homogenous mixture the components are uniformly distributed throughout the mixture, while in a heterogeneous one, the components are not uniform and can have localized regions with different properties.

Gibson defines a set of primary environmental substances: soil, sand, oil, wood, minerals, metal and, above all, the various tissues of plants, and animals (ibid.). His list already includes the key ingredients of a silver gelatin print: wood (or plant tissues) in the paper carrier, animal protein and metal in the silver-enriched gelatin layer. The texture of the photographic surface is predominantly determined by its gelatin-coated layer – the coating that embeds the metallic silver, which comprises the image after development. The relative visibility of the photographic surface is therefore dependent on the textural properties of the gelatin layer. What determines or influences this texture? The gelatin layer is the binding medium and colloid for the image-forming substance – the silver (salts). Because of this, the relative stability of the gelatin layer (in relation to environmental factors such as humidity and temperature) determines the sustainability of the print. In consequence, the properties of gelatin are central to preservation and conservation studies.[5] Visible deterioration of a photograph can be attributed to the silver particles (they are susceptible to oxidation). Effects of this oxidation include image fade, the loss of highlight detail, silver mirroring on the surface, and colour shift (to yellow-brown). However, the oxidation of the silver parts can only occur when the photograph is subjected to circumstances that affect the stability of the gelatin.

Gelatin is a translucent substance with a basis of collagen, which is usually extracted from cattle bones to make the photographic material. It is produced by the partial hydrolysis of collagen and therefore remains sensitive to water through its lifespan. As a solution it has a higher viscosity than water and this thickness makes it gel-like, more resistant to deformation than water. According to Gibson, there are numerous ways to distinguish substances, which differ in hardness, cohesiveness, elasticity, plasticity, and viscosity. He describes the latter as a resistance to flow (2015 [1979], 16). The gelatin's resistance to the flow of substantial and insubstantial matter (an absorption or vaporization of substances) is proportional to its solubility. Gelatin melts when heated and solidifies when cooled. When mixed with water, it forms a semi-solid colloid gel. This is why photographic films and prints are preferably stored and exhibited in places that are not only regulated in their relative humidity but are also guaranteed to retain a low temperature.[6] The fact that the substance of the gelatin (and therefore its texture) can vary on the spectrum between liquid and solid is another indication of the gelatin's receptivity to external factors.

It is worth mentioning that the two binding elements of Tacita Dean's *Crowhurst II*, the gum of the gouache and the gelatin of the photographic emulsion, are both hydrocolloids. A colloid is a substance that is dispersed throughout another substance, in this case water. The quantity of the water will determine the states of the gum and the gelatin as liquid, semi-solid, or solid matter. The gouache paint is in fact more hydroscopic than the gelatin layer, composed as it is of pigment, gum, and water. Although gouache does not hold water in its dried painted state, it remains soluble in water. Therefore the paint is able to absorb and to repel water more easily than the gelatin. When Dean painted on the photograph, the solid gelatin layer was exposed to the liquid paint and the water may have caused it to set. This would explain the undulation of the photographic print as something that occurred during the drying process (of the paint and the re-hydrolysed gelatin) (fig. 1.4). During the process of painting, the gouache literally binds to the gelatin layer: the water in the gouache makes the gelatin bulge and bulb as the paint and the gelatin slowly, simultaneously, dry. What is unclear is whether the gouache actually drains water from the gelatin layer. In fact, the photograph is more flexible for stretching and shrinking (if the surrounding climate is unstable) than the dried paint. The wavy corrugation is the visible consequence of this oscillation.

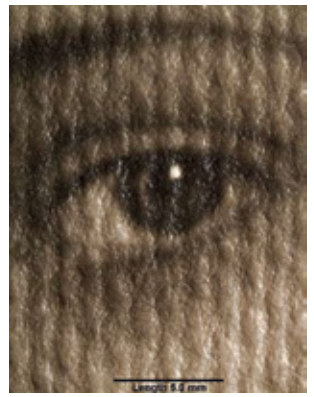
One could argue that the gouache layer here shields the underlying photograph from any fluctuation – this is why the whitened parts of the photowork remain flat, while the uncovered parts wave.[7] But that in itself can be regarded as paradox: more often, when gouache is used on drawing paper, the painted parts bulge while the unpainted plain paper stays flat.

Given the fact that circumstances modify both substance and texture of the gelatin, how can we describe it through Gibson's categorization of substances? He states that natural substances frequently undergo structural and chemical change, and therefore it is important to distinguish substances by how susceptible they are to chemical reactions. This susceptibility must include the degree of solubility in water, the volatility in air, and the degree to which the substance can absorb light (2015 [1979], 16). The degree to which the substance is open to chemical transformation is influenced by the form of its surface.[8] When a substance such as gelatin changes in reaction to external (or internal) factors, the layout of the photographic surface and its texture also change. Gibson stipulates a difference between the texture of the surface and the structure of the substance that lies under the surface. For Gibson, in the realm of natural substances, a perfectly smooth surface is forever an abstraction. Only manufactured substances, such as gelatin-coated paper, might approximate such smoothness. The chemical and geometric units of the gelatin surface are relatively small and the texture is subsequently fine. Gibson concludes a paragraph on "characteristic texture" by writing that in certain conditions a surface is not visible to people with ordinary sight: when it is homogeneous, very smooth, flat, and large (2015 [1979], 24). As a psychologist, his writing tends towards the explanation of visual-perceptual behaviours of animals, including human beings. In the context of my own research, Gibson's behavioural theory, applied to photo theory, can clarify why the material surface of a photograph is mostly overlooked.

In sum, the textural relation between the yew's bark and the surface of the silver gelatin strokes seems distant. A physical relationship between photographed and photograph determines the composition of the gelatin, but this relationship is not necessarily a transference of texture. It is the relief, small gouache strokes and a glossy bulging photographic surface, that makes up the texture of *Crowhurst II*. There are other photographs that relate physically to the subject that they depict without any additional material or medium (even though these photographs might be seen as exceptions). Carbon printing or Woodbury type techniques, beside other photographic textures, will be discussed in the following section.

1.2.
MATERIAL TEXTURES OF *Photographic Surfaces*

The surface of most photographs appears homogeneous, if the gelatin layer is sound. The texture of the photograph is therefore habitually neglected as a material value, overshadowed by the medium's exquisite ability to *represent* textures. While maintaining my overarching interest in the textural relation between the material photograph and the photographed, I will now consider what alternative (hi)stories photographic textures can tell. Here, technical aspects of manufacture are as important as the specific application or usage of certain photographic processes by photographers and artists, whose artistic work may have become associated with those textures. In this part of the dissertation, theorization stands in the shadow of technical explanations and applications. The outline of material photographic textures, however, will form an essential knowledge base on which further theory can be developed in the later part of the text. When we more carefully look at and listen to the texture of the photographs that we encounter in archives, on exhibition walls, or in our own photo albums, what do we discover that the image itself cannot tell?



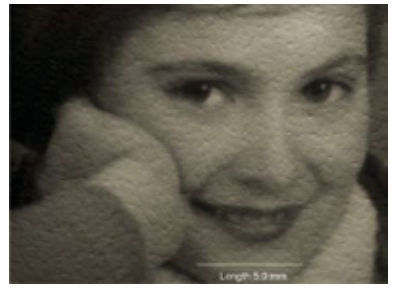


FIGURE 1.6A. Kodak Opal Grade Z [Tapestry] photographic paper micrograph. In "Photographic Papers Manufactured By Eastman Kodak Company", Rochester: Eastman Kodak Company, circa 1937.

FIGURE 1.6B. Kodak Ektalure Paper E [Fine grain] photographic paper micrograph. In "Kodak Master Darkroom Dataguide R-20", Rochester: Eastman Kodak Company, 1968.

FIGURE 1.6C. Kodak Polylure Paper Y [Silk] photographic paper sample and micrograph. In "Kodak Master Darkroom Dataguide R-20", Rochester: Eastman Kodak Company, 1968.

TEXTURE HISTORIES

When texture is the focus of a text on the history or theory of photography, the argument inevitably deals with the medium's unrivalled capacity to *represent* textures. An alternative history that can include the chronological development of material photographic textures would require access to 'real' photographs, rather than mere representa-

tions of photographs. The physical artefacts are also the main source for and subject of scientific research into photography. This is why the resources for this section include technical papers by photographic paper engineers, and writings by photo conservators and photographers, but few photo historians and theorists. As Gerald Cipriani writes in his essay 'The Touch of Meaning: Researching Art between Text and Texture': "[…] the practice of research has always privileged 'textual reason' over 'sensory texture,' the *textual* over the *textural*" (Cipriani 2016, 159, emphasis in original). Edward Weston's (1886–1958) photographs and writings push this point home, especially when complemented with technical insights.

Van Gelder and Westgeest note that "[…] the transparent surface of the photograph is one of the main reasons to call photography a more transparent medium than painting" (Van Gelder and Westgeest 2011, 57). They argue that Weston puts emphasis on the transparent character of the photographic surface by bringing the skin textures of his famous photographed nudes into close focus. By quoting from Weston's writings, in which he argues that the human hand could not achieve the fine detail recorded in photographs, Van Gelder and Westgeest state that photography is the superior artistic medium for representing textures (ibid.). According to them, Weston presents transparency with hypermediacy as aim. This makes the viewer aware of the medium's capacity to highlight the textural properties of the photographed. Weston goes so far as to claim that the viewer "may find the recreated image more real and comprehensible than the actual object" (Weston 2003 [1943], 107, quoted by Van Gelder and Westgeest 2011, 57). Although Weston refers here to the photographed object, the quote might be also applied in a metaphorical respect to the photographic object, his physical photographs. Van Gelder and Westgeest pursue this train of thought by approaching the work as image, leaving behind its material values.

The main resources of images for scholarly research are books and vast online databases. These represent or mention hardly any physical features of the photograph, such as its framing or material surface and support (with the exception of exhibition installation shots). This two-dimensional representation of photographs, projected through another material surface (of book paper or screen), permits us immediately to forget the actual surface of the photograph. Van Gelder's and Westgeest's argument is based on Weston's photographic works, which were originally glossy contact prints, made around 1930. In these years, Weston started to make his contact prints on Kodak's Azo glossy silver gelatin paper, developed in Amidol. (Both the paper and the acid developer became associated with Weston's master practice.) These photographs – glossy prints only – were shown in his first solo exhibition in New York in 1930, as is set out in in the catalogue edited by Nancy Newhall for Weston's exhibition at The Museum of Modern Art years later in 1946 (Newhall 1946, 8). As she writes in her catalogue essay, these works "[…] demanded a brilliance and clarity beyond the bronze tones and matte surface of the palladiotype […]" (ibid.). In the mid-twenties, during his stay in Mexico, Weston preferred to work with platinum and palladium papers. Unlike silver gelatin, which is applied to the paper with an adhesive, platinum or palladium are applied directly to the surface of the paper using only a brush. The choice of paper determines the surface characteristics of palladium prints, hence their matte look (figs. 1.7a & b).

FIGURE 1.7A. Edward Weston, *Cloud Mexico*, Negative Date July 1924, Print Date 1924. Palladium print, 17.6×23.9cm. The Museum of Modern Art, Thomas Walther Collection, Gift of David H. McAlpin, by exchange, New York, United States.

FIGURE 1.7B. Edward Weston, *Shells*, Negative Date 1927, Print Date 1927–35. Gelatin silver print, 24.1×19cm. The Museum of Modern Art, Thomas Walther Collection, Purchase, New York, United States.

Weston's preferred Azo glossy silver gelatin paper is one of Kodak's prefabricated Azo papers. A product line that grew from one paper in around 1900 to six papers with different surfaces in 1911. Each paper was identified by a letter from the alphabet and a reference to texture, sheen, and tint (such as, for instance, Azo W: Rough, Lustre, Old Ivory). Kit Funderburk, a former paper engineer at Kodak Eastman, relates the history of what he calls the "Kodak Alphabet Soup" in *A Guide to the Surface Characteristics. Kodak Fibre Base Black-and-White Papers*.

Funderburk states that in the 1930s "[t]he 38 different combinations of texture, gloss, and tint, had anomalies, but this system of surface identification appeared to have provided the basis for rationalization into what later became a clearer method of product characterization" (Funderburk 2009, 8). By that time, texture was classified as either smooth, rough, medium rough, fine-grained, linen, silk, or tapestry. These textures were produced through the combination of emulsion with different matting agents. Barium sulphite was the most common, others included rice and starch, inter alia. Heavily textured photographic papers were created by texturing the paper substrate or the baryta layer (Stulik and Kaplan 2013c, 30). After the 1940s, the range of textures of the Kodak fibre base papers was scaled down to seven textures. Funderburk gives an account of each paper by describing how they were produced, which effects they offered, and when they were used and fabricated. The accompanying visual samples (especially the magnified images) clearly illustrate the textural differences (Funderburk 2009, 45–57) (figs. 1.6a, b & c).

The sheen as an index of surface value, was not clearly defined by Kodak through a specific system, Funderburk shows. It was classified as glossy, high lustre, lustre, semi-matte, and matte, ranging respectively from the highest surface reflection to the lowest (2009, 57). Funderburk's guide concentrates only on fibre base black-and-white papers manufactured by Kodak. Gawain Weaver and Zach Long give further insight into the surfaces of chromogenic prints including Kodak's colour papers (Weaver and Long 2009, 4–6). Whereas the colour fibre base papers only came with a glossy surface (either air-dried or ferrotyped), in 1968 Kodak introduced the resin coated paper (or RC) which offered a wider range of surfaces, each produced through a different method. The paper base was sealed from both sides with a PE-coating (polyethylene), which was cooled against a textured steel roller called the "chill roll" (2009, 5). Silk and matte were then introduced to the chromogenic papers – silk became the photofinishing surface of choice in the early seventies, as Weaver and Long state (ibid.). The typical texture pattern of a silk finish is familiar to anyone who has a family album with photographs from the seventies (similar to the texture of fig. 1.6c).

The study of Kodacolor and Ektacolor prints by Weaver and Long is just one small part of the history of chromogenic prints. Studies of prints by manufacturers like Agfa, Fuji, and Konica are lacking. Nevertheless the authors claim that by analysing the characteristics they cover (including supports, surfaces, dye layers, dye clouds, image deterioration, optical brightening agents (OBAs), and manufacturer and photofinisher backprinting or stamps) any individual Kodak print can be attributed to a certain period within the technological continuum (2009, 13). Thinking of the many other companies that have produced photographic papers besides Eastman Kodak, we can only imagine the vast number of different surface textures, some more memorable than others as fashions and periods of the photograph. Today's prefabricated photo papers also have particular features that affect how they look and feel, as is set out in 'A Consumer Guide to Modern Photo Papers' (2009), published by the Image Permanence Institute. Contemporary papers – wet-process photo paper and modern printing papers – are characterised by *thickness* (basic weight), *texture*, and *surface sheen*.

Because surface textures are subject to technical inventions and contingent fashions, they reliably indicate a photograph's period. Van Lier describes this phenomenon as "the initiative of industrial technology", that is, the initiative of the photographer comes *after* other initiatives, one of which is the development of the various tools and means (processes, papers, lenses, cameras, a.o.) (Van Lier 2007 [1983], 53–58). He argues that the introduction of photography changed the whole system of 'traditional' culture, in which the artist or artisan was the initial master and creator. By contrast, each industrial technological invention created new devices that evoked (or, his word, "initiated") new applications, which were, in turn, mastered by particular photographers. He cites Edward Weston as the photographer of high definition film, Henri Cartier-Bresson as the photographer of the decisive moment (because of his 35mm film and handheld Leica camera), and Ernst Haas as the photographer of Kodachrome 1 (2007 [1983], 54). Van Lier extends this further:

> If one were to multiply these examples, it would become even clearer that the different technical combinations inflecting the photographic process of each epoch are divided amongst the classical masters of the history of photography, each one of them pushing the technical possibilities available at that time to their extremes, just like ancient artists used to do (ibid.).

Although Van Lier highlights only the materials and devices used during the initial photographic act of shooting, his argument also concerns the processes of the second act – exposure and development in the darkroom. Weston's shift from matte palladiotypes to the much glossier Azo prints in the 1930s is only one example. It was not solely the surface sheen that convinced Weston to switch to this silver gelatin paper, it was also the higher cost of platinum and palladium papers (McCabe 2014, 6).

In photographic reproductions, replacing one surface texture with another is intrinsic to the process, where this is part of photographic and photomechanical printing methods. Two 'surface texture fashions' that are often encountered in photoworks from the mid-1980s on are both a posteriori finishing techniques: face mounting and plastic lamination (fig. 1.8). One could argue that these processes bring about an absolute annihilation of the photograph's texture. Both involve the permanent adhesion of a substance to the surface of the photograph – of a rigid sheet of clear acrylic (notably, Plexiglas) in the case of face mounting, or, in the case of lamination, a plastic film (commonly PVC or polyester). While these surfaces are neither materially nor technically akin to the surface of the photograph, they are indisputably the de facto photographic surfaces of many contemporary photoworks, and therefore, we need briefly to address them here. The surface texture of laminated photographs has a wide range of potential gradations between glossy and matte, and can even imitate the textures of leather or canvas, as Sylvie Pénichon and Martin Jürgens explain in their contribution to Constance McCabe's edited volume *Coatings on Photographs: Materials,*

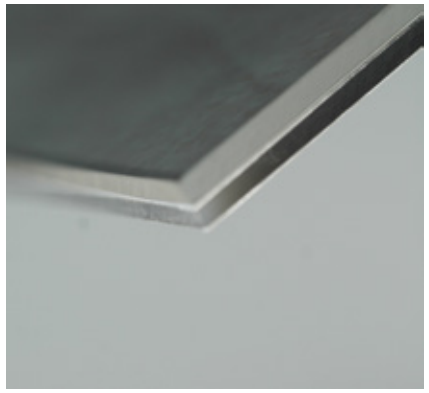


FIGURE 1.8. Acrylic face mounted print, backed with aluminium Dibond – the 'sandwich.'

Techniques, and Conservation (2005, 219). Face-mounted photographs, in contrast, always have a 'wet' look, because of the highly glossy surface of the acrylic sheet, which is often compared with the effect and function of varnish in paintings (ibid.).[9] Despite their popularity among artists, gallerists, and collectors, the fragility of laminated and face-mounted photographic surfaces makes the handling and preservation of these kinds of photoworks a very delicate matter. The fact that photoworks are always the result of layered sandwiching – this is the case even for the 'simplest' unmounted photograph – will be the focus of the third chapter.

Photography, as a medium, lends itself to unlimited transferrals of the photographic image from one (texture) materiality into another. This characteristic can disperse or 'blur' the provenance of the photographic 'source' image. The photograph's texture indicates the period of origin of the positive print – not that of the negative film. For this reason the collectors' market deals in the more or less vague characterization of the *vintage print*, a term that indicates that the print was made soon after the negative's development, preferably (though not necessarily) by the photographer him/herself. Its counterpart is the *modern print*, a photograph that has been developed years or decennia apart from the negative.

Surface analysis is therefore key to discerning the historical provenance of photographic materials. The exemplary research project 'Object:Photo. Modern Photographs: The Thomas Walther Collection 1909–1949', conducted at The Museum of Modern Art in New York between 2010 and 2014, has a website offering insight into this process. One of the project's advisors was conservator Paul Messier, also a private collector of over 3,500 (historic) photographic paper samples, each identified by manufacturer, date, and surface sheen. His article 'Image Isn't Everything: Revealing Affinities across Collections through the Language of the Photographic Print' (2014), published in the context of the Object:Photo project, states that the "complex work of defining textures is still unfolding" (Messier 2014, 10). Together with his project peers, Messier developed a method for measuring and indexing photographic texture through a microscopy-based imaging system which used a low-angled raking light to illuminate surface features (2014, 5). This same lighting was used to illuminate, evaluate, and objectify the semantics of the manufacturers' surface descriptions, despite the absence, to date, of any "surface index" for characterizing all kinds of photographic surfaces. Messier explains:

> Surface texture designations proved even more diverse, with manufacturers attempting to describe a range from smooth to rough. The spectrum of possible attributes and variables, such as random versus regularly patterned features, is difficult to encompass in a single numerical "surface index" (2014, 6).

The terms that manufacturers use to describe the surface texture of their photographic papers tend to align with marketing strategies rather than to stipulate technical data. The project applied its material measuring techniques to the 341 silver gelatin photographs of the Thomas Walther Collection, and also to a broad segment of Messier's own reference collection of silver gelatin papers which date from (approximately) 1900 to 2000. The team identified broad overlaps between textural forms, across the diverse paper descriptions, indicating "a lack of precise terminological uniformity across the industry" (ibid.). Messier thinks this could explain why many photographers held onto particular papers from particular manufacturers, and experienced problems when changes to production forced them to adapt their preferences (ibid.). As Funderburk and Messier independently argue, this lack of standardization means that the photographer-as-user is left to intuitive, haptic and visual impressions when choosing from the myriad textures of professional photographic papers. In Van Lier's words: "Photography places its users within a multidimensional and planetary technical network, putting the species to work so to speak" (Van Lier 2007 [1983], 55). He names three conditions that have to be met "for every shot or zoom lens, for every film, developer, or fixative" (ibid.). Marketing engineers must first understand the conscious and unconscious desires of an international market; and these desires must then be given form by physical engineers (for lenses) or chemists (for films). Finally, "their means of production must enter the harsh manufacturing and distributional competition governing the global market" (ibid.). These preconditions determine the initiatory character of the industry and define, according to Van Lier, a kind of "*homo photographicus*" (ibid., emphasis in original).

Object:Photo's project synopsis proposes that a focus on physical values (including texture) will offer "fresh perspectives" on the history of the photographs. Photographs as "[…] discrete objects made by certain individuals at particular moments using specific techniques and materials. Shaped by its origin and creation, the photographic print harbours clues to its maker and making, to the causes it may have served, and to the treatment it has received […]" (Object:Photo 2014). Although this approach to photographic texture may not directly elicit insights on the (hi)story of the represented, it can, through close observation, reveal tokens of the photograph's historical and personal universe. Whereas the materials and processes addressed above create a photograph whose texture is detached from the image it represents, there are other (historic) photographic techniques, such as the photogravure technique which Dean uses for many of her artworks, which literally generate the image *through* texture.

FIGURE 1.9. Tacita Dean, *Deformed Trees*, 2005 (detail).
White gouache on B&W-postcard, 38×28cm (framed).

Dean is a distinctive and enthusiastic collector of found photographs and postcards, among many other collectables, from four-leave clovers to round stones. Found images appear throughout her oeuvre either intact or in different materialities (often tremendously enlarged). I will further explore this archiving and collecting component of her artistic practice in my second chapter on photographic tactility. What interests me here is her intuitive engagement with surface textures. As she explains at the beginning of an interview with Hans Ulrich Obrist, it is intuitive in the sense that she is not keen on discussing her motivation: "In a way I now realise that I don't want to know, because if I did, I think I would become too self-conscious" (Obrist 2013, 8). There is a predilection for trees and images of trees, and she admits to a rather expensive weakness for albumen photographs of trees (2013, 80). She started to overpaint these photographs, and worked similarly with postcards of deformed trees (fig. 1.9), before using her own photographs of ancient trees – of which one became *Crowhurst II*. There is an historic paradox concerning the texture of albumen prints and the influence of taste (this is mentioned by Dusan Stulik and Art Kaplan in their atlas on the albumen process). Following the introduction of the highly glossy albumen photograph to the market (which happened in around 1850), these photographs were widely criticized in photographic literature, as the public at the time was accustomed to the matte look of salt prints (Stulik and Kaplan 2013a, 6).

Dean's intuitive but discerning choice of certain materials draws viewers toward an awareness of these values. If we neglect the texture as surface value in her works, we neglect the artist's intentions and overlook these small but significant aspects of her work.

FIGURE 1.10. Tacita Dean, *Study for Fernweh*, 2008.
Photogravure on Somerset White Satin 300g, paper size 59×79cm, printed by Mette Ulstrup. Edition of 36 signed and numbered by the artist, published by Niels Borch Jensen Editions, Copenhagen, Denmark.

Photographic RELIEFS

In parallel with her photographic and film work, Dean is also a printmaker. Specifically, she works on photogravures in close collaboration with Niels Borch Jensen's printmaking studio in Copenhagen (nowadays called Borch Editions). Dean uses the intaglio printing technique of the photogravure (fig. 1.10) to create new works, often taking her collection of historic photographs and postcards as source material. As described on the studio's website, this is the "most haptic" way of transferring a photo to a piece of paper. "In this way she [Dean] combines photography and graphic art to conjure up a distinctive tactile effect that gives the images a strong physical immediacy and presence" (Borch Editions, n.d.).

Photogravure is a photomechanical printing process, one might argue that it does not belong in a study of photographic surfaces. But a gelatin film is exposed to light in the creation of a printing matrix for photogravure – following processing, it is this that results in the *photographic relief*. Highs and lows are sculpted by light. In this respect, the printing matrix itself is a photographic object, though this often goes unrecognized because of its intermediate status. The notion of a photographic relief in the context of sound surfaces (of common

photographs, like silver gelatin or chromogenic prints) requires attention here as it is almost an oxymoron. Simply put, to manufacture a photogravure, a photopositive is brought onto a printing plate by exposing its light sensitive material through a finely rasterized film, resulting in microscopic indentations in the plate's surface. Depending on their depth, these indentations hold different amounts of ink during the printing process, thus allowing for a more extensive colour gradation than any other printing technique (Borch Editions, n.d.).

Photogravure is not the only process to make use of the hardening capacity of this reaction (which occurs when gelatin containing bichromate of potash is exposed to light). Other techniques that deploy the same photochemical behaviours are the collotype, the Woodburytype, and the carbon transfer print (Hentschel 2002, 157), all of which were preceded by William Henry Fox Talbot's photoglyphic prints, and therefore extend right back to the beginnings of photography. Talbot observed how bichromate of potash, also known as potassium dichromate, had a hardening effect on gelatin in proportion to the degree of its exposure to UV light. He patented this process as *photoglyphic engraving* in 1858. As mentioned in the first part of the chapter,

FIGURE 1.11. William Henry Fox Talbot, *[Dandelion Seeds]*, 1858 or later. Photogravure (photoglyphic engraving from a copper plate), sheet 15.1×11.3cm, plate 12.5×9.4cm, image 10.5×7.6cm. The Met Museum, Rogers Fund 2004, New York, United States.

FIGURE 1.12. William Henry Fox Talbot, *[Dandelion Seeds / Taraxacum officinale]*, 1852. Experimental steel plate, 10.2×6.75cm. Science Museum Group, United Kingdom.

gelatin will absorb cold water by swelling up, and it will subsequently discharge this swelling when saturated with potassium dichromate and exposed to sunlight (Vogel 2011 [1875], 225–26). The Metropolitan Museum in New York holds one remnant of Talbot's early photoglyphic printing experiments, a depiction of dandelion seeds (fig. 1.11). Talbot laid the seeds directly onto a photosensitized copper plate during light exposure to create a photographic relief manifesting across the hardened (exposed) gelatin parts and the non-hardened gelatin. He then dissolved this in warm water in the dark. The parts beneath the seeds, which were shaded from direct sunlight, became bare 'flat' copper – again – after this washing process. The other parts have different depth contours, corresponding to the amount of light received. A solution of ferric chloride, when poured onto the whole plate, ate into the residual bare areas (the negative relief). These become the areas that retain ink in the intaglio printing process. Talbot's plate was then washed and the gelatin removed through rubbing with soft whiting. And so the *photographic* relief is no longer present on the final printing matrix, which is now held in the collection of the National Science and Media Museum (formerly known as National Museum of Photography, Film, and Television) in Bradford (fig. 1.12).

During this period and for some twenty years after Talbot secured his patents for the photoglyphic and photographic engraving process, many photomechanical variations were developed and adapted by the print industry. The collotype process, for example, uses the printing matrix as the actual photographic relief. A continuous-tone photographic negative can be inked and printed from this relief, using standard flatbed or rotary graphic presses (Stulik and Kaplan 2013b, 5). Heat and cold water-treated dichromate-sensitized gelatin is the material basis of this method. The treated gelatin tends to reticulate and this creates a surface micro-pattern. The advantage of this pattern (when partially hardened in proportion to the light that filters through the negative) is outlined by Stulik and Kaplan in their characterization of collotypes of *The Atlas of Analytical Signatures of Photographic Processes* (2013). "Because oil and water do not mix well, the areas of the pattern receiving more light exposure hold more ink than the less hardened, more hydrophilic areas of the less exposed gelatin surface" (2013c, 5).

Hermann Vogel, a renowned German photochemist, dedicated three passages of his *The Chemistry of Light and Photography in their Application to Art, Science, and Industry* (1875) to chemically and photographically produced reliefs.[10] Here Vogel explains that heliographic and photoglyphic processes are inadequate for reproducing the halftones that are essential to photographic images. While these processes are very useful for the reproduction and enlargement of linear drawings, they render soft halftones into rigid hard lines, thus creating "very ugly" pictures from photographic sources (Vogel 2011 [1875], 229). All that changed in 1865 when Walter Woodbury invented the Woodburytype. Vogel has this to say on the method: "Although production of reliefs with cold and also with hot water [...] has not at present been utilized for any kind of photo-sculpture, a new printing process has been founded on it" (ibid.). The multi-step process takes a relief image in hardened bichromated gelatin as described above, and impresses this image on a lead plate. Woodbury replaced the black printing ink (as used in Talbot's process) with a warmed semi-transparent gelatin solution supplemented with colour pigments. In his process, the solution is poured into the indentations of the lead relief. Finally, a piece of paper is softly pressed onto the pigmented area. As the gelatin consolidates, an impression of the image is left on the paper in relief and in colour. "As the ink is transparent, it appears in thin sheets much less black than in the thick, and in places where its thickness gradually diminishes occurs a transition from black to white – a perfectly homogeneous halftone" (2011 [1875], 231). In essence, this rather expensive and difficult process uses a physical relief of pigmented gelatin on paper to create the different tones of photographic images. But strictly speaking only the first gelatin relief is produced photochemically, the final relief image is printed.

The carbon print works on the same basis, gelatin enriched with pigments, but relies on photochemical reactions. Dutch artist Witho Worms interpreted this process in his contemporary photowork series *Cette montagne c'est moi* (2006–2011) (fig. 1.13): a set of carbon prints depicting slag heaps, residues of the coal mining industry that are deposited in small hills throughout Europe (in Belgium, France,

FIGURE 1.13. Witho Worms, *Setterich*, *Germany* from the series Cette *montagne c'est moi*, 2006–2011. Carbon print, 15×48cm, 5 + 2 AP.

Germany, Poland, and Wales). Worms collected coal from each of these manufactured mountains, capturing the photographed landscape both visually and materially. In the studio, each particular coal was then ground into a set of pigments that were attributed to the associated hill portrait. Worms used the historic process of carbon contact printing to manufacture and sensitize a piece of flexible plastic with coal-pigmented gelatin and a solution of dichromate, one for each photographic print in the series. Each hill is depicted in an image, which uses the coal from the mine in its carbon pigment, thus portraying the sites on material and image level. After mounting a negative on these unique *carbon tissues*, Worms exposed them under ultraviolet-rich light, which – as discussed above – hardens the gelatin according to the densities of the negative. Following a complex washing, sandwiching, and drying process, during which a precise water temperature is as crucial as a patient and knowledgeable developer's hand, the unhardened (not lit) gelatin is discarded. A photographic surface relief is left behind on the final (paper) support. Besides their indexical and iconic reference, these photoworks also have a textural value, because the thickness of the pigmented gelatin varies. The surface relief of carbon prints is the end result, rather the intermediary printing matrix (as in photomechanical printing processes). There is hardly any contemporary literature on photographic reliefs. And yet, the fact that artists like Tacita Dean and Witho Worms still turn to haptic techniques and gestures to create their photoworks shows us that the concerns and the writings of the nineteenth century endure.

A MATERIAL AND THEORETICAL TEXTUROLOGY

In conclusion to this section on material photographic textures, I would like to highlight one contemporary example in which the surface texture is experimented with and pushed. Like the photoworks by Dean and Worms, "photographic rubbings" by the American artist Klea McKenna use a haptic photographic form for the representation of nature. McKenna embossed outdoor surfaces such as concentric tree rings on silver gelatin paper (fig. 1.14). By hand-rubbing these textural subjects 'through' the light sensitive paper, in the dark of night, she creates a tactile relief in paper. She then 'fixes' this latent physical image by exposing the textured paper to a flashlight, therewith creating a photographic image in and through relief. To describe these photographic

FIGURE 1.14. Klea McKenna, *Automatic Earth #95*, 2017.
Gelatin silver print, unique photogram with impression, concentric tree rings on silver gelatin paper, 59.4×49.5cm.

rubbings as photograms would be misleading because the cut-off tree-trunk does not lie *on* the photographic surface, rather the opposite: it hides underneath the paper. The rise and fall of the rubbed paper, and the angle of the flashlight, determine what is exposed – and what isn't. In McKenna's work, the immediate reciprocity between the subject's texture and its photographic depiction is astonishing, this is why I include it in my study. The tree rings' pattern physically creates the texture *and* the image of the photographs, at a one-to-one scale.

It is tempting to consult Gilles Deleuze's book *The Fold* here. However, a formal summary of this rich and complex work of philosophy would be reductive, and so I refer to the writing of Giuliana Bruno, a scholar in Visual Studies whose approach is heavily inspired and influenced by Deleuze's text, which she outlines in the first chapter of her book on surfaces, 'A Matter of Fabric – Pleats of Matter, Folds of the Soul'. For Bruno *The Fold* is "an important theoretical nexus for [her] book: the sensing of textures as a landscape of the surface" (Bruno 2014, 15). She is particularly interested in the texture of the fold: "As a theoretical fabrication, the fold sports a particularly fluid, adaptable, intricate texture, comprising a variety of mediatic surfaces that become interconnected in its generative field" (ibid.). By interweaving the textured surfaces of baroque architecture with his philosophical thoughts and his take on Leibniz's philosophy, Deleuze aims (Bruno argues) to project the historic form of the fold towards contemporary surface designs. Deleuze works out the specificity of the Baroque and its contribution to art in general, delimiting across six sections "the possibility of expanding it, without arbitrary extension, beyond its historical limits" (Deleuze 1991, 242). In line with Bruno's material approach, I seek to explore the effects Deleuze's philosophy (as a mutual figure of inner and outer spaces and phenomena) on the photographic surface as a textured manifestation, and vice versa.

In McKenna's photographic rubbings, the encounter between tree trunk and silver gelatin paper is mediated through the texture of a photographic surface that quite literally takes on the dermal texture of the tree. The photograph covers the natural epidermis and thereby becomes an extended skin. In a wider context, I would argue that the surface of *Crowhurst II* could also be considered a dermal texture, though it has never physically touched the tree. The photowork's relief, formed by the undulations of the photographic paper, intensifies the (almost life-size) corporeality of the tree's depiction; the short brushstrokes recreate the bark's texture. The two materialities, in cohesion as the photowork-entity, are "folding" manifestations. "As a general rule, it is the way in which matter folds that constitute its texture: it is defined less by its heterogeneous and genuinely distinct parts than by the manner in which, by virtue of particular folds, these parts become inseparable" (1991, 245). The corporeality of *Crowhurst II* comes to life in an ongoing reciprocal exchange between the viewers and this huge photowork with its distinct surface texture.

Mieke Bal describes the fold of "Deleuze's Leibniz" in her guide to interdisciplinary cultural analysis *Travelling Concepts in the Humanities* (2002) as follows:

> According to Deleuze's Leibniz, the fold represents infinitude by engaging the viewer's eye in a movement that has no vanishing point. The fold theorizes and embodies a relationship without a centre. [...] Baroque point of view establishes a relationship between subject and object, then returns to the subject again, a subject that has been changed by that movement, and that goes back, in its new guise, to the object, only to return, yet again, to its ever-changing 'self.' Scale is one important element in this transformation.
>
> Subjectivity and object become co-dependent, folded into each other, and this puts the subject at risk. The object whose surface is grazed by the subject of point of view may require a visual engagement that can only be called microscopic, in relation to which the subject loses his or her mastery over it (Bal 2002, 87).

It is the exteriority of the photowork, the corrugations, the façade, the "fabric" (Deleuze/ Bruno), that leads to its interiority, the withdrawal, the "soul" (Deleuze). Entering through and activated by the surface texture, there is an ongoing exchange between photowork, my perception, and theoretical concepts, each of which are continually modifying one another. Though I have not assumed or claimed mastery over Dean's im-

pressive photowork, nor over photoworks in general, I reproduce Bal's lines in full so as to recognize this continuous process. My reference to Deleuze's fold in this context seeks to pinpoint the possible exchanges that are bestowed in actual texture of the photowork and can trigger theoretical reflections without suggesting a one-to-one relationship. Hence this section's subtitle: material and theoretical texturology. Texturology as a form of relational texture (a term, in turn, borrowed from quantum physics as well as from Deleuze's text) can be situated between materials and theory, between photowork and personal perception/interpretation, between subject and photographic surface. In another book, Bal gives her take on Deleuze's texturology as "a theory or philosophy of the surface as skin [...] of texture as the site of point of view" (Bal 1999, 30). When Bal approaches all artefacts as texts, it is because they are to her "fabricated, complex, and structured" and "they have a complex 'surface' that matters, like a sophisticated fabric, a texture, as invoked in Leibniz's 'texturology'" (1999, 82). She underlines that she does not intend to reduce these artefacts to language but "to reactivate the etymological riches of the notion" (ibid.).

The research question posed at the beginning of the chapter asked how the textures of the photographed are reflected in the photograph's texture. Our response makes it apparent that the photographic medium has very limited resources for creating actual textures, when contrasted with the full visual palette for representing textures. However, it also becomes apparent that the myriad of possible material photographic textures (whether deriving from manufactured carrier materials or from the textural habits of (historic) photographic processes) should at the very least alter our conception of the photographic surface as flat.

Beyond the actual texture of the photographic surface, and the textures of photographed objects, texture can also be attributed to the visual patterns that can arise through those techniques and devices that generate the photographic image. It would be more accurate to specify this form of texture as *visual texture*: one that materially reveals the structure of the photographic image, the process of shooting and development, and the apparatus behind these processes. In the following section, I use artistic examples to consider this in more detail.

1.3. VISUAL *Photographic* TEXTURES

When Tacita Dean's favourite film lab in London stopped printing 16 mm film, overnight, she became an advocate for the medium of film and its industry – and, indeed, for its coexistence with the digital. Several of her artistic films, such as *FILM* (2011 for the Turbine Hall in London) and *Kodak* (2006), convey the unique beauty of photo-chemically produced imagery and its industrial manufacture. As artist-in-residence at the Getty Research Institute in Los Angeles (2014–15), she initiated and contributed to a vivid exchange between individuals from all areas of film use: artistic, commercial, preservation, and exhibitions. The intention was to bring people together to fight against the extinction of film and the cultural and artistic losses that would result from its disappearance. Dean explains her motivation in a campaigning contribution to *Artforum* magazine in the same year (October 2015): "Film as a medium brings qualities to the work, some that the maker never intended – characteristics integral to its chemistry and to its internal disciplines and material resistance" (Dean 2015, unpaged). Although she faced institutional difficulties when exhibiting her artworks on film, "the experience of encountering my work as a film installation would be vastly different from that of encountering a digital version of it; therefore I neither countenance nor allow the digitization of my work" (ibid.). Her arguments discuss the unique process and possibilities of shooting with photo-chemical film, and she also thinks about how to display it. When film is used, projected images (or films) lack material texture (beyond the projection surface), but they offer medium-specific visual qualities such as their soft, slightly granular texture. Dean writes about how one of her collaborators, film director Christopher Nolan, has described "how film is resolution independent, which means that the grain structure of film is a constant unaffected by ever-changing technology"(ibid.). In contrast, the "[d]igital is continuously developing. Early digital transfers of film look compromised to our evolving perception, just as decade-old digital effects have aged and appear clumsy to our increasingly sophisticated eyes" (ibid.). The value that Nolan and Dean are describing can be attributed to the film's *visual texture* (that which James Gibson describes as *pigment texture*; Gibson 2015 [1979], 79). As a textural layer that is materially rooted, it determines the overall look of any filmic and photographic image. This brings me to the final question of this chapter. How do the surface and structure of the photograph visually determine its representation?

VISUAL TEXTURE OF GRAINS AND CLOUDS

In 2011, the renowned British documentary photographer Paul Graham presented a photo series, *Films* (figs. 1.15, 1.18, 1.19), which took on a new tone. This tone was set by abstract colour clouds, blurred patterns of various colour ranges, black-and-white camouflage, and pigment noise: alienated colour compositions which appeared, at least at first sight, far from Graham's characteristic socially engaged documentary subject matter. In previous work, his critical engagement with British social issues had extended to analysis of his photographic medium. With *Films,* he developed and expanded this engagement with the photographic medium. Series titles, added to each patterned image, refer to the matter that each image was founded on. Graham's interest here had arisen almost incidentally. In 2009, as he scanned negatives of his oeuvre (for the purpose of a retrospective exhibition and book covering the previous thirty years of work) he became enraptured by the material itself. *Films* is a series of greatly magnified images of the film emulsions that years earlier had created his body of work. It is a poetic reflection on the physical substance of the negatives he made through a period of rapid decline in the production and usage of film. Extreme digitally enlarged close-ups of the films' structures (captured

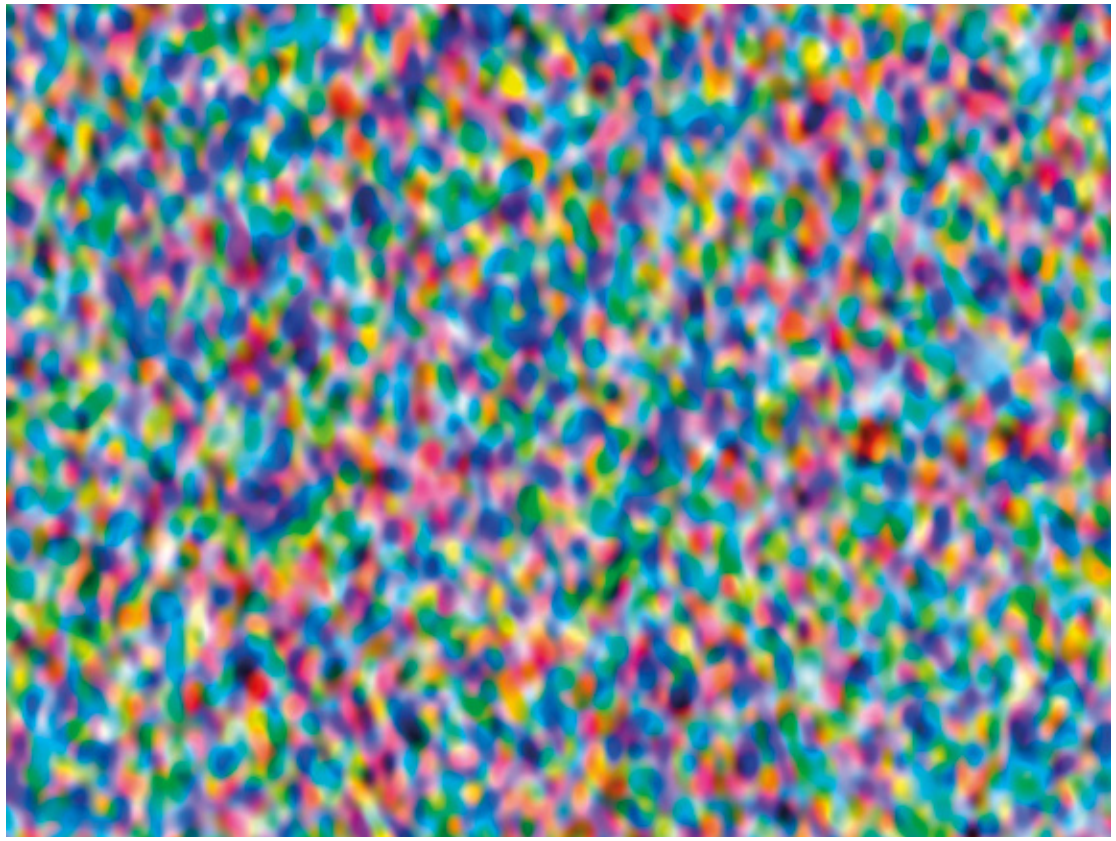


FIGURE 1.15. Paul Graham, *Fuji Fujicolor Reala Gen. 2, 100 asa, Paintings, 1999*, 2011.

and inhabited by high-resolution scans) reveal the grains and the clouds of colour dye. Although these image-forming substances do not tangibly contribute to the texture of the photographic surface, their visual properties do affect its appearance. In this respect, *Films* gives a literal insight into the formation of visual texture in all chromogenic or silver gelatin photographs.

Sean Cubitt's *The Practice of Light: A Genealogy of Visual Technologies from Prints to Pixels* (2014) outlines the historical role and appearance of these textures and others, through the development of (print) media. Cubitt recounts the technical aspects of printmaking, from the advent of the mezzotint in the late 1650s right up to contemporary digital imaging. He is interested in how the technological possibilities of each time determined the texture of its images. This is what I call *visual texture*, which Cubitt combines with represented textures, without differentiating as I do between the three textural forms. He omits entirely the textural properties of the photographic material that I addressed previously, and focuses solely on the visual qualities that enhance the reception of texture in photography. To him, two of these qualities stand out: resolution (the number of grains per square centimetre) and acutance (the clarity of the edges) (Cubitt 2014, 83). In his argumentation, photography is foremost a print medium. He circulates around the writings of the American photographer Ansel Adams, who has written in great detail about his own printing processes. For Adams, these processes are open to all kinds of interventions by the creative photographer. Cubitt sums up, quoting Adams:

> Producing texture in photographs demands that the photographer attends to illumination, distance to the subject, focal length, aperture, exposure time, efficiency of the lens [...]; of film speed, the type of the developer used, duration, temperature and agitation during the development process, the type and duration of fixing and the care taken in washing and drying the negative, the quality of the printing materials and paper used, the duration of the exposure for different areas of the negative, and the final viewing conditions of the print (2014, 87).

Cubitt's and Adams's writings show that photography is not only a record of light (of the first stage) but also a complex translation of light into the granular structure of the print (in the second stage). What exactly, then, is this granular structure, and how is it shaped?

Timothy Vitale, a photo conservation specialist with over thirty years experience, can help us understand this matter at its microscopic scale. Vitale's research report 'Film Grain, Resolution and Fundamental Film Particles' (2007) argues that what is often referred to as film grain is a visual phenomenon, it results from the perceived accumulation of smaller particles in the relative thickening of the emulsion layer (Vitale 2007, 2). These smaller particles are the actual image particles and they are more minute than film grain: silver halides in an undeveloped silver gelatin film are between 0.2 and 2 microns small (1 µm being a thousandth of a millimetre); colour dye clouds in the case of colour film images are between 10 and 15 µm. Human vision ranges from 75 to 100 µm (2007, 3).[11] Vitale critiques the common conflation of film grain with the true fundamental image particles:

> Film grain is the product of the human eye and brain working in combination when viewing clumps of small image particles, seen through the full thickness of the emulsion layer, often numerous layers. Thus, film grain is 'perceived' property rather than an actual physical 'particle' (2007, 6).

Nevertheless, the grain determines the image's structure and thereby its visual texture. The colour grains we see in Graham's *Films* are accumulations of tens to hundreds of dye clouds – the fundamental image elements in chromogenic colour film. The 'flat' noise pattern that is perceived in Graham's colour works actually emerges from nine individual dye layers in the film's emulsion (this will be discussed in chapter three). Although these images appear at first sight as regular noise patterns, Vitale claims that "[r]andomness is a necessary condition for the perceptual phenomenon of film grain" (2007, 17). The size of the grain varies from photograph to photograph. It is highly dependent on multiple factors of which the first is the type of film used: the faster the film, the coarser the grain. A faster film has a thicker emulsion layer, which allows more vertical clumping of image particles (Hirsch 2009, 79). As Vitale explains: "the thickness of silver-halide-gelatin emulsion has tens, to hundreds, of silver particle stacked on one another in a small region" (Vitale 2007, 10). One has to imagine that the silver halide

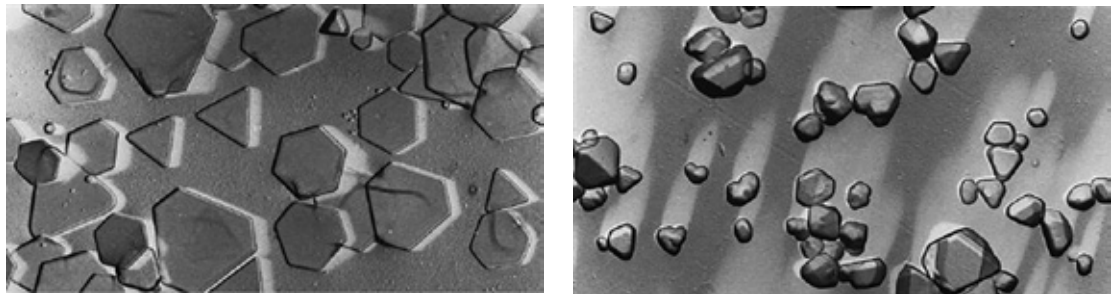


FIGURE 1.16A. *KODAK T-GRAIN emulsion crystals 1982–present, H-1.*
FIGURE 1.16B. *Conventional silver-halide crystals, 1860–1982, H-1.*

crystals are of various sizes and shapes (figs. 1.16a & b), and these forms determine their particular sensitivity to light: the larger the crystal, the more light-sensitive it is (2007, 17). The larger crystal's surface will catch more incoming photons (light). A film's speed (currently given in the ISO value on its package) is therefore based foremost on particle size. As an example, a fast sensitivity layer has rather large silver halide particles. Therefore Vitale also quotes from *Kodak Professional Black-and-White Films* (1984, 32), "as a rule, the faster the film, the greater the tendency towards graininess" (2007, 9). In general, colour films hold silver halide particles that are an order-of-magnitude (ten times) larger than those in black-and-white film, and this gives them an overall higher light sensitivity (2007, 6).

The second determining factor is the length of exposure. During short exposures, the larger and therewith more sensitive halides react with the incoming light. At the other extreme, overexposure can also result in graininess. The third phase that influences the size of the grain is development. Length, temperature, and developer type, all determine grain size, as Vitale explains: "In general, higher temperature favours larger grain; longer development time favours larger film grain size; and specific developers produced larger or smaller (B&W) grain depending on aggressiveness and pH" (2007, 10).

We have been discussing the varying granularity of exposed and developed film. The grain pattern is not very noticeable in the negative film (unless it is scanned and enlarged as in Paul Graham's series), however, it becomes enlarged when printed. Similar rules apply to exposed and developed paper. As the size and contrast of the print increase, the grain is rendered more visible. One can picture the enormous enlargement of Tacita Dean's yew tree negative, and how it disperses a visible granular texture along the four vertical bands of silver gelatin paper (each at 90–95cm width and 3 metres length) (fig. 1.17). One could argue that this "fourth granulation" (Van Lier 2007 [1983], 60–61) of the photographic process subsumes the previous granulations discussed above from a chemical and technical point of view.

I want to return to randomness, which Vitale briefly mentioned as a condition for perceiving film grains. Or, in Dean's words, to "internal disciplines and material resistance" (Dean 2015, unpaged) as characteristics of the photo-chemical film. In her manifesto 'Save Celluloid, for Art's Sake', written for the *Guardian* newspaper a week

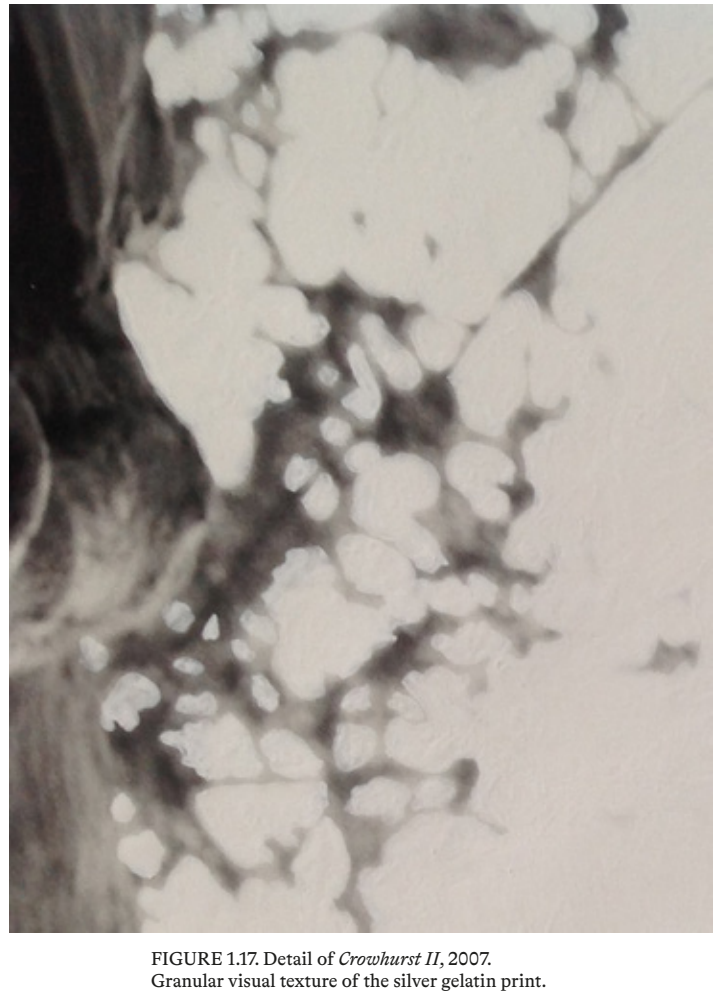


FIGURE 1.17. Detail of *Crowhurst II*, 2007.
Granular visual texture of the silver gelatin print.

after her Soho film lab ceased processing 16mm films, she puts the finger on her relationship with film: its many blind and non-intentional habits transform her practice into a magical endeavour.

> My relationship to film begins at that moment of shooting, and ends in the moment of projection. Along the way, there are several stages of magical transformation that imbue the work with varying layers of intensity. This is why the film image is different from the digital image: it is not only emulsion versus pixels, or light versus electronics but something deeper – something to do with poetry (Dean, 2011b).

I would argue that the randomness with which the silver particles are distributed in the emulsion can be aligned with the fact that some silver halides react with the light while others do not, even within an area of uniform exposure (Vitale 2007, 17). These are characteristics that position a film's behaviour beyond human or mechanical control. Both the material's openness to intervention, as well as its resistance, contribute to the Dean's fondness for this medium.

Van Lier's theoretical analogue to Vitale's granular randomness is the *discontinuity* of the halide crystals as they react with light. For Van Lier, conversely, light stands for the cosmic constant *c* (for *continuity*): the physical fact that light's speed in a vacuum is constant in every direction. The regularity of the grains' dispersal through the emulsion in no way approximates the regularity of light, he argues. Furthermore, the transformation of the silver halides is a discontinuous phenomenon that gives "rise to a first type of fractionation, or graining" (Van Lier 2007 [1983], 59–60). For him, the transformation of certain crystals is so weak that they remain invisible, in the form of a latent image. Latency means that "the transformed crystals induce transformation" in neighbouring (as-yet-unaltered) crystals and this is an "operation of colonization". His conception of the developing process, as it makes the image visible, is one "in which new discontinuities join those of the latent image" (ibid.). Photons entering the emulsion should either be absorbed immediately on contact with a silver halide particle, or leave the emulsion. However, in some cases the silver halide, depending on its size and shape, can reflect light and pass it onto a neighbouring silver halide particle. Such an irradiation (internal light scattering) ultimately results in a loss of detail in the image, it reduces edge sharpness and contrast (Hirsch 2009, 80). From Van Lier's point of view: "figural peculiarities [...] are triggered by the modifications of a few crystals subordinated to sudden energy jumps in some of the grains" (Van Lier 2007 [1983], 61).

The specific ways in which the irregularity and discontinuity of the granular structure influence the way we perceive a photographic image are well explained by Vitale, who contrasts this perceptual experience to the (non-)perception of a printed halftone dot pattern. He argues that although the eye registers the individual dots when a graphic print is magnified, it does not perceive graininess, because of the print's regular and not random pattern:

> [...] the eye notices the regular dot pattern and does not group dots into random patterns, just the half-tone pattern. [...] At lower magnifications, where the half-tone dots can no longer be resolved, the awareness of half-tone pattern fades away and the image appears smooth, patternless and grainless (Vitale 2007, 17).

All of the above extends the issue of photographic texture creation, which Ansel Adams (quoted by Cubitt) summed up in fewer than a hundred words, as quoted at the beginning of this subsection. Cubitt names resolution and acutance as the two main qualities of visual photographic texture, and irradiations or other discontinuities automatically lead us back to these two values. The resolution – the film's ability to record and reproduce fine detail in an image – is a value that depends on far more than the film's own materiality, however, it is closely related to its acutance value. This acutance, a relative ability to represent and reproduce 'accurate' sharp edges of objects, depends on the size of the grains and the thickness of the emulsion. The thinner the emulsion and the finer the grain, the higher the film's acutance value. Less spreading or irradiation of the light occurs, as there is "not as much emulsion through which light must travel" (Hirsch 2009, 80).

FIGURE 1.18. Paul Graham, *Fuji Fujicolor Reala Gen. 2, 100asa, American Night, 2001*, 2011.

Over the years, as technologies have improved, there have been changes not only to the edges of the represented in the photographic image, but also to the edges of dye clouds themselves. The chromogenic process needs a brief explanation here. The difference between this process and the silver gelatin process is that in chromogenic colour film (and paper), colour couplers are dispersed alongside the light-sensitive silver halides. With the addition of a colour developer, all the exposed silver halide grains turn into metallic silver. The colour developer itself is oxidized during this developing process, and in this new capacity it reacts with the dye couplers in each of the three colour layers. During this reaction the colours are formed as dye clouds in the immediate vicinity of the developed silver grains. As the silver is no longer of use, it is removed in another step and the dyes 'fixed'. What lasts is the developed negative (or positive print) that solely holds the dye clouds and therewith the colour-reversed image (Weaver and Long 2009, 7). The oxidized developer, which is washed out in the black-and-white process as a purposeless chemical by-product, is an essential agent in the chromogenic process. In Graham's work *Fuji Fujicolor Reala Gen. 2, 100asa, American Night, 2001* (2011, fig. 1.18) we can clearly discern dye clouds as dots of primary pigment colours – cyan, magenta, yellow (CMY) – which create yet more colours when layered. Here, we can imagine that each dot is formed 'around' or on the basis of a silver grain which is itself no longer present.

Due to changes in the manufacture and processing of emulsion, the dye cloud edges have become less diffuse through history. This is a valuable indicator when dating (historic) colour prints. Weaver and Long characterize chromogenic prints in three groups:

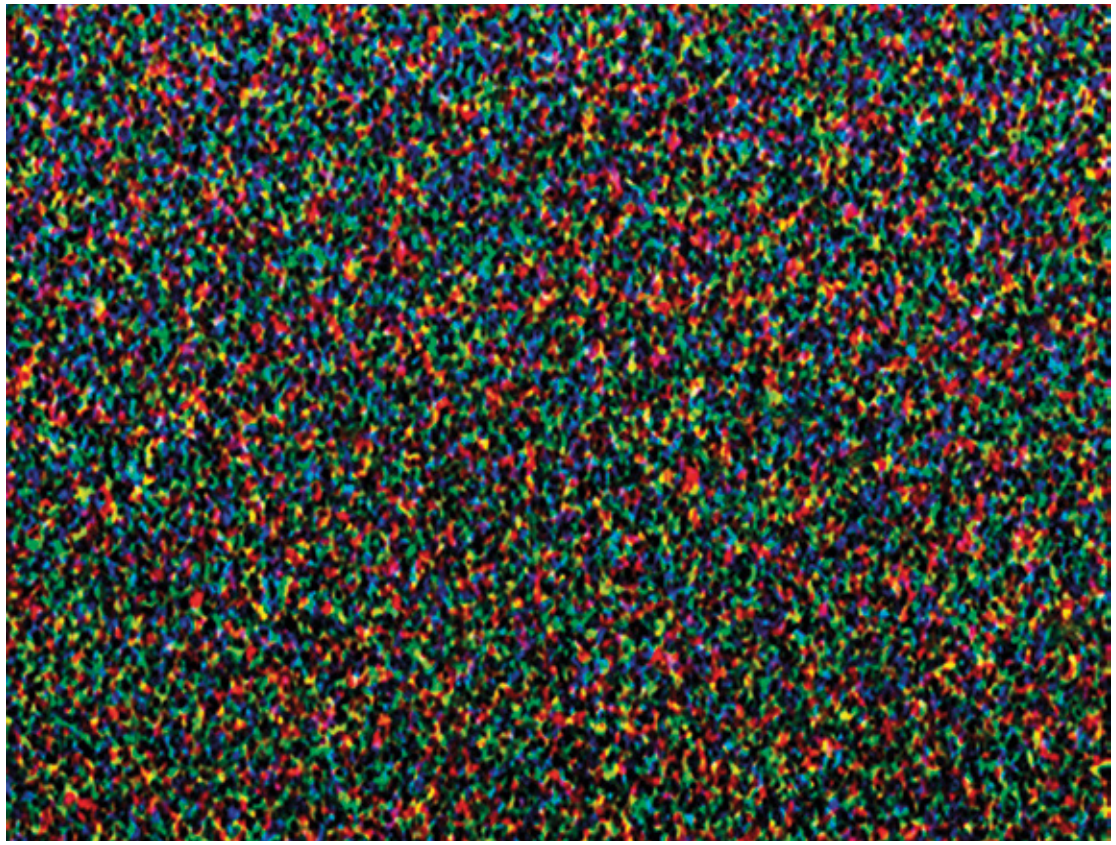


FIGURE 1.19. Paul Graham, *Fuji Fujicolor Super HR100, 100 asa, Troubled Land, 1984,* 2011.

> The first period is from 1942 through the 1960s, and is identifiable by diffuse dye clouds. Starting in the early 1970s, dye clouds become slightly more defined, having a relatively circular shape with a moderately defined edge. This lasts until the early 1980s when dye clouds become very well defined with hard edges. This period continues to the current day (2009, 7).

Unfortunately, Graham's scanned and magnified oeuvre originated between 1977 and 2004, and this limits its relation to foremost the last group, and also (to a lesser extent) to the second group. His colour negatives all date between 1982 and 2004; the earliest examples of the work, from the late seventies, are all silver gelatin prints. Although the magnification factor of the works is never precisely the same, one might detect some slight difference in the dot structure between two exemplary works with an age difference of fifteen years: *Fuji Fujicolor Super HR100, 100 asa, Troubled Land, 1984* (2011, fig. 1.19) and *Fuji Fujicolor Reala Gen. 2, 100 asa, Paintings, 1999* (2011, fig. 1.15). The sinuous twists of the structure of the dye clouds in the former are somewhat less regular than the dotted pattern of the second 'younger' image. Still, the irregularity of these magnified textural patterns is what characterizes visually (and materially) film-based photoworks. This stands in extreme contrast to the regular grid pattern of any digitally created photograph, as I will now discuss.

VISUAL TEXTURE OF PIXELS, SCREENS, AND OTHER INTERFACES

A short detour into the structure of a digitally generated and presented photo can clarify the structural difference between this form and the photographic surface of the film or print that is characterised by a material cohesion between image particles. Unlike the gathering of silver grains, the 'grain' of a digital image is a square arranged in the form of a regular grid. An arithmetic design based on numbers orders the 'grains' that react to light in the digital camera. Each cell within this grid responds to the light that falls on it. It samples the light across its surface by averaging its different wavelengths. The raster grid is the standardized and normalized form for both the signal receiver and for the display (Cubitt 2014, 95 ff.). As Cubitt mentions, qua structure, these images are foremost prepared for the construction and exchange of information (2014, 107). The JPEG can be an example here. As compression/decompression protocol, the JPEG was developed by the

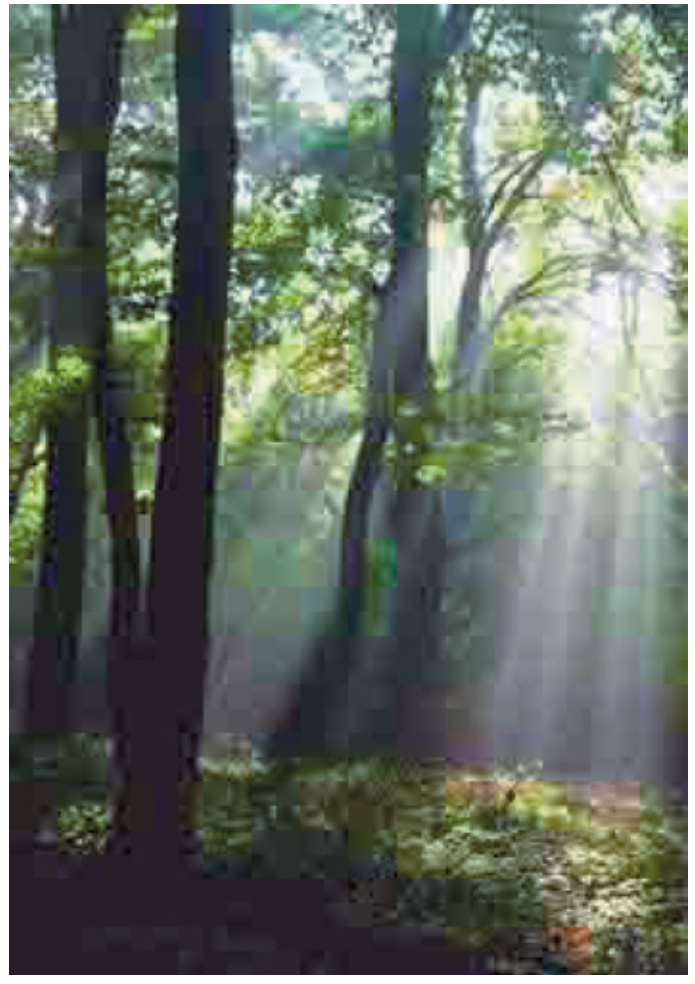


FIGURE 1.20. Thomas Ruff, *Jpeg wd02,* 2005.
C-print with Diasec, 255×185×6cm. Stedelijk Museum Amsterdam, The Netherlands.

Joint Photographic Expert Group to facilitate an image's exchange and interoperability across various digital platforms (Hoelzl and Marie 2015, 3). Each pixel has a numbered address along the *x*- and *y*-axes of this mathematical space, and its size is beyond the diffraction limit of the visible wavelength. Only when the digital image file is put through extreme enlargement and/or compression can the grid be made visible. This is the visual texture of the digital image file's structure. It is visualised in Thomas Ruff's series *jpegs* (2004 – 2009) (fig. 1.20). For *jpegs*, he stripped down the digital grid to just beyond its photorealist resolution, to the stage at which square pixels comprise the photowork's visual texture. The enlarged raster of colour squares, the visual texture of the original digital image, no longer materially correlates to its structure. The only correspondence between image and carrier is the structure of the grid. Digital printing techniques such as inkjet and laser printers use dots and scanning on a raster grid, too. As with screen displays, the printers deliver points of colour in raster arrays of parallel lines (Cubitt 2014, 100). The raster, which invisibly organizes numerical codes on the 'inside' of the device, coincides with the raster of colour squares on the outside – on the surface of the digital image.

To return to the distinction between texture and structure, Gibson specifies that the (layout) texture is the structure of the surface, but this is different from the structure of the substance underneath the surface (which I discuss in the third chapter on layers). In contrast, the hidden structure of the digital image correlates so directly to the visible structure of the pixels that a distinction becomes obsolete. A sense of flatness is created not only by the non-hierarchical order of the pixels, but also in the merging of surface and its underlying substance. The horizontal coherence between one pixel grain and the other is structurally inherent to the grid, which dictates the numerical continuum along the two axes. The colour squares in Ruff's *jpegs* do not blend – they are joined by voids. These spaces form a white grid framework, bordering the pixels and appearing empty in contrast to the squares that can be filled with any of the 16.777.216 electronically generated colours.[12] I would go so far as to say that the digital image file does not have a surface texture per se. Its visual texture is a manifestation of the information system, structured by the device that displays the image. Through this matrix only, the 'surface' pattern of the digital image file is mutable. Think of Michael Wolf's *street view* series (2009–10) (fig. 1.21): the distinct granular texture of these images is determined by the structures of the digital image devices and systems, rather than by the 'underlying' digital image file. Wolf photographed iconic street scenes and gestures seen on a computer screen via Google Street View. The visual textures of his LCD-screen and Google software are both transmitted to his photographs. A visible interface is created that encompasses several different spatial and temporal layers, all mediated by the photo's visual texture.[13]

Giuliana Bruno dedicates a chapter of *Surface: Matters of Aesthetics, Materiality, and Media* (2014) to a concept of surface tension in media that focuses on texture, canvas, and screen. She argues: "Many changes affected by the migration of images happen on the surface and manifest themselves texturally as a kind of surface tension, which affects the very 'skin' of images and the space of their circulation" (Bruno 2014, 3). The visual texture of a printed digital photo can therefore refer not only to the concealed organizing grid structure of all digital image files, but also to the image carrier's technical structure and software system.[14] Theoretically, the photoworks by Ruff and Wolf manifest as forms of *remediation*, as conceptualized by Jay David Bolter and Richard Grusin in their book *Remediation: Understanding New Media* (1999). Bolter and Grusin describe the medium as one that appropriates the forms, textures, techniques, and social significance of other media. "A medium can never operate in isolation, because it must enter into relationships of respect and rivalry with other media" (Bolter and Grusin 2000, 2). Both artists present their works in the form of the classic tableau of a large (Ruff) or medium size (Wolf). They refashion the historical media of painting and analogue photography with the new media of the digital image, devices, and the Internet, in one continuous process. Old and new interact and influence each other. In doing so, the artists achieve a distinctive, even iconic, imagery, reflecting the image's moment of origin through reference to the visual characteristics of dominant media. A crucial aspect of remediation theory is a logic which achieves immediacy by denying the reality of the

FIGURE 1.21. Michael Wolf, *Paris Street View #28*, 2009.
Archival Pigment Print, 152.4×121.9cm, Edition of 3 + 1AP.
Christophe Guye Galerie, Zurich, Switzerland.

medium's actual appearance. Ruff and Wolf tend to do the opposite by bringing precisely these real, visible features of their media to the fore. Their method aligns with the term *hypermediacy*, a "style of visual representation whose goal is to remind the viewer of the medium" (2000, 272). As the determinant of these photoworks' visuals, the grid structure is an obvious reference to the devices and the medium from which they originate. Remediation, according to Bolter and Grusin, operates between the two opposing poles of *hypermediacy* and *immediacy*.

One example of immediacy is the science of "texture mapping" in the digital realm. Texture mapping is a method that was developed in 1974 to add more detail, surface texture, or colour, to computer-generated models. As Fabia Ling-Yuan Lin outlines in *Doubling the Duality* (2014), the early forms of 3-D computer generated images manifested an extreme smoothness of surfaces (due to a lack of texture, bumps, scratches, dirt or fingerprints). She explains how PhD student Edwin Catmull developed a texture mapping application in 1974 to create the *immediacy* of these computer-generated graphics. To date, it is one of the primary techniques for enhancing the digital representation of objects. Lin describes it as a blending of photography and painting through algorithms (Lin 2014, 38–40). It draws on the visual features of older media to create a photorealistic texture, causing the viewer to "forget the presence of the medium [...] and believe that he is in the presence of the objects of representation" (Bolter and Grusin 2000, 272–273).[15] This is the very definition of *immediacy*, as described by Bolter and Grusin – texture mapping becomes a prerequisite for computer-generated images in immersive video games or movies.

Thinking of computer-generated textures only further inscribes the importance of material textures when seeking authenticity. Even though those added textures 'disturb' the visual representation, they deliver a more 'life-like' impression. Considering the popularity of analogue film filters and other photographic defaults in apps and image-editing software, this authenticity argument can be extended to the textures of photographs themselves. In the previous two sections, we have explored the various material (paper and gelatin) textures of photographs, and how visual textures are created through their material prerequisites and during development. One group of photographic textures now needs a closer look: unintentional, unforeseen, but intrinsic texture manifestations that emerge through chemical interactions.

INADVERTENT TEXTURAL PHENOMENA

Honeycombs, ice flowers, snowfalls, strings of pearls, telegraph wires: the list may sound like poetic pattern descriptions, but it is actually a selection of the accidental failures that can manifest in surface texture, as summed up by Peter Geimer in *Inadvertent Images: A History of Photographic Apparitions* (2018) (original title *Bilder aus Versehen: eine Geschichte Fotografischer Erscheinungen*, 2010). Through photography's technical history, each new process has been accompanied by its attendant 'defect' textures, which resulted from process-specific chemical interactions beyond human control. Initially a material matter, these phenomena ultimately produce visual, textural consequences. Peter Geimer has written a brilliant alternative photographic history which brings into focus those images that have been left out of photography's history, from its very beginnings, because their marks bear witness to unintended chemical behaviours. These are "photographic incidents whose aesthetic status, origins, and function were a matter of ongoing investigation" (Geimer 2018 [2010], 41). *Inadvertent Images: A History of Photographic Apparitions* bundles his in-depth research and analysis of historic articles, letters, and other source materials, to shed light on a previously obscured perspective on the historical development of photography.

Irregular, inadvertent textural exceptions are inherent to the photographic process and they are always potentially present as a part of the photographic surface. Therefore, they are interwoven throughout this thesis. Geimer poignantly titles one of his subsections 'The accident is original.' During the genesis of any chemically created photograph and throughout its existence, inadvertent textural elements can arise within or commingle with the depiction. Geimer underlines that "it is virtually impossible to maintain a systematic distinction between internal and external, immediate and subsequent, agents of destruction. The history of photographic representations cannot be detached from the corresponding history of contaminations, disturbances, and destructions" (2018 [2010], 34). As discussed in the previous section on grains and dye clouds, the granularity, and therewith the acutance and resolution, all depend on many factors. The mode of production is fairly unstable. For Geimer, this ambivalence between image creation and its integral process of destruction means that it is impossible to dismiss these extraordinary phenomena as failures or accidents. "The blackening of the images is not an accident, not a mishap that befalls photography, but an integral part of it" (2018 [2010], 35). Van Lier, for his part, characterizes the photograph "in every sense a matter of *black*" (Van Lier 2007 [1983], 37, emphasis in original):

> What is most important for photography – as with interstellar space – is the night. In film rolls and blank paper, the camera, darkrooms and printing laboratories, it is the night, the darkness and non-light out of which luminous eventualities manifest themselves punctually and incidentally, emerging out of the dark only to return to it (ibid.).

The picture as a photochemical galaxy. Geimer uses historic examples of early photography to demonstrate how these extra textural elements (often in the form of a dense chemical haze) have an "iconographic life of their own". "Some appear as spots and mere supplements on the surface of the picture, while others penetrate the pictorial space, colliding with details of the depiction and often fusing with them to the point where the two become indistinguishable" (Geimer 2018 [2010], 37). In this same fragment, Geimer also refers to Walter Benjamin's iconic characterization of "the fog" that "surrounds the beginnings of photography" (2018 [2010], 37 and 17). When analysing and writing about these photographic hazes or spots, now up to 150 years after the genesis of the original image, unless one has the profound knowledge and connoisseurship of a professional photo conservator, it is always a matter of guessing which elements stem from the initial development of the print and which joined the image over the years. Although Van

Lier's assertion that the photograph emerges out of the dark only to return to it might appear somewhat deterministic, attention to these extremities of a photograph's lifetime can expose its potential for visual and material variability. These changes and accidents are, as Geimer writes, "always already possible, unexpected and yet 'waiting to happen'" (2018 [2010], 50). This mutative nature of any chemical photograph receives full attention in my final chapter on the photographic surface as processual interface. Van Lier's characterization of a photograph "emerging out of the dark only to return to it" could be also read in a conservational context. Photographs emerge from the dark development chamber only to be then stored in darkened (and cooled) archives to extend their durability.[16] Dark storage conditions are anyhow prerequisite for durable photographic archives, and museum policies are designed (with limited exhibition hours and low lumen value) to protect works, especially when showing historic photographs.

Geimer compiles a list of the more prominent classifications of exceptional photographic textures, working from various journals and handbooks with titles like *Photographic Failures, First Aid in Photography*, or *Das große Fotofehler-Buch* (the Great Book of Photographic Defects) among others. There are labels including

> [...] "moss-like spots," "a green haze," "a red and a brownish-yellow haze," "a milky white haze," "round dull dots," "an opalescent plaque," "streaks," "aureoles," "ramifications," "flash glares," "powdery black traces," "damask-like traces," "small star-shaped dimples," "cloudy figures suggesting a map," "marble veins," "precipitation of little white stars," [...] (2018 [2010], 45).

From a theoretical point of view, the overarching title descriptions assigned to these phenomena are even more interesting. They are discussed as "defects," "spurious apparitions," "fallacious phenomena," "anomalies," "vexatious disruptions," "mysterious phenomena," "disastrous effects," "witchcraft," and "enemies of the photographer (2018 [2010], 43–44). The inadvertent becomes adverse in these negativistic technical interpretations. This brings me back to Van Lier, who wrote, in his later appendix 'New Theoretical Perspectives', that "[...] technically speaking, the photograph is in itself a catastrophe" (Van Lier 2007 [1983], 109). We cannot isolate Van Lier's take on the photograph as a catastrophe from the argumentative context in which he is writing. The interpretation is founded on one of his book's central tenets, that photography "is able to capture the 'quantic' character of the Universe by virtue of its granularity, that is to say its physical composition consisting of grains" (2007 [1983], 107). Spanning the range between the behaviour of grains and the forces of the universe, he argues in favour of unstable, non-linear changes in form, because of their very nature and physicality, as he explains in this fragment:

> As transformations do not cross from one form into another in a continuous and equal fashion but in a catastrophic manner through morphic *leaps* – effecting *stable, unstable*, and *meta-stable* states – the Universe is able to assume its "quantic" nature not only through the behaviour of its elementary particles or of its "small" size effects (photographic development), but also – and this clearly concerns a much larger scope – through the forms of its mountains and living organs, from one species to another, and perhaps especially from one epigenetic stage to another (2007 [1983],108, emphasis in original).

The textural apparitions on (or more precisely of) the photographic surface act, in this sense, as a micro-cosmos. Embracing the various possible states of transformation, Van Lier again regards here the photograph as "an indexable indicial imprint, [that] offers all its forms together with its non-forms, on the brink of catastrophe" (ibid.).[17] Although the German scholar in literary and media studies Bernd Stiegler does not refer to Van Lier in his text 'Katastrophen und ihre Bilder' (2009) ('Catastrophes and Their Images'), Stiegler's overall argument broadly agrees with it. In approaching photography and its history as catastrophe, he perceives the mission that photography undertakes as "rescue in and by the image" (Stiegler 2009, 225).[18] Rescue, in that whilst photography cannot bring back what has passed, it makes possible a certain historic experience (2009, 226). Stiegler's photo-historical contexts are early news photographs and the darkroom experiments of the surrealists. He uses them to offer an in-depth working out of the accident as subject matter, and of the limit of representations, and ultimately comes to the same conclusion that Geimer did, a year later, in his book: the accident is original and a structural condition of photography. Stiegler names the accident as an "enabling condition" ("Ermöglichungsbedingung") (2009, 223).

While Stiegler's text switches between the accident as subject matter and as an apparition on or of the photographic material, he writes that a perfect news photograph of an accident is not shot by chance, but is anticipated by the photographer, who expects the catastrophic to occur (2009, 238). What would such forecast look like when it comes to the material accident? Are we mentally, emotionally, and theoretically prepared for the many potential disruptive effects that could arise on the photographic surface? I am highlighting this idea of the photograph as catastrophe on paper at the end of this chapter, because it draws us close in on the very condition of the photographic surface as textural and textured interface. This awareness is the ground on which several arguments will be developed in the next three chapters. Geimer adds an inspiring and important etymological nuance to the word accident, which unites two meanings in both English and French, but can be distinguished in German between *Unfall* and *Zufall*. *Unfall* has destructive effects whereas *Zufall* is just a random happening. He recalls French philosopher's Paul Virilio's conception of the accident, (in Geimer's words), that "[...] the invention of the substance of a technology, product, or process [is] inseparable from the invention of its immanent slippage, its disruption and unpredictability" (Geimer 2018 [2010], 49). Each photographic process, along the line of historic inventions, introduced new photographic textures that refer visually to the structure of the material as well as to possible defaults. The same can be said of its developmental continuation in the digital realm. The surface is thereby both vehicle and tenor, it represents all kinds of visual texture elements *alongside* the depiction.

In conclusion, when it comes to the resemblance of textures, the photographic medium, with its homogeneous surface textures of gelatin and (paper) carrier, has apparently very limited resources for representing or mimicking the actual textures of the depicted. The added texturing of small brushstrokes in *Crowhurst II* highlights this, though a material textural link between the photograph and the photographed *can* be traced, if only on an extremely magnified scale. Although the texture of the photographic surface does not at all physically resemble the photographed textures, the gelatin surface layer does change its composition after exposure and development. A material dialectic can be identified in the dispersal of the image-forming substances within the emulsion layer: the silver grains (in black-and-white photographs) and the dye clouds (in chromogenic colour photographs). Their size and mass is so marginal that they do not affect the gelatin's textural body. It is for this reason that theoretically drawn analogies between the photograph and figures including trace, footprint, or imprint, are misleading because they bring physical connotations of a change in surface texture. The same goes for another common field of characterization for photography: as writing, engraving, or impregnating with light. As an alternative to these descriptions, I introduce the *photograph as charge*. Without changing its texture, the photograph is charged (physically *and* visually) with the image of the photographed through the workings of light.

The range of material textures of photographic surfaces is as wide as their carrier media (most commonly, paper or polyethylene) – *together* with the appearance of the gelatin, which, in some cases in the past would have been 'chilled' against a patterned or glossy roll during manufacture. We also should not forget a handful of (historic) photographic processes that actually re-present the image in the form of photographic relief. Material surface textures are subject to technical inventions and fashions: they tell their own histories of provenance which are similar to those told by what I call the *visual textures* of photographs. Grains or dye clouds determine the granular structure of the photographic image. They are shaped by multiple factors, including the manufacture of the photographic source material, the handling and technical equipment during shooting, and the skills and products of development. All of these factors mean that the translation of the photographed into the granular structure of the print is a process that is open to intentional, human interventions *and* to the unintentional, irregular tendencies of the various substances.

Material and visual textures of the photographic surface literally mould the textures of the represented. They entail additional stories and indexicalities, enriching the subject matter of photographs and awakening an awareness of the many layers of interactions with the photographic surface. This tactile aspect of the photographic surface receives full attention in the following chapter, which addresses the sensory aspects of the production and perception of a photograph. Because by touching the photograph it somehow touches us back.

ENDNOTES

1
My treatment of the digital process through comparison with the analogue photograph elucidates the physical aspects of the latter so as to fully grasp the profound differences between the two forms in relation to material, production, and process. Nevertheless, some of my points may apply to analogue processed photographs and also to those that are digitally created.

2
The artificiality to which Baudrillard is referring to is only valid in terms of the (multiplied and reproduced) photographic image, and doesn't relate to the photograph that is created of the traces that the photographed objects left on the light-sensitive material. However, in our digital environment, characterised as it is by the decline of the material link between the photographed and the image, Baudrillard's argument is appropriate. Strictly speaking, the digital photo is created and remains in the first phase. Only exceptionally is it made material as a printed artefact. Although this artefact can occupy many different textural possibilities, its printed materiality holds no physical link with the depicted. One could argue that an ontology of the material condition of the photograph is outdated now, that it is less meaningful to study the materiality of contemporary photographs than to approach them through studies of sign systems or social practices. However, this argument would signify the ultimate victory of the *trompe l'oeil* over the awareness that we are dealing with an object.

3
Generations of remarkable critics and scholars have related the indexical quality of the photograph to the notion of the 'trace', among them are Walter Benn Michaels ('Photographs and Fossils', 2013); André Bazin ('The Ontology of the Photographic Image', 1958); Susan Sontag (*On Photography* 2005 [1973], 120 and 125); Margaret Iversen (*Photography, Trace, and Trauma* 2017); Alan Trachtenberg ('Likeness as identity: Reflections on the Daguerrean Mystique' 1992, 187); Rosalind Krauss ('Notes on the index: part 1' 1977); Philippe Dubois ('Pragmatique de l'index et effets d'absence' in *L'acte photographique et autres essais* 1990, 54–108).

4
On the conservation of historic churchyard yews, see the complete article by 'Historic Churchyard Yews' (2015) by Toby Hindson.

5
For in-depth reading on the properties of the gelatin, see 'Properties and Stability of Gelatin Layers in Photographic Materials' by Klaus B. Hendriks, Brian Lesser, Jon Stewart, and Doug Nishimura; http://albumen.conservation-us.org/library/c20/hendriks1.html (accessed January 20, 2017).

6
The dark storage conditions recommended for silver dye-bleach prints are temperatures below 20°C and humidity between 30 and 50 per cent. For chromogenic prints, a temperature around 2°C at a humidity level of 40 per cent is recommended (Pénichon 2013, 205 and 231; Marchesi 2017, 236).

7
Another interesting feature is that the undulation of the paper runs in different directions. In the upper part of the work, the undulation sets out vertically, whereas in the lower part (depicting the bark) it manifests horizontally. This is the more interesting as the paper structure in itself has only one direction.

8
The surface, according to Gibson's argument, is characterized by its layout texture (the physical texture) as well as its pigment texture (the chemical texture). This distinction between the layout and the pigment texture is relevant to my research as it will appear in a different fashion when discussing material and visual textures of a photograph in the other two sections.

9
Pénichon and Jürgens describe this as follows: "The scattering of light that would be present in a layer of air between the print surface and the glazing in a conventional frame is eliminated. The surface of the photographic print cannot be distinguished from the other components, whatever the viewing angle or distance. Instead, light reflects from the surface of the acrylic, behind which is a deep 'space' of colour, namely the thickness of the acrylic sheeting" (2005, 219–220).

10
The titles of these three subsections are 'Heliography with Salts of Chromium' (Vogel 2011 [1875], 219–224), 'The Production of Photo-reliefs' (2011[1875], 224–229), and 'Printing in Relief' (2011[1875], 229–232).

11
In the same section Vitale compares the size of the image particles across scales that are used for the wavelength of visible light. The silver particles are between 200 to 2000 nanometres in size (one million nanometres being one millimetre); the average size of visible light is 400–750 nm. This brings up another interesting dilemma, the "wave-particle duality paradox" discussed by Karen Barad in her concept of diffraction. In certain conditions, light behaves like a wave, but under other experimental circumstances it acts as a particle – and yet waves and particles are two very different forms. For more, see the 'Diffraction' chapter in Barad's *Meeting the Universe Halfway* (2007), which I discuss in the fourth chapter.

12
Red, green, and blue (RGB) can be combined in different proportions to obtain one colour. Each of the three RGB-levels is measured by the range of decimal numbers from 0 to 255 (which means 256 levels for each colour); in total 256×256×256 = 16.777.216 different colours. The German artist Adrian Sauer developed for his photowork *16.777.216 Farben* (2010) a program to produce images that contain all of these colours exactly once. The result is a digital c-print measuring 125cm×476cm on the exhibition wall.

13
The streets of Paris (the actual subject matter) are mapped and scanned by Street View cars (with layers of defaults resulting from moving objects). This image material is then delivered to the huge, engulfing database of Google Street View (which adds layers of signs and arrows 'on top' of the image). Wolf selected, framed, and enlarged static scenes on (or in) his computer screen, and photographed them with a digital Mamiya medium format camera. The captured Paris street scenes have migrated through successive visual states, each of which has changed their appearance.

14
The structure of an LCD screen, for instance, is determined by a process in which electrodes are sent to liquid crystals that carry light between two layers of polarized glass. The crystals are placed in rows on one side of the screen and in columns on the other. This gives each pixel a unique row-column address in the screen's grid. On the visible side of the screen, red, green, and blue colour filters cover the surface of the glass, and this facilitates millions of colour combinations (Cubitt 2014, 97–99). In Wolf's images the raster of the LCD screen, along with the three basic colour layers, is prominently present and covers the image like a semi-translucent patterning veil.

15
This phenomenon reminds me of an early article by Lev Manovich, 'The Paradoxes of Digital Photography' (1995) in which he compares the typical 'film look' of cinema to the harsh, flat, too clean, and too perfect digital image (Manovich 1995, 5).

16
For further reading on long-term storage of analogue and digital photographic prints, see the recommendations of the Image Permanence Institute and of its digital print preservation portal DP3: https://www.imagepermanenceinstitute.org/education/publications.html and http://www.dp3project.org/preservation/storage-recommendations (both accessed October 20, 2022).

17
Anne Pasek's article 'The Pencil of Error: Glitch Aesthetics and Post-Liquid Intelligence' (2017) offers insight on the counterpart in digital processes: glitches or errors that are part of computational mechanisms which can also leave their unintended traces.

18
"Die Wahrnehmung der Photographie als Katastrophe schreibt sich in eine Diskurs- und Metapherngeschichte der Photographie ein, in der die Photographie durch eine besondere Aufgabe gekennzeichnet ist: die Rettung im und durch das Bild" (Stiegler 2009, 225).

Chapter 2

Touching PHOTOGRAPHIC SURFACES

FIGURE 2.1. Detail of *Crowhurst II,* 2007.
Corrugated appearance of the gelatin layer due to the paper's structure.

The yew tree in Tacita Dean's *Crowhurst II* is separated from its surroundings by the white gouache that neatly embraces trunk, branch, and twig on the photographic paper. The texture of this flat gouache layer is immediately arresting, as is the undulated photographic surface of the unpainted areas. The impression of this juxtaposition is intensified by the way the matte paint absorbs light, while the glossy and wavy gelatin layer reflects it. Tension between flat and undulation, between matte and glossy, result in a tangible relief, which lends an unexpected physicality to this photowork and its depiction of the old yew's bole and branches. The different material properties of the two interacting surfaces produce an optical tactility out of the ordinary flat photographic experience.

It is the tree's surface, its bark, that stays with us (fig. 2.1). When explored in nature with the touch of the hand, the tree's 'skin' is sensed by the body's skin, which acts as a sensory boundary between the two perceptual beings. Skin as the endless surface of the body, without beginning or end. On one side, an internal impression is left by bark on human skin, on the other, the bark itself has its textural properties. When mediated by the photograph, a third skin comes into play: the photographic surface. The perception of the photograph of the tree relies on a remembered bodily and haptic experience of trees to invoke and sustain any impression or sense of touch. It depends on an established knowledge network of relationships that connect the visual with memories of how it feels to touch any such material (Cipriani 2016, 161). Thomas Elsaesser and Malte Hagener's *Film Theory: An Introduction Through the Senses* (2009) bases its approach to cinema as a haptic experience on a conception of the skin as an organ of continuous perception (Elsaesser and Hagener 2009, 126). In this, Elsaesser and Hagener follow in the footsteps of other remarkable scholars in film theory whose work will be addressed (among other disciplines) in this chapter on the tactility of the surface. Perhaps the most prominent and widely cited by photography scholars is Laura U. Marks. She introduces the term *haptic visuality* in her book *The Skin of the Film: Intercultural Cinema, Embodiment, and the Senses* (2000). Marks states that optical visuality requires the separation of the viewing subject and the viewed object, whereas haptic looking also discerns texture and form by drawing attention over and around a surface. She describes this haptic looking as something that moves rather than focuses, grazes rather than gazes (Marks 2000, 162). Precisely this experience of looking was triggered when I approached and examined *Crowhurst II*. The questions of this chapter spring from here: what tactile qualities of the photographic surface contribute to the idea of touch? Which tactile and haptic encounters are triggered?

In the penultimate section of 'Part One: The Texture and Structure of the Photograph', Van Lier describes how mental schemas are triggered by photographic material. The photograph frustrates nearly every property of perception, he says. Therefore the process of perceiving a photograph is not something that happens through an interaction between the photographic imprints and the body, nor between signs and imprints, but between the print's brighter and darker areas and the viewer's mental schemas (Van Lier 2007 [1983], 39–40). For Van Lier, the photograph is foremost an extraordinary trigger of mental schemas, there is an "immediate activation of the eye-brain nexus, thereby bracketing the other parts of the body" (2007 [1983], 43). This argument is based on an almost entirely visual perception of the photograph. Giuliana Bruno goes further and positions touch and the haptic sense as central to mental activity in the section 'The Fabric of Touch and Mental Images' of *Surface: Matters of Aesthetics, Materiality, and Media*. Basing her argument on contemporary neuroscience, she states that we use the same neuronal paths that make up material sensory perception when creating mental images (Bruno 2014, 18–20).

In this section on the tactility of the photographic surface, I would like to discuss non-visual sensory capacities that can be associated with the production and perception of a photograph. Mika Elo, author and editor of *Senses of Embodiment*: *Art, Technics, Media* (2014), has written a number of interesting articles on touch in relation to new media and photography and I will return to this more fully later in the dissertation. Elo approaches touch "as a mediator between processes of signification, affectivity and materiality" (Elo 2016, 272). My approach pursues a similar division. I want to begin by highlighting one process that immediately comes to mind when considering touch and the photographic surface: the haptic actions that are undertaken in the darkroom by the artist or printing professional. In the first chapter of

this thesis, I elucidated this as a physical process: the bodily engagement with chemicals and the light sensitive surface. In this chapter, my attention shifts to the affective process of holding and looking at photographs. To help us apprehend the tactile properties of (material) photographs I highlight the reciprocity between touching a photograph and being touched by its material and subject matter. My third consideration of the tactility of the photographic surface emerges from the exhibition space, a place where haptic perception of the photowork involves a substitution between vision and touch: the eyes act as surrogates for the fingers.

2.1. TACTILE INTERACTION WITH THE *Photographic Surface*

Before delving into the theoretical connotations of the photograph's tactility, I want to begin by zooming in on the encounter between the photographic surface and the human hand. The setting and the photograph's format both influence the way in which a person can address the photographic material. At what moments does the human hand actually touch the photographic surface? The most common way to hold a single photograph is with the pad of the thumb lightly resting on the photograph's surface and the other four fingers backing the photograph. While pinning a photograph to the wall or the fridge, the thumb will often touch the front. If the photograph is mounted in an album, its paper back is hidden, but when pointing at the image, the index finger might – deliberately or not – touch the surface. Not to forget those situations when a photograph is torn apart or crumpled in anger.

Interestingly, the very first encounter between the photographic surface and the hand tends to be overlooked, perhaps because it takes place in the obscured space of the darkroom during the development of the photograph. Here, too, it is desirable to keep physical contact between fingers and photographic surface to a minimum, because of the sensitivity of the negative and photographic paper. Wherever the emulsion is touched, even if the hands seem clean and dry, a minimal residue of oils, dirt or perspiration will be deposited on the gelatin. To reduce contact between emulsion and fingers, the (processed) film or paper photograph is best held lightly between the outer edges of the thumb and the index finger. Different print tongs can be used to get the wet prints out of or into the different solution trays, and protective nitrile gloves are also manufactured for development and post-development handling.

THE FINGERPRINT

Although many scholars have drawn the comparison between the photographic message and the notion of the trace, the footprint or the fingerprint, any relation with an actual fingerprint on photographs is habitually omitted from the analysis. The French film theorist André Bazin stated in the essay 'The Ontology of the Photographic Image', that the photograph and the photographed share a common being, after

FIGURE 2.2. Alison Rossiter, *Eastman Kodak Kodabromide G2, expired March 1946, processed 2009,* 2009. Two silver gelatin prints, left: 17×5.6cm, right: 17.6×12.2cm. Collection of Leslie, Judith, and Gabrielle Schreyer.

the fashion of a fingerprint (Bazin 1960, 8). The fingerprint as a possible threat to the photographic surface is a very real part of handling photographs (throughout making and viewing). Different fingerprints can be present on or in a single photograph. The fingerprint caused during development by touching the emulsion of the film negative will appear enlarged and lighter than the surroundings on the developed print. Another real-size fingerprint may show up after processing the silver gelatin paper in either black or white, if contaminated fingers have touched the non-exposed light-sensitive photographic paper in advance. And finally, there is the fingerprint that is made on the fully developed photograph which has been held in hands or touched when hung on the wall. Hypothetically, all four forms of fingerprints could be present in one photograph.[1] The conceptual fingerprint-figure in photography theory refers to the indexical capacity of the photograph to depict what has been there in front of the camera. The literal multiplicity of possible fingerprints on the photographic surface all, equally, point to what has been there: the layers of (handling) processes that encircle a photograph.

Indexicality has been taken up by generations of photography and art critics. Elspeth Brown and Thy Phu argue in their edited volume *Feeling Photography* (2014) that indexicality is a means

of conceptualizing the tactile sense of feeling in photography. They base this understanding on the connection between the referent and the represented image: that the photographic surface is touched by reflected photons is confirmation of the photography's evidential efficacy (Brown and Phu 2014, 14). Similarly, Margaret Olin, in her essay 'Touching Photographs: Roland Barthes's "Mistaken" Identification', says that the photograph as a remnant is a trace, and a trace is inherently tactile (Olin 2002, 100). Olin slightly amends the indexical power of the photograph, and her conception is even more relevant than the classical conception to my study of the tactile qualities of the photograph. She states that the indexical connection may lie more in the relation between photograph and beholder, than in the relation between photograph and referent. She creates a notion of a "performative index" or "index of identification" (2002, 115).

Van Lier further elaborates the idea of indexes in the second part of his first chapter. He differentiates between indices and indexes in order to find the relationship between the photographic imprint and the spectacle:

> INDICES are not signs; they are the physical effects of a cause they physically *signalize*, either through *monstration* [...] or *demonstration,* as when an unusual disarrangement of objects might reveal a thief's route to a detective. Indices are non-intentional signs, and are neither conventional nor systematic, but physical. Lastly, INDEXES indicate objects much in the same way the index finger or an arrow might point to an object. These are outright signs, as they are intentional, conventional, and systematic signs. Moreover, they are minimal signs since they designate nothing by themselves; they merely indicate (Van Lier 2007 [1983], 17, emphasis in original).

The fingerprint in the photograph is hence an *indice*, it demonstrates the handling gesture of either the person developing the film (or print) in the darkroom, or the person holding the photograph. It is a physical effect of the finger touching the photographic surface of the film or the print, and it physically signals this effect. An interesting example is the photowork *Eastman Kodak Kodabromide G2, expired March 1946, processed 2009* (2009) (fig. 2.2) by the American artist Alison Rossiter (b. 1953). As the title indicates, Rossiter has a special interest in working with historic photographic papers. While processing 'only' the expired photographic paper Eastman Kodak Kodabromide G2, without exposing it to any light source, black fingertips appeared around the edges of the white paper. Like a ghostly presence, the life-size indices of the fingers of an unknown and absent person, who once touched the undeveloped paper sometime between 1946 and 2009, arose in the developing bath. As this is a black-and-white paper, the black tones of the fingerprints indicate that the silver halides in the emulsion have been converted to silver particles here. In fact, these fingertips are now visually represented by the same material, as any imaginative image would be.

Expired papers often have exhausted halide chemistry and are therefore no longer sensitive to light. Rossiter explores the material in the darkroom under safelight by processing the papers with conventional silver halide developer and fixer. Both her experience and the properties of the paper influence the final outcome. It is a play between control and loss of control that challenges her artistic darkroom practice. Another uncontrollable element comes in through the flaws and other marks of wear that can be found in historic papers such as this Kodabromide G2 paper by Kodak. The practice affirms Van Lier's reasoning that photonic imprints are always indices that signal their cause (Van Lier 2007 [1983], 17). In this instance, light reflections from the photographed objects ultimately share the common visual effect of the imprints of a fingertip's grease.

GESTURES IN THE DARKROOM

It is unusual for photographic gestures to be subjects of a photograph, as Margaret Olin states in the introduction of her book *Touching Photographs* (Olin 2012, 13–14). The term 'gesture', in the context of photography, refers to the moment of taking a photograph rather than to the moment of receiving or making it in the darkroom. When Vilém Flusser dedicates a whole chapter of *Towards a Philosophy of Photography* to the notion of the gesture, he considers the photographer's actions while taking the photograph, but he neglects the subsequent stage during which a photograph is developed in the darkroom. Both gestures are effectively hidden, somewhere off the edge of the photograph's field-of-vision. Olin briefly mentions the "massaging gesture" performed in the darkroom as one of the few photographic gestures that actually registers on the print, but she does not pursue the form or relevance of this gesture (2012, 13). For her, "[...] photographic gestures indicate that photographic practices do more than merely represent the world. Gestures turn photographs into presences that populate the world like people and act within it to connect people" (2012, 14). Photographic gestures position the photograph in a relational network, drawing together photographed objects, subjects, a photographer, a viewer, and sometimes (if the photographer does not develop the print him/her/themself) even a professional printer. In the following analysis, I stay with the simplified case of a photographer developing his/her/their photographs in a darkroom.

The tactile interplay between the photographer and the exposed photographic surface takes place for the first time in the darkroom, as the latent images on film are developed into photographs via multiple chemical and physical steps. The film must be removed from its canister, unfurled from the spool, fed into and then wound onto the film reel, before it is put in the developing tank. After the film has been developed, it has to be taken out of the tank again and dried before being exposed to photographic paper. All these actions come with the possibility of (unwanted) fingertips on the film or on the paper. The photographer's gestures engage only with the materials of the second stage of the image-making process: water, chemicals, light (or its total absence), film, light sensitive paper, and a projection enlarger. However, as various photographers and darkroom specialists have explained, the eyes and the mind (the imagination) are also primary tools. The developer's hands translate vision into action as they operate machinery, hold back the light (known as *dodging*), and move the paper through the steps of chemical development. Closeted in a darkened room, the

mystery of this process is seldom accessible to others, who confront only the final result of the photograph – this may be why there are so few academic texts that deal with the darkroom's relation with the photograph.[2] Van Lier characterizes the photograph as "the most vivacious experience of what physicists call the *black box*, where one can clearly perceive the entrance (*input*) and the exit (*output*), without ever knowing quite well what takes place between the two" (Van Lier 2007 [1983], 38, emphasis in original). The tactile interplay between the photographic surface and the person exposing and developing the photograph is hidden in the dark. As the output (the photograph) is not the same as the input (the negative), we can only guess at the significance of the gestures that take place in the black box of the darkroom.

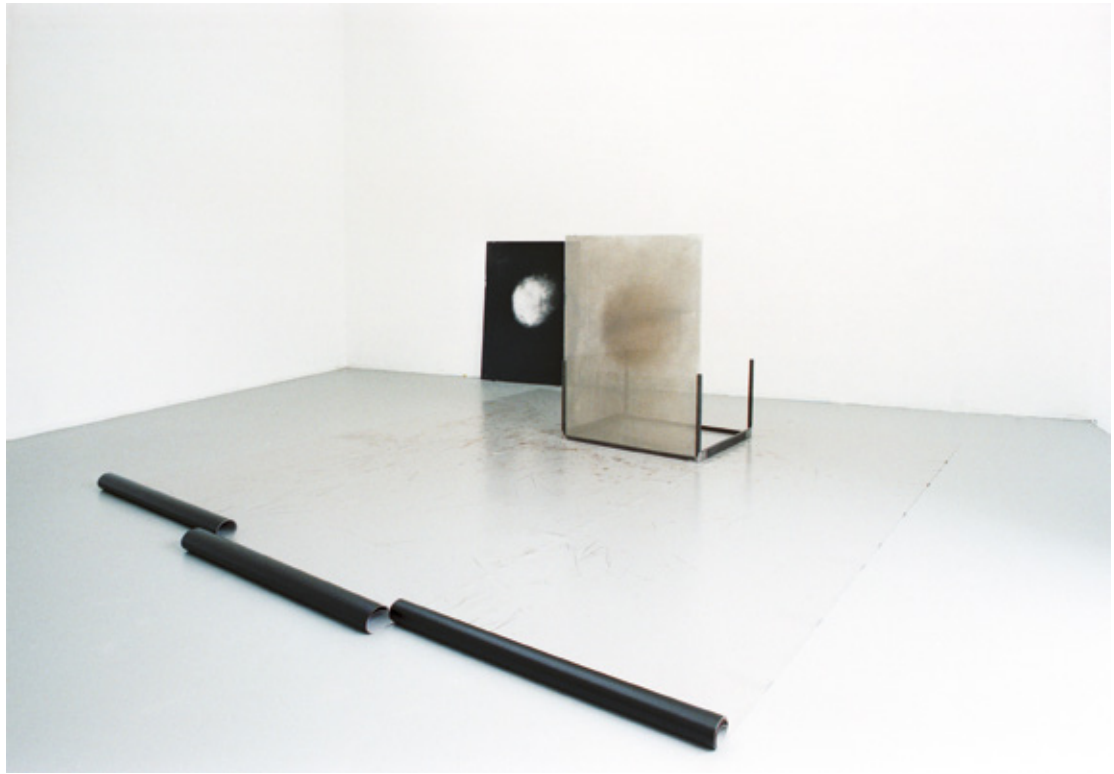


FIGURE 2.3A. Gwenneth Boelens, *Exposure Piece (Sensitizing)*, 2010. Collodion glass negative, gelatin-silver contact print on aluminium, both 127×169.5cm, metal, dance vinyl, total dimension 450×550cm. Installation view at Prix de Rome jury presentation, Amsterdam, The Netherlands.

One photowork that lifts this veil is the photowork and installation *Exposure Piece (Sensitizing)* (2010) (fig. 2.3a) by the Dutch artist Gwenneth Boelens (b. 1980). The work presents the traces of the artist's actions through a process of sensitizing, exposing, and developing a huge collodion glass negative and its silver gelatin contact print. In exhibition, the work is encountered as an abstract black-and-white photograph leaning against a wall, and a glass negative of the same size held by a simple metal construction, installed on three rolls of white vinyl floor. The vinyl floor is as much a part of the final spatial sculpture as the photograph or the negative glass plate: the floor 'records' the making process of the photowork as it shows dark stripes of footstep marks that were caused by silver nitrate spilled during the making of the negative (fig. 2.3b). Boelens captures her body's movements on the floor, and in so doing she brings the performative dimension of the darkroom developing process into the exhibition space. The extraordinary size of the glass (127×169.5cm) also enlarges the dimensions of handling. To lift the plate in and out of the baths of chemicals, Boelens needed the help of three assistants. After the glass plate was sensitized, it had to be exposed within ten minutes. Boelens intuitively cast a simple ray of light on the wet emulsion and this created an abstract image on this huge glass negative. Later, she created a contact silver gelatin print by placing the dried negative on sensitized paper of the same size and exposing it.

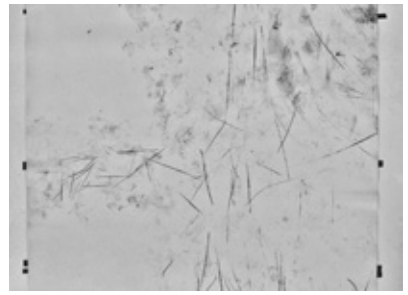


FIGURE 2.3B. Gwenneth Boelens, *Exposure Piece (Sensitizing)*, 2010. Dance vinyl.

Such contact paper has a low sensitivity to light and can be exposed with a normal lightbulb from a metre away. Contact printing involves a negative that is mounted with the paper in a spring-loaded frame, and the emulsions of both are kept close together during exposure (Benson 2008, 164). As Richard Benson relates in *The Printed Picture* (2008), which covers all types of photographic printing, most nineteenth-century materials were handled in room light, and it was not until the beginning of the twentieth century that papers became more and more sensitive to light. This is the moment at which the darkroom made its entrance into photographic practice (2008, 148). In the obscurity of the darkroom, the photographer can control the print's exposure to light. As Ansel Adams has argued, the negative holds neither black nor white, but a wide-ranging scale of grey tones, which the photographer can decide to apply as black or white on the print (2008, 160). This explains his often quoted image of the negative as a musician's score, which waits to be played out on paper through the photographer's darkroom interpretation (ibid.).

Exposure Piece (Sensitizing) is part of Boelens's long-term exploration of the negative as proto-image. Fascinated by the fact that the negative is closer to the image source than any print, but at the same time often overlooked as an intermediary image, she puts it at the centre of her artwork. In some works, the negative is installed in a spa-

tial relation to the print, as in *Exposure Piece (Sensitizing), It Has Been Here* (2010), and *Peering Grasping Longing* (2011). In others, it is installed on its own, as in *Negative, Rather than Truth* (2010) and *Events Unwitnessed* (2012). The question of what the image really is: the negative, the print, the object, or even the gesture, is manifested through the materials that the artist uses. It lingers in her oeuvre. The act of touching the (photographic) surface is naturally part of her practice, which culminates with a series of huge and varied ceramic tablets that she made by hand in 2013. Boelens's fingerprints cover the surface of these plates and give them their shape. Even though she departs here from the photographic process to express her ideas of trace and gesture through clay, these ideas are enduringly rooted in her photographic practice.

Silver gelatin photographs, among other historic processes used and interpreted by Boelens, are only sensitive to the blue and blue-green region of the light spectrum, and so they can be developed under red or amber safelights. Chromogenic photographic materials, in contrast, are sensitive to all visible wavelengths and reproduce natural colour tones. Therefore these are the most extremely sensitive photographic materials and need to be handled in complete darkness. In the total darkness of the colour darkroom, the hands alone can enact the craft of development. The imperative here is on tactile perception and the experience of the person developing the print. He/she/they follows a kind of choreography that is orchestrated by the various stages through which the colour print has to pass (I will discuss this more thoroughly in the third chapter).

As I was seeking a language for this form of tactile interaction, I happened upon the work of the Australian artist Danica Chappell (b. 1972), who coined the term *darkroom haptic* for the methodology of her own master's thesis. According to Chappell, the darkroom haptic describes and encompasses the "materially-driven haptic processes that are developed in the blind space of the colour darkroom" (Chappell 2012, 2). It qualifies the bodily actions that are performed in complete darkness to produce the photographic artwork. Chappell poetically describes these actions as follows: "Fingers lightly dance over all the surfaces in the darkroom to produce the latent image; however, the toil that guided the haptic action is hidden in the fixed record on the photographic surface" (2012, 47). For her own unique photoworks, she used a complex photogram process which was split into two stages, first producing a "negative-gram" and a "transparency-gram", and then building an adapted photogram, using the materials of the first stage (2012, 46). Working blind in the darkroom's total darkness, these handcrafted photoworks rise beyond the artist's intentions and expertise. The result is a photographic recording of the layers of processes and gestures that merge on the photographic surface (fig. 2.4). For Chappell, the haptic is that which determines the relationships between the materials, the darkroom, and light. It refers to the physical action and tactile interaction that "pulls four-dimensions into two-dimensions; resulting in an irreproducible moment and outcome" (ibid.).

The unnatural setting of the darkroom gives a sighted person insight into an experience of blindness. Navigation through space and the handling of things rely solely on the senses of touch, sound, and

FIGURE 2.4. Danica Chappell, *Thickness of Time #1*, 2018–19.
Unique chromogenic photogram, orientation flexible, 116.8×86.4cm.

smell.[3] In this context, Chappell speaks of her mind's eye, a perceptual experience which speculates on the outcome during the developing process, and emerges through a haptic vision. To make sense of this relationship between the optical and the tactile she refers to Deleuze's writing on Francis Bacon, in which he describes the infinitely rich relationship between eye and hand. He argues that this relationship passes "[…] through dynamic tensions, logical reversals, and organic exchanges and substitutions" (quoted by Chappell 2012, 46–47). For Deleuze, this richness frustrates any simple understanding that the eye judges and the hands execute. The analogy between hands and eyes is clearly a topic that has its own complex discourse, which I will not elaborate here. I use this reference here to emphasize the tactile exploration that occurs between photographer/artist and photographic material, which arises when visual perception is excluded during the developing process of colour prints in general, and of Chappell's photograms in particular.

CONTACT IMAGES

Today, the digital imaging process is omnipresent and the tactile nature of the photographic record and print vanishes into oblivion. The act of touching may seem rather abstract when it is understood as light particles hitting a photographic surface (as described at the beginning of chapter 1), or chemical solutions enveloping and infiltrating the exposed. However, these phenomena mean that film-based photography is

inevitably above all a *physical* chemical process. Artists such as Danica Chappell and Gwenneth Boelens who intervene with light sensitive material highlight the bodily entanglements of the developing process.

Rossiter's photowork with its fingerprints, Boelens's photo installation, and Chappell's *Double Dark* photograms, share in their diversity one key feature: they are all contact images. Fingers, negatives, or objects have, at some point, touched the photographic surface, and thereby affected the (non-) exposure of the light sensitive particles. The touched and untouched parts comprise the image of light present or absented. These non-perspectival representations underline the tactile quality of the surface as the critical site of image creation. French philosopher and art historian Georges Didi-Huberman's poetical-associative train of thought when introducing contact images in his essay on that subject is a good starting point here. It simultaneously draws on the physical origin and effect of this kind of image:

> Contact images? Images that touch something and then someone. Images that cut to the quick of a question: touching to see or, on the contrary, touching to no longer see; seeing to no longer touch or, on the contrary, seeing to touch. Images that are too close. Adherent images. Image-obstacles, but obstacles that make things appear. Images coupled to each other, indeed even to the things of which they are the image. Contiguous images, images backing each other. Weighty images. Or very light images that surface and skim, graze us and touch us again. Caressing images. Groping or already palpable images. Images sculpted by developer, modelled by shadow, moulded by light, carved by exposure time. Images that catch up with us, that manipulate us, perhaps. Images that can ruffle or chafe us. Images that grasp us. Penetrating, devouring images. Images that move our hand (Didi-Huberman 1997, unpaged).

In his discussion of contact images, Didi-Huberman uses photograms as his example because they make explicit this thing that concerns all photography, but which too often drowns in the seductive depths of field of perspectival images. His introduction gathers together all the paradoxes that a contact image holds, unfolding from this momentary unity of object and image when the surface is exposed. The dialectics of touching and seeing, weight and weightlessness, proximity and distance, are mediated by the photographic surface. The photo historian Geoffrey Batchen describes photograms in particular, as one form of contact image, in *Each Wild Idea: Writing, Photography, History* (2000):

> Here object and image, reality and representation, come face to face, literally touching each other. Indeed the production of a photogram requires real and representation to begin as a single merged entity, as inseparable as a mirror and its image, as one and its other (Batchen 2002, 160–161).

What characteristics of the contact image encourage this notion of touch, and thereby invoke an awareness of the tangible qualities of the photograph's surface? I will focus on the photogram in particular, for the purpose of a clear argumentation and response to this question. The photogram can be seen, ultimately, as a paradigm for all contact images and photographs that share the photographic surface as their carrier. The physical contact between surface and pictured phenomenon gives photograms a direct quality. This directness is bolstered by the fact that there are no mediating optical instruments between the pictured object and its reflection, which relate at a scale of one-to-one. In 1927 and 1928 the Hungarian artist László Moholy-Nagy wrote several essays dealing with the matter of photography, and in particular of the photogram. He highlights the light-sensitive layer as the main instrument of the photographic process (as opposed to the camera), and this makes photography "[…] the first means of giving tangible shape to light, though in a transposed and – perhaps for that reason – almost abstract form" (Moholy-Nagy 1989 [1927], 83–85 as quoted by Van Gelder and Westgeest 2011, 192). Whereas the field that surrounds the pictured appears to be a monochromatic void, the image object is created by the non-exposed parts – the residue of that which has been obscured. These often abstract shapes seem to be pressed against the picture plane. One important characteristic of the photogram is that it does not afford gradations of spatial differentiation between the two extremes of figure and ground, unexposed and exposed. Its visual content is built of two-dimensional shapes, rather than through perspective. As Batchen writes:

> But a picture of this kind also collapses any distinction between figure and ground (as well as between up and down), and its edge becomes an arbitrary cut within a field of potentially infinite elements rather than a rational frame surrounding a discrete object (Batchen 2016, 9).[4]

The visual proximity of these shapes recalls the near-space of haptic exploration. Unlike vision, touch is confined to the body's surface and so it does not have a three-dimensional sensible field and does not differentiate between near and far. Likewise, the shapes perceived in a photogram are all aligned on the same level: the surface. The volume and depth of the objects that created the image are absent from the photogram. What is represented, and left behind for the viewer to relate to, is only this *one* element – touch, immediate and singular. We can only graze the photographic surface, the bright and the dark parts. The sensory awareness of touch cannot cover spatial awareness at once, (as opposed to visual perception). Only moving the hand or the body can lead to a haptic experience through which we might track the volume of an object or the constraints of the space.

Vision is "[…] distanced and even deceitful, whereas touch seems more intimate, reassuring and proximal […]", as Mark Paterson writes in the first chapter 'The Primacy of Touch' (Paterson 2007, 2). In its proximity and immediacy, he writes, the haptic experience is base or even bestial. His book investigates the tension between "immediate" and "deep" metaphorical touching, a tension that I will consider in the next section on the reciprocity of touching and being touched. As we are technically dealing only with the visual trace of the removed object, the sole tangible relic of this encounter is the photogram's surface. It is not without reason that Didi-Huberman describes contact images as "images that move our hand" in the introduction to his essay, which concludes with the following paragraph:

> Thus contact images are not immediate images (a genre which, in any case, probably does not exist). Rather, they are images

> that impose a certain symptom of adherence on optical distance, such that we can feel our seeing touched. Or that force physical contact to retreat – severely or only slightly – in a well-composed distancing, such that we can feel our touching seen. Contact images? A slight trembling from front to back. A dialectical groping of the hand that seeks to see and the eye that seeks to touch (Didi-Huberman 1997, unpaged).

Didi-Huberman's double figure of the hand seeking to see and the eye seeking to touch is made manifest in the all-embracing title of his essay: contact images. Images that are created through physical contact and which, in return, 'make contact' through their visual closeness. Twenty years before Didi-Huberman, Rosalind Krauss wrote about the allegorical power of photograms as physical traces in her bipartite 'Notes on the Index: Seventies Art in America' (1977). She states:

> But the photogram only forces, or makes explicit, what is the case of all photography. Every photograph is the result of a physical imprint transferred by light reflections onto a sensitive surface. The photograph is thus a type of icon, or visual likeness, which bears an indexical relationship to its object. Its separation from true icons is felt through the absoluteness of this physical genesis [...] (Krauss 1977 part 1, 75).

Krauss explores how the index appears and functions in 1970s art, with an expansive explanation of photography as index (as well as reflection on her contemporaries). Her work has been influential for scholars. But when – like many other scholars – I focus on the presence of the photographic trace and the absence of its cause, I overlook the intrinsic material presence of exposed silver particles and the absence of non-exposed silver halides in the photograph's surface layer. Whereas the exposed silver halides are developed into metallic silver and ultimately become the black parts of the print, the non-exposed silver halides are converted into a water-soluble complex in the fixing bath, and washed away.

Consequently, the trace left by the object *on* the surface of a photogram is converted, during the developing process, into an *absence* of silver halides. What remains here is the coated white paper without anything dispersed in it. Can it still be called a trace, when nothing is left behind? Can absence be regarded as trace? The trace of the objects placed on the photographic surface is an 'emptied' trace. The contact did not impress, imprint, or inscribe anything, as the suffix of the word photo*gram* – from γράμμα or *grámma*, meaning written character, letter, that which is drawn – would insinuate. The contact simply covered particular parts of the surface in darkness, withholding light from this sensitive surface. The photogram is therefore rather a *skotogram* (deriving from σκότος or skotos for darkness). As Didi-Huberman wrote in the excerpt quoted above, photograms are metaphorically "sculpted by developer, modelled by shadow, moulded by light, carved by exposure time". Just as the photographic surface is touched by all of these phenomena, so too the contact image can "graze", "grasp", and "touch" us in reverse.

Such 'emptied traces' in *skotograms* can nevertheless affect us and we 'fill' them with our (emotional) associative response. I understand why for Van Lier the "photograph is strictly an effect. *Photo-effect. Effect-photo*" (Van Lier 2007 [1983], 20, emphasis in original). For Van Lier, "photography is an ambiguous word" because "[g]raphs as writing or drawing, are the human products par excellence; and light, as physical agent, cannot be drawn or described" (ibid.). This *photo-effect* is a physical consequence of matter being affected by light, and subsequently of the effects that image and object have on a viewer. These effects will be discussed in the following two sections.

2.2. THE RECIPROCITY OF TOUCHING AND BEING TOUCHED

"I began by collecting postcards of deformed trees – strange mutations with rogue branches or outsize trunks, not consciously knowing why, but just adding them to my collection of images that I found in flea markets", writes Tacita Dean (Dean 2011a, 84). The interest that was sparked by these found black-and-white postcards later evolved into a deeper investigation into the ancient trees of Dean's natal country, England, and this, eventually, found its way onto photographic paper. Dean continues reflecting on this process: "And then idling in the studio, I began outlining the tree shapes with white – highlighting their forms and monumentalising their grotesque beauty. It was very satisfying, denying all the chaos of the background" (ibid.). For two years after this, she painted, first on the small postcards, the *Deformed Trees* series (fig. 1.10), and later on the huge "painted trees" (figs. 2.5a–f) including *Crowhurst II*.

FIGURE 2.5A. Tacita Dean, *Majesty*, 2006.
Gouache on black and white fibre based photograph mounted on paper, 300×420cm.
Tate, London, United Kingdom.

FIGURE 2.5B. Tacita Dean, *Beauty*, 2006.
Gouache on black and white fibre based photograph mounted on paper, 358.14×373.38cm.
SFMOMA, San Francisco, United States.

FIGURE 2.5C. Tacita Dean, *Crowhurst*, 2006.
Gouache on black and white fibre based photograph, 300×409.9cm. The Museum of Modern Art, purchased with funds provided by Kathy and Richard S. Fuld, Jr., New York, United States.

FIGURE 2.5D. Tacita Dean, *Majesty (Portrait)*, 2007.
Gouache on black and white fibre based photograph mounted on paper, 368×299cm.
Fondation Louis Vuitton, Paris, France.

FIGURE 2.5E. Tacita Dean, *Monkey Puzzle II*, 2007
Gouache on fibre-based photograph mounted on paper, 499.9×329.2cm.
Norton Museum of Art, West Palm Beach, Florida, United States.

FIGURE 2.5F. Tacita Dean, *Tree of Life*, 2016.
Gouache on black and white fibre based photograph mounted on paper, 336×420cm.
Marian Goodman Gallery, New York, United States.

In the same passage, she expresses her pleasure in dealing with these impressive trees with such closeness and focus: "I then hand-painted around every branch with a small gauge paintbrush in white gouache paint, delighting in my proximity to even the tiniest and most inaccessible of branches on these mighty trees" (Dean 2011a, 84). Her proximity to the exposed photographic skin contrasts with the viewer's physical distance when standing before a photowork like *Crowhurst II*. Still, her physical engagement with the material, in the acts of painting and mounting, produces a haptic photowork. The juxtaposed bulging photographic paper and matte dried gouache contribute to the photowork's sensuous appearance. How can we approach these values and dimensions with a perspective that includes and acknowledges the somatic sense experience in addition to the primal ocular observation? In particular, how can a photowork like *Crowhurst II* invoke a more affective experience of touching or being touched for the viewer, when direct cutaneous contact is out of the question?

This subsection focuses on the photowork's relation to various ideas of touch, whether tactile sensing, haptic perception, tangible materiality, or the metaphorical notion of being affected. Mark Paterson's *The Senses of Touch: Haptics, Affects and Technologies* (2007) was a guide for me as I found my way through these overlapping categories. Touching, in the sense of *tactile* experience, can be characterized as an immediate sensation: skin brushes against the surface of something that gives both a sense of the surface's texture and a "spatial awareness that derives from interoceptive (inward-oriented) senses of bodily position, movement and balance" (Paterson 2007, 3–4). In comparison, the *haptic* pertains to the sense of touch and of tactile sensation. A haptic perception need not presuppose physical contact, but draws on previous tactile experiences and quotidian habits. The *haptic* also "expands the reach of touch from cutaneous surface to more inwardly-oriented senses", says Paterson (2007, 4). Understanding the tactile properties of a haptic photowork like *Crowhurst II* is then also an attempt to understand its "capacity to affect", as Paterson explains in a more general sense (2007, 80–81).

I am particularly interested in how we can speak of the reciprocal effect of touching a photograph and being touched by its material and its subject matter. I argue that the essence of the interaction between viewer and photograph – what happens when we hold a photograph in our hands – might elicit something of the core of our relationship with photography, which stands in contrast to, but is still present when, dealing with (monumental) photoworks on the exhibition wall. Because we cannot touch those photographs without triggering an alarm, we have to rely on other, more indirect forms of sensing and experiencing the tangible.

THE PHOTOGRAPH'S AFFORDANCE: (FORBIDDEN) TO TOUCH

On Tacita Dean's *Crowhurst II,* several fingerprints are visible on the corners of the work and along the right and left edges (fig. 2.6). Some of the fingerprints carry little particles of white gouache paint. These are likely to have been made during the painting process and to be prints of the artist's own fingertips. The other fingerprints, which did not leave paint traces, might also be Dean's, because other professionals who have dealt with the artworks (printers, art dealers, curators, conservators, and others) are likely to have used professional lint-free, nitrile or cotton gloves to protect the photographic gelatin from the finger's oils. These oils can destroy the emulsion and can lead to bleaching, staining, and silver mirroring, all of which are serious threats to

FIGURE 2.6. Detail of *Crowhurst II*, 2007.
Fingerprint on photographic surface.

the photograph. As in a criminal investigation, these fingerprints offer indisputable evidence of a person's presence: of the contact they made and the nature of the action. A conservator will always search for these marks when seeking to determine the condition of a photograph for the purpose of treatment or a condition report, before and after exhibiting the photowork (especially when it is being loaned). Fingertips and other forms of mechanical or chemical damage, as well as additions made by the artist, are used to retrace the biography of the photowork when it is being 'mapped' (I will return to this later).

The work of Elizabeth Edwards, an English anthropologist and historian, is central to any analysis of the photograph as a tangible material object that is shaped by our tactile engagement with it. Edwards views the context in which the work appears as an important element of material practice. The 'placing' of a photograph frames its meaning but also the engagement with it that can be expected or triggered. During my previous work in exhibition making, I was struck by the lack of respect that visitors showed towards photographs when compared to, for instance, paintings. Photowork condition reports testify to this, itemizing several fingerprints, scratches, once even a 'noseprint'. I cannot but attribute this harmful intimacy to the fact that we literally 'feel close' to the medium because we all have a relationship with photography as photographer and subject (through shooting, printing, touching, sharing, and in Dean's case, leafing through piles of photographs). Because of this personal engagement with prints, and because of the idea that they are reproducible, we lack respect for photographs. I argue that these associations, which derive from our personal treatment and use of photographs, come into play when we approach photoworks in a museum environment. Though the museum setting assumes a specific treatment of artworks, the compulsion to touch a photograph is so strong that it over-rides assumptions of restraint and physical separation. Edwards, in her description of this process of 'placing' a photograph, states that there is a certain etiquette to viewing photographs (Edwards 2012, 226–227). This leads to an inherent and context-sensitive paradox: touching photographs and absolutely not touching photographs.

Back to basics: which (tactile) actions occur when we use a photograph in normal life? One way to consider the photograph as tangible object is to think in terms of what it affords. James Gibson pioneered the idea of affordance in *The Ecological Approach To Visual Perception,* the same book which helped in the first chapter to understand the tripartite relation between surface, texture, and structure of the photographic surface. Gibson coined the noun *affordance,* referring to a contingent behaviour or action that comes forth between the (surface) distribution of the environment, and the animal. In brief, a few examples of affordances for humans: anything cup-shaped affords drinking, anything firm at knee-height above the ground affords sitting. Important elements of an affordance are to Gibson that it implies a complementary of human and environment, and that it is relative to the human. The latter has the consequence that an affordance cannot be measured. His description here returns to the fact that viewer and environment are both crucial:

> An important fact about the affordances of the environment is that they are in a sense objective, real, and physical, unlike values and meanings, which are often supposed to be subjective, phenomenal, and mental. But, actually, an affordance is neither an objective property nor a subjective property; or it is both if you like. An affordance cuts across the dichotomy of subjective-objective and helps us to understand its inadequacy. It is equally a fact of the environment and a fact of behaviour. It is both physical and psychical, yet neither. An affordance points both ways, to the environment and to the observer (Gibson 2015 [1979], 121).

So, what affordance(s) can be attributed to the photograph and its beholder? To answer this question we have to distinguish between the photograph as material object and as image. The fact that there is a wide range of photographic objects means that their affordances must also be multiple. Most prominently, we have private photographs, onscreen or printed (left over from the analogue period). Gillian Rose discusses the affordances of such photographs in *Doing Family Photography*. The scale of the printed family photograph allows them to be picked up individually and placed in albums, boxes or frames (Rose 2010, 20). It is hard, in fact, to establish clear material-based affordances for family snaps in Rose's book. When she writes about the objects' qualities and their affordances, the surrounding and preceding practices automatically come into play (as it does in Edwards's writings). The most significant affordance, however, is independent of these display and circulation practices: it is the indexicality of what these photographs show. Rose mentions that this indexical affordance of photographs was taken for granted by all the interviewees she consulted when conducting her research (2010, 30). When family photographs are shown to or shared with others, indexicality is key. Even though these images situate themselves in the context of happy family leisure, they appear so "truthful" that at times they seem to substitute for memories of the depicted individuals (2010, 32).

So, seeking an answer about a photograph's material affordances, we return to Gibson. He asks at the beginning of his theory of affordances: "How do we go from surfaces to affordances? And if there is information in light for the perception of surfaces, is there information for the perception of what they afford?" (Gibson 2015 [1979], 119). Hesitantly, he proposes that the composition and the layout of the surface might already constitute what they afford. It is indisputably the size, paper thickness, and the (glossy or matte) surface layer that reveals (tangibly and at first sight) the nature of a photograph. But perhaps even more significant is the very specific distribution of the grains, and therein the photograph's graininess, which forms the visual language that we associate with any photographic image, positioned somewhere between sharpness and out-of-focus. It is this material-based visual language, as part of the photographic surface, that indicates immediately that we are dealing with a photograph rather than any other image medium.

Gibson points out that "[…] the basic affordances of the environment are perceivable and are usually perceivable directly, without an excessive amount of learning" (Gibson 2015 [1979], 134).

Following from that, I would argue that the 'picking up', 'looking at', 'storing in', 'caressing', and 'sharing' are the affordances of loose printed family photographs. With the handheld touchscreen, the current display and storage object for family snaps, a "perceived affordance"[5] is the (swiping or ticking) touch of the index finger, the thumb, or both, in order to share, enlarge, or to delete. What is left is a trail of grease on the glass, detached from the photographs. Though highly tactile, the 'screened' photograph itself remains untouched during and after viewing. In fact the reciprocity of touching and being touched by the photograph, including *both* the traces left on the photographic surface *and* in the emotion of the beholder, is unique to printed photography. By taking up an argument by Cathryn Vasseleu, Mika Elo explains in his article 'The New Technological Environment of Photography and Shifting Conditions of Embodiment' how digital technologies detach the objective aspect of touching from its affective qualities. They rely on a "formalization of touch" wherein touch becomes an objective sense (Elo 2016, 276) and the finger its omnipresent tool. Accordingly, the affective and physical aspects of touch are separated and represented as two "relatively autonomous dimensions" (2016, 277). Elo concludes:

> With regard to the tensional relation between vision and touch this implies that it is the affective link between the user's body and digital information that tends to motivate the visual appearance of media contents in digital culture, whereas in pre-digital visual culture the most powerful substrate of affectivity was made up by visual appearances (2016, 278).

I mention the polarity between the physical and the affective touch, as enhanced through digital means, to highlight the difference between digital and 'analogue' experiences of touch. Introducing the sense of touch, Elo says that in contrast to other senses, "touch makes the sensing and the sensed coincide" (2016, 271). I would go so far as to argue that the differentiation between subject and object is questioned if not abrogated, when it comes to touching the photographic surface. Gibson's idea of affordance, which involves both human and (a part of) its environment, also defies the problematic subject-object classification by focusing on the complementary relationships. Drawing on Gibson's description of touch as "both physical and psychical, yet neither" (Gibson 2015 [1979], 121), I am even more tempted to regard touching as the most basic affordance of a photograph – even though (following Rose) the indexicality may be its most significant. The tactile and the indexical affordances are two different systems and both are at stake when we approach a photograph. Both are at hand when we speak of the reciprocity of touching and being touched by photographs. In that very encounter, photographs become 'objects of affect'.

FIGURE 2.7. Tacita Dean, *Floh*, 2001.
Artist book. Made in collaboration with Martyn Ridgewell. Page unknown [176], Hardcover with linen cloth, Smyth sewing, slipcase, Edition of 4000 signed and numbered, 29.7×24cm. Published by Steidl, Göttingen, Germany.

OBJECTS OF AFFECT

Dean's postcards of deformed trees, which she found browsing flea markets all over the world, are not outliers in her practice. These particular postcards led to the monumental painted tree photoworks. In another work, *Floh* (2001), published with Steidl as an artist book, Dean pays tribute to the original images she found. *Floh* has no text, it is a selected and edited reflection of her massive accumulated archive of found photographs, which appeared as a numbered and signed book edition of 4,000. Dean creates sequences of images that are open to the reader's own associations with family snaps, private portraits, landscape views, or still lives (though there are no trees). She often displays paired photographs, printed on facing pages. Only occasionally are these scanned or rephotographed images displayed in full bleed (which makes the subject or content of the image appear more pronounced). Most of the photographs appear to be represented in their original size and with the marks that history has left on them, all of which draws emphasis to the nature of each image as an object (fig. 2.7).[6] *Floh* can shed light on how Dean appropriates and uses found photographs in her own projects, and also on our own basic tactile interaction with personal photographic objects. With this in mind, we might think differently about how *Crowhurst II* can have a tangible and haptic impact on our perception, even though there can be no direct tactile engagement with it. The focus is on the photograph's layered stories, as well as on the visual content of the images.

As mentioned before, Edwards conducted, developed, and discussed many material approaches to photographs in her outstanding work. For her, the visual apprehension of the image was not sufficient – it needed to be extended into the subjective and emotional placement of photographs as "objects of affect". In an essay with this title, she writes,

> The shifts from meaning alone to mattering and from content to social process are integral to material approaches to photographs and have demanded an analytical approach that acknowledges the plurality of modes of experience of the

> photograph as tactile, sensory things that exist in time and space and are constituted by and through social relations (Edwards 2012, 228).

Edwards is a key figure in the academic field of material approaches to photographs and it is easy to find relevant arguments across her written and edited volumes. But when I read her texts, thinking with my own research into anthropologies of material culture, I find myself pondering the extent to which her analytical methodology is relevant to artistic photoworks. Dean's works, rooted as they are in found vernacular photographs, might bridge the two different approaches. Best known for her 2004 book *Photographs Objects Histories: On the Materiality of Images* (co-edited with Janice Hart), Edwards has recently turned her object-oriented attention to the networks in which the photograph travels, thereby building its social biography.[7] She regards social biography (as borrowed from material culture studies) as an effective concept for understanding the shifting roles and meanings of photographs as they move through different spaces and hands. Edwards refers to the biographical model Igor Kopytoff established in 'The Cultural Biography of Things: Commoditization as Process' (1986), in which he "[…] argued that objects cannot be understood through only one moment of their existence but are marked through successive moments of consumption across space and time" (quoted by Edwards 2012, 222). Edwards and Hart distinguish between two forms of social biography, of which one is the social biography of image content (as different prints, publication formats a.o.) in which the material form can differ. The other is that of a specific photographic object, which physically changes as it moves through time and space (Edwards and Hart 2004, 5). In the case of the collection of photographs presented in *Floh*, the social biography was that of specific single objects, until remediation by Dean. Each showed the marks of time and affection it had acquired before and during its time on the flea market stall. Each then appears in a new materiality, that of a paper book page, following Dean's collecting, scanning, editing, and publishing it. Thus one form of social biography becomes the other: object biography becomes the biography of image content. Post-publication, some pages of *Floh* have been rephotographed and posted online by viewers and users. Here, the historic photographs take on yet another form, one without any materiality at all.

Her collection of tree postcards (fig. 1.10) which eventually led Dean to *Crowhurst II*, are an interesting case. The (social) biographies of the overpainted postcards define them as objects. The historic postcards became part of a contemporary artwork, which now adds to their biography. In this form, can we propose that a new (social) biography, that of an artwork, begins? Or is the artistic intervention only a part of the initial social biography? How might Edwards respond to this possibility of divergence in the photograph's social biography – a divergence that could be seen as inherent to the artistic process of repurposing photographs? She draws on two models to extend her own biographical framework. The first model is Alfred Gell's idea of the "distributed object", which facilitates a nonlinear social biography of photographs that appear in "divergent multiple material originals." Edwards quotes Gell:

> In the process [of viewing], photographs emerge as relational or *distributed objects* enmeshed within various networks of telling, seeing, and being, which extends beyond what a photograph's surface visually displays and incorporates what is embodied in their materiality (as quoted by Edwards 2012, 224, emphasis in original).

The other model is Deborah Poole's conception of "visual economy" (1997), which accounts for the asymmetries of imaging practice and is based on the images' "exchange values" in circulation. As Edwards explains:

> Poole placed the meaning of photographs not in content alone but in the fluid relationships between a photograph's production, consumption, material forms, ownership, institutionalization, exchange, possession, and social accumulation, in which equal weight is given to content and use value (Edwards 2012, 223).

Whereas Edwards and Hart were distinguishing in their book between the two forms of social biography (Edwards and Hart 2004, 4–5), Edwards admits years later that the meaning of photographs as their various forms "shift through a double helix of image biography and the biography of material refiguration and remediation" (Edwards 2012, 224).

None of these three models – Edward's "social biography of the photograph", Gell's "distributed object", or Poole's "visual economy" – are quite right for the demands of an artistic photowork like Dean's *Crowhurst II*. Therefore I propose that most of Edwards's collected methodological tools are helpful because they take into account the connotations of the photograph or photographic objects regarding its/their historic or vernacular usages and performances. An artistic photowork can make reference to these uses, but ultimately it comes from a different motivation. The mechanisms of presentation, circulation, and conservation, then, determine the course of its biography (as I will address at the end of the third chapter). As Edwards and Hart say in their introduction, contemporary arts practice is beyond the scope of their book, even though the "material turn" is directly relevant to the work of artists like Christian Boltanski or Joachim Schmid, whose practice is rooted in an engagement with photographic material (Edwards and Hart 2004, 4). Having said this, Edwards's approach does meet the needs of a photowork when it comes to the place of affect in the apprehension of objects (Edwards 2012, 228–230). Edwards states that the "affective qualities", not only the visual, but also things like texture, weight or size, are the qualities that "invite tactility, gesture, and embodied apprehension" (2012, 228). The explicit involvement of the body in its relation to the photograph, which is crucial to any sensory appreciation and comprehension of the photographic image, is as relevant to artistic photoworks as to personal photographs.

THE PHYSICAL PUNCTUM

In 2005, the year that Dean over-painted her found postcards, Mark Godfrey wrote a profound article on *Floh* for *October* magazine. Interestingly, his text evinces a couple of (still tentative) thoughts concerning the tactile aspects of photographs, which would be articu-

FIGURE 2.8. Tacita Dean, *Floh*, 2001.
Artist book. Made in collaboration with Martyn Ridgewell. Page unknown [176], Hardcover with linen cloth, Smyth sewing, slipcase, Edition of 4000 signed and numbered, 29.7×24cm. Published by Steidl, Göttingen, Germany.

lated and elucidated, years later, by scholars including Margaret Olin, Elspeth Brown and Thy Phu, and Tina Campt (I will address these works of scholarship individually in this subsection). Godfrey tries to understand and to characterize Dean's "treatment of photography" by looking at how she has collected and presented found photographs. I will highlight two of his observations here. Firstly, he examines how Dean selected the photographs, which she calls "lost objects" rather than found images. And secondly, he considers the role of the photographic material in this process of finding and presenting these lost objects. Godfrey compares Dean's process with the ways in which other artists have used found photographs, and concludes that Dean, searching randomly through flea markets, found the photographs in a less directed manner than her peers: "The photographs had to find her, so to speak, jumping out of the piles of old images to attract her attention" (Godfrey 2005, 101). When looking through photographs or postcards in a flea market, Dean says, it's her attraction to a certain subject that will initiate one of her mini-collections. A collection is begun whenever she has two or more versions of something (Obrist 2013, 32–33).[8]

Of course we cannot lay bare *what* exactly moved her, but we certainly can state *that* she was touched. Discussing the deformed tree postcards (fig. 1.10), she admits that she was collecting them while "not consciously knowing why" (Obrist 2013, 80). There is an ambiguity in being affected by anonymous found photographs, as they do not depict personal memories and lack contextual information. This particular habit, in which the true referent of the photograph can be unknown even as it 'touches' the viewer, is consistent with Olin's notion of an *index of identification*. The beholder's emotional reaction (re-) contextualizes the image with personal associations in an unforeseeable manner. Godfrey describes how, as the many photographs in *Floh* are not ordered thematically or hierarchically, the volume "offers to us the possibility of finding our own images" (Godfrey 2005, 115). As a wordless publication, *Floh* does not direct our reception by imposing meaning on these found images or giving provenance. There is no option but to respond in an intuitive and personal manner, as Dean did when leafing through the cards on flea-market stalls.

Reading Godfrey's text, it becomes clear that Dean's attention is caught by both the images' content and also by marks of affection and hatred *on* the photographic material. Godfrey builds his argument around two photographs which bear clear signs of intervention. One is a group portrait of twenty-three men and women arranged in three rows. The faces of two of the women are scratched out with blue pen (fig. 2.8). Godfrey:

> These marks, sitting on top of the photographic surface, or rather on top and within it (the pen has torn away the paper), witness an altogether different kind of treatment of photography. They find their match toward the end of the book in another mark over a photograph of two young boys returning successful after a fishing trip. This time it is a mark of tenderness: we see a fingerprint over the youngest boy's face, the indexical sign of the index finger that once touched the image of the child (Godfrey 2005, 110).

The dual meaning of touching – sensational and emotional – is physically manifest in these two examples from *Floh*. Contributions to the 'Touchy-Feely' section of the edited volume *Feeling Photography* pursue this double path. They affirm my impression of the reciprocity of touching and being touched. As the editors Brown and Phu state in their introduction:

> As numerous practitioners, critics, and collectors would agree, photography is fundamentally tactile. Touching photographs, whether it is the glossy surface of a developed print itself or even the protective frame that might enclose this print, is one of our most compelling engagements with the medium, particularly since this act is often accompanied by the sensation that the subjects pictured on this surface can somehow touch back (Brown and Phu 2014, 13–14).

At one point, reflecting on the marks of affection and disregard, Godfrey switches in his article to write in the first person:

> Such touches of hatred and care spring off the pages of *Floh* as I turn through the book, and once I notice the scratched-out faces of the cadets, or the tenderly touched face of the young boy, I cannot see the images in the same way again. Could these latter marks act like a punctum, then? (Godfrey 2005, 110).

This personal voice emerges logically from his line of thought, as he is struck by these material traces of expressed emotion. *Studium* and *punctum*, coined by Roland Barthes in his *Camera Lucida*, are terms with a personal tint – their meaning is completed by the contemplator.

They have, to a certain extent, aided the progress of photography theory, but they have equally been shown to be problematic, when simplified. Barthes describes the punctum in the first part of *Camera Lucida* (1981, original title *La Chambre Claire*, 1980) as follows:

> [...] it is this element which rises from the scene, shoots out of it like an arrow, and pierces me. A Latin word exists to designate this wound, this prick, this mark made by a pointed instrument: the word suits me all the better [...] for *punctum* is also: sting, speck, cut, little hole – and also a cast of the dice. A photograph's *punctum* is that accident which pricks me (but also bruises me, is poignant to me) (Barthes 1981, 26–27, emphasis in original).

By asking whether the punctum could be something *on* the photograph instead of *in* the photograph, Godfrey, however, brings up the new and compelling prospect of a third person – somebody who is involved here, but whom Barthes himself did not envisage. Godfrey argues that these relicts of the touched surface point to the irrational aspects of everyday photography (Godfrey 2005, 112). Though present in absence, they bring in beholder(s) who at one point shared one or more moments with the photograph. Herewith, Godfrey turns also to the other (more indexical) conception of the punctum, articulated further on in *Camera Lucida* by Barthes:

> I now know that there exists another *punctum* (another "stigmatum") than the "detail." This new *punctum,* which is no longer of form but of intensity, is Time, the lacerating emphasis of the *noeme* ("*that-has-been*"), its pure representation (Barthes 1981, 96, emphasis in original).

Strictly speaking, it is the material of the photographic object that triggers the idea of the 'second' punctum. For Godfrey or for Dean, when looking at this particular *Floh* photograph, this apprehension of the punctum occurs twice: for the photographed young boy (who is by now either aged or even dead) *and* for the person who has been there caressing the photograph of him. In response to Godfrey's question, then, this is not an either/or issue, the punctum can be both something on *and* in the photograph at once.

In both *Touching Photographs* by Olin and *Feeling Photography* by Brown and Phu, a rereading of *Camera Lucida* precedes many of the authors' reflections on the relation between touching the photograph and being affected by it. Brown and Phu even attribute to the punctum a crucial role as powerful concept for a "theory of feeling photography" (Brown and Phu 2014, 4–5).[9]

Another essay in *Feeling Photography*, 'Photography between Desire and Grief – Roland Barthes and F. Holland Day' by Shawn Michelle Smith, stands out in this context, as Smith focuses on the notion of the "wound" in relation to Barthes's punctum. For Smith, *Camera Lucida* is Barthes's provocative attempt to describe photography's affective power (Smith 2014, 29). She focuses on this affective approach, what Barthes called "affective intentionality": his active way of observing a photograph (quoted by Smith 2014, 30). Smith aligns Barthes's understanding of photography with that of photographer F. Holland Day. Both, one through words and the other through the lens, believed that "feeling intervenes in the relationship between photographic signifier and signified" (2014, 30–31). Whereas Smith's article considers how feelings can be seen *in* photographs, and doesn't think of the viewer – how photographs make one feel – nonetheless, I want to highlight her elaboration of the wound here.

Barthes chose a deliberately haptic language of feeling to describe his punctum, thus illuminating the physical effects that a photograph can have when triggering our emotions. As Smith states (and Olin too), his understanding of photography is notably tactile: "[…] his experience of viewing is one of being touched" (Smith 2014, 34). She describes the punctum as follows:

> The unpredictable wound of the punctum disrupts the scripted meaning of the studium. It opens the photograph to deeply personal significance. It is the trigger that meets the viewer's "affective intentionality" and transports her down a unique path of associations. The details of the image become springboards that send one in unexpected directions. Although dependent on the contingency of the photograph, and on its indexicality, the punctum unsettles the site of photographic meaning, opening it up to the viewer's affect (2014, 34–35).

Interestingly, the associations and emotions that are triggered can then again take the form of physically touching or 'hurting' the photographic surface: touching and being touched go hand-in-hand in a continuous haptic engagement. The physical residue of the emotional response to the punctum's wound can then quite literally be surface wounds of the intact gelatin layer: fingertips, creases or scratches. One of the collected contributions to *Issues in the Conservation of Photographs*, published by the Getty Conservation Institute, explains that finger oils and sweat are acidic (with sodium chloride as its principal component) and can etch the binder layers over time (Norris and Gutierrez 2010, 611). Due to a less developed gelatin hardening technology in earlier periods, older photographs (those printed on photographic paper manufactured more than fifty years ago) are more susceptible to the effect of a fingerprint than contemporary photographic material. A fresh fingerprint on a contemporary photograph can be wiped off the surface more easily without leaving any mark (Hendriks and Krall 1993, 12).

In *Floh*, physical damage to the photographs is a mark or residue of past feelings, and it intervenes with the depicted scenes. Surface damage disrupts the portraits of the two boys and literally defaces the group portrait. This sends the viewer's attention off in a different direction, that is, it draws attention to the person who touched the photographs and was affected by it. There are no indexical indications of this person who caressed or damaged the surface, and so the viewer must rely on personal associations (unless they take a forensic approach, searching databases for a matching fingerprint). It does not surprise us, then, that Godfrey's response is affective and it led him to seek a relationship between the physical marks of the touched surface and the notion of the punctum.

The signs of use on the photographic surface reveal the "[…] time of printing, storing, and gathering dust; the time of treasuring and touching" (Godfrey 2005, 109). According to him, these marks

refer to an "expanded temporality" that follows the instant of exposure. Tina Campt coined the term *haptic temporalities* for these various 'times' of the photograph. Especially in the first chapter ('Family Matters – Sight, Sense, Touch') of her book *Image Matters: Archive, Photography, and the African Diaspora in Europe* (2012), Campt explores a selection of domestic photographs of black German families through the sensory and affective register of touch. She takes her own archival encounter and scholarly engagement with these photographs as point of departure, but emphasizes that this interaction is only one fraction of a series of haptic encounters that these photographs had and will have. These are haptic temporalities and not tactile temporalities, she says:

> [...] the haptics of a photograph reside not only in its status as tactile object of physical contact or in their optical representation of engaging visual depictions. The haptics of domestic photos derive from their capacity to solicit a relay of social transactions that evoke sensate, embodied, and affective engagements (Campt 2012, 44).

Her concept of haptic temporalities therefore resonates through both physical and psychical contacts with family photographs, beside the visual contact of seeing.[10] Godfrey's writings align with Campt's definition of these haptic temporalities:

> [...] initiated at their moments of production through a desire to create a material object of sentiment to have and to hold. The multiple temporalities of these images continue through the diverse temporalities of their circulation, distribution, and the passing on of these objects to others (2012, 34).

Although these family photographs of black Europeans from the first half of the twentieth century are much more contextually loaded than Dean's *Floh*-photographs, I cite Campt here because of the way she positions herself and her treatment of the photographs as part of their haptic temporalities. Campt acknowledges that her contact with these photographs shapes them in the present and will initiate other haptic encounters in the future. These temporalities have already shifted during her research, from the moment of initial contact to the moment of her writing about them. She confesses:

> [...] even the haptic temporalities in which I participate are rife with the affects I attach to these photos as objects I, too, [like their makers and keepers] invest with sentiment and meaning as traces of people, many of whom I did not know yet some of whom I once knew but never quite knew "like that" – as the people captured in photographs of past lives and earlier selves (2012, 34).

The multiple emotions that a photograph can provoke will automatically extend its temporal register. In that sense it can be appreciated as a meaningful object that accumulates many layers of use and affection during its existence, including through our own encounter(s). The critical difference between the photographs Campt discusses, the *Floh*-photographs Dean edited into a photobook, and *Crowhurst II*, lies in their different tactilities. When the four strokes of *Crowhurst II* were laid out, one at a time, on the huge table in the restoration studio of the Stedelijk Museum, I was even then not allowed to touch the sensitive surface with my gloved hands during our examination of its condition.[11] I could look from different angles and come close to the photowork's surface without an alarm going off, but for the rest, my non-tactile encounter did not differ from that of an exhibition visitor. This only placed a greater significance on the role of my eyes. Vision had to sense the gloss, the corrugations, the brittle gouache paint, the paper, et cetera. This is why I turn in the next subsection to writings by film scholars who have theorized a *haptic visuality* over the past three decades, much in contrast to photography studies, where the notion appears only tentatively.

This photowork touched me at that moment of examination and in that moment, shaped my theoretical approach. By forcing me to deal with it in a haptic manner, without touching, I had to find a suitable theoretical framework that would include its signifying material properties. It offered me a chance to extend my theoretical register, and I hope that my account of the tactility that *Crowhurst II* evokes can open new doors for haptic encounters with this photowork, or even with other photoworks.

2.3. PERCEPTION OF THE HAPTIC PHOTOWORK IN EXHIBITION *Spaces*

Because *Crowhurst II* has an unprotected open surface, it is very vulnerable to external factors like humidity, light, *and* curious museum visitors. Protective framing or mounting of the photowork behind glass would, however, tremendously alter its appearance and therewith the artist's intention. Moreover, the viewer's perception of and response to the photowork are determined by the extra surface of the protective (though transparent) glass on top. Nevertheless, photographs, when exhibited, are often framed. Conservational concerns prevail, especially for vintage and historic prints. The consequences of such a widespread policy are seldom thought through. A haptic photowork like *Crowhurst II* epitomises this matter, which matters to all photographic prints when thinking of their material and haptic qualities. How can we (theoretically) characterise our relations with all the values of photoworks that lie beyond the visual – whether through or in spite of our obedient tactile approach to exhibited photoworks? What agency can be attributed to the tangible character of photoworks in exhibition contexts?

THE DISEMBODIED VIEWER AND THE DISEMBODIED PHOTOGRAPH

Glenn Willumson, former curator of photography at the Getty Research Institute, has written about the consequences of framing photographs following formal criteria that are based on the tradition of the fine art print. Although his text 'Making meaning: displaced materiality in the library and art museum' dates from the beginning of the millennium, the curatorial practice of framing vintage and historic photographs remains current. Traditions of presentation for the fine

art print were taken as the point of reference, and formally applied to photographs when they entered the art museum context (Willumson cites the first photography exhibition(s) at New York's The Museum of Modern Art). The result of this established framing practice is, according to him, a displaced photographic materiality in the art museum, where the attention is limited to the surface quality of the photograph (Willumson 2004, 74). Discussing the practice and publications of Beaumont Newhall – former librarian at The Museum of Modern Art and from 1940 on the first curator of the photography department – Willumson shows how framing discourse "divorced the photographic object intellectually from its materiality and its context" (2004, 76). He states that Newhall delivered the first comprehensive exhibition of photographs in The Museum of Modern Art in 1937 (which had a now-famous accompanying catalogue *The History of Photography*), and that Newhall's curatorial practice shaped a methodology for photography exhibitions in the United States. The fine art framing process was instrumental in the historical shift towards the reception of photographic works as fine art. Photographic works, especially documentary photographs such as those by Margaret Bourke-White, were aligned with traditional models of art historical methodology and museum practice to enter the sphere of fine art. Newhall's criteria established a common practice that has endured to this day. Material aspects of the photographic object are often lost in this mode of presentation.[12] This preliminary method of presentation for photographs, initiated in 1937 and modelled on the exhibition practice of other accepted art forms, has had also a positive effect on the preservation of these photoworks in the long term.

Willumson claims that the art museum setting is one that intentionally removes the body of the viewer and its tactility, for the purposes of preserving the art object (2004, 73). Monica Marchesi explains how framing is common part of preventive conservation, that leads to a "blindness about frames" among conservators (Marchesi 2017, 180–181). As it is regarded as a "neutral, safe action", the consequences it has on the perception of the photograph by the viewer is left out. The corollary of this practice is that it eliminates any traces of the previous trajectories of the photographic object – its entire personal biography. Willumson poignantly summarizes this in a single sentence: "Just as the museum displays enact the disembodiment of the viewer, so exhibition policies enact the disembodiment of the photograph" (2004, 74). He advocates exhibition policies that give space to the histories and trajectories of photographic objects. When we treat the photograph as an organic thing that, like the human body, has its own personal biography, we can address an audience who will recognise this experience as familiar (2004, 77).

So what does Willumson mean, exactly, when he describes the disembodiment of the viewer in relation to the disembodiment of the photograph? Does the disembodiment concern the body of the viewer and his movement as he views the framed photograph on the wall? Or does Willumson try to address the various senses of perception that are receded from optical perception by such displays? Fay Zika, a Greek scholar in philosophy and theory of art, published an essay, 'Tactile Relief: Reconsidering Medium and Modality Specificity' in the *British Journal of Aesthetics* in 2005. Basing her arguments on the term "tactile pictures", theorized by Dominic Lopes, Zika shows how a single medium (in her case painting) may be associated with the sensory content of more than one sense. Lopes's line of argument relies, inter alia, on empirical psychological studies that explore how blind people experience pictures. One study invited blind and sighted people, when blindfolded, to touch drawings and feel the outlines of the drawn objects and landscapes. The researchers discovered that the blind people were able to reproduce recognisable versions of these drawings afterwards, without tuition. It is commonly assumed that sight but not touch can give insight in the spatial properties of the world. Lopes argues that the findings of this empirical study refutes that (Lopes 1997, 428–431). Still, vision, unlike touch, affords a perspectival experience, whereas touch apprehends – albeit directly – only point-by-point parts within space. It cannot present an overview of spatial relationships within a single point of view. For this reason, Robert Hopkins has criticized Lopes's argument in an article written in response, 'Touching Pictures' (2000). Zika, in turn, juxtaposes the two point of views with the intention of refining Lopes's term *tactile pictures.* Her answer lies somewhere between the multisensory, and the multimedia multimodal (Zika 2005, 437).[13]

Zika emphasizes that sight-sensing can activate or evoke other sensory contents, and this leads to a unified experience of the artwork. Her argument aims to overcome the modal singularity of any specific medium (2005, 435–436). The discourse of framing, as criticized by Willumson, excludes, or at least minimizes, the perception of the photographs with other senses than sight. The glass that is placed over the photographic surface becomes the object's surface as the viewer perceives it. Its glassy homogenous plane prevents the viewer from exploring any small undulations or irregularities on the photographic surface. Mounting and framing not only hides the back of the photograph (and in the case of passe-partouts also the edges), it presses the photographic object into perfect flatness between the glass and the back cover. Taking a side-angled view doesn't reveal new insights on the photograph, rather, it brings the light reflections from the exhibition spots into view.

One of the differences between an inkjet print and a silver-gelatin or a chromogenic photograph becomes visible when looking at the surface sidelong under grazing light condition. Whereas the dark image parts of the inkjet print stand out (in contrast to the light parts), the smooth gelatin surface of the photographic paper does not show up any visible differences between dark and light image parts.[14] This clearly discernible disparity between these fundamentally different processes is effaced when framed behind glass. The glass in front of the photograph stands in analogy to the screen in that it renders the photograph's materiality to one and the same outer material configuration. This is not a carrier medium but an encapsulating medium. The picture frame 'absorbs' the body of the photograph by directing all the viewer's attention to its image content. This is why Willumson talks of the disembodiment of the photograph in exhibition policy. Storing and dis-

playing objects and artefacts behind glass automatically contextualizes these works as predominantly visual. When we lose these other forms of information given by the object, which refer to their original cultural context, there is always this risk that the photowork will only be understood on limited terms (Marks 2000, 114–115; Classen 1993, 136). But this is the responsibility of the museum staff, who must find modes of display that on the one hand fulfil the conservational needs of sensitive photoworks *and* on the other hand facilitate the adequate perception of the photowork as a multi-faceted object.

A HAPTIC PHOTOWORK

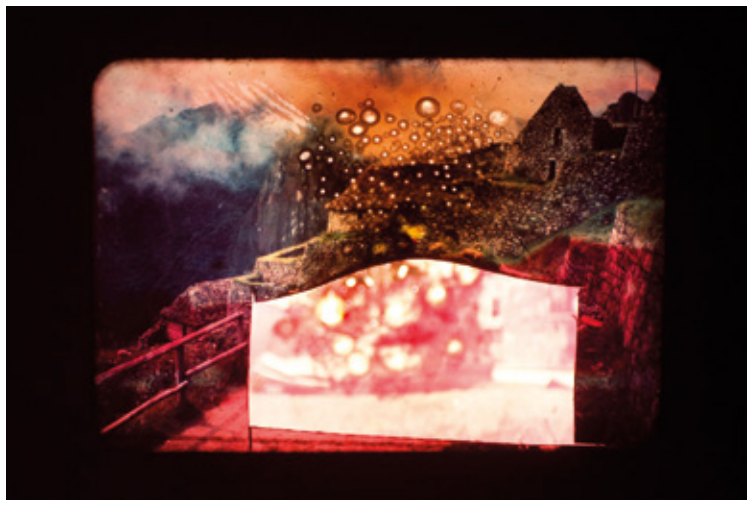
How can/does the viewer's perception pay tribute to the tangible nature of the photowork, given that actually touching it is forbidden? The tactile aspect of the visual realm has been approached as an abstraction by (in chronological order) art history (Alois Riegl), philosophy (Gilles Deleuze and Félix Guattari), and film theory (Laura U. Marks). Here, the haptic is a notion that demands an embodied perception without automatically suggesting physical touch. Instead, the eyes function as organs of touch, establishing a connection between exterior (image surfaces) and interior (modes of feelings).[15] The *haptic*, as discussed by these scholars, is not a synonym for *tactile*, though tactility can certainly be an aspect of the haptic.

Visual culture studies' discourse on the haptic often defer to Alois Riegl's notions of *tactile* or *haptic vision*.[16] Riegl was an Austrian art historian at the beginning of the twentieth century, his influential work explores the complex relations between the hand and the eye in visual experience. Riegl centralises this relationship as the critical faultline between the art of antiquity and the art of the modern world, from the Renaissance on. His analysis addresses ancient depictions of objects as clear material entities, individually delineated and impermeable, and contrasts these representations with depictions from the Renaissance on, in which objects are presented within a unified space. Riegl asserts a connection between these distinct historical perceptions and representations, and antagonism between the (disembodied, long-distance) vision of the optic and the (close-range, tactile) perception of the haptic. He focuses on craftworks such as jewellery, textiles, or architecture; objects that are intrinsically tactile. Mark Paterson outlines the key figures of this longstanding debate within the art historical tradition of the optic and the haptic in his book *The Senses of Touch: Haptics, Affects and Technologies* (2007). My aim here is not to reproduce the various conceptions of the haptic-optic dichotomy as established in art theoretical discourse, but to investigate how scholars in the field of photography have taken up these discussions so that I can assess their value for my approach to photoworks.

I can think of only a handful of scholars (discussed in the previous section – Elizabeth Edwards, Margaret Olin, Tina Campt, Elspeth Brown and Thy Phu, and Geoffrey Batchen) who profoundly elicit the haptic aspects of (vernacular historic) photography. However, in film theory since the 1990s there has been a veritable upsurge in the theorization of an embodied film experience centring on the haptic. Thomas Elsaesser and Malte Hagener rationalise this concern as a consequence of linguistic signification and of the ocular-centrism that dominated previous film theory.[17] In the introduction to their edited volume of photography theory, Brown and Phu ask why photo criticism has been so reluctant to address the feelings and haptics of photography. Their answer is that this form of criticism drew almost exclusively on what they call a methodological "thinking photography". One reason for this aversion to feeling could be that in the 1970s and 1980s "feeling became the collateral damage in the disciplinary war against the often depoliticized incorporation of photographic images into the art historical and museological canon" (Brown and Phu 2014, 3). The circle is closing with Willumson's account of the reception of the photograph as something that has been enduringly influenced by the modernist methodology of exhibiting photography.[18]

As the viewers have internalized an expectation that photoworks will not be touched in exhibitions, their sight surpresses any haptic perception. The question is, can the cognition of the visitor in an exhibition space align with that of the viewer who is immersed at the cinema? One photowork that could act as a bridge between the tangible photograph and the screened film, is the double slideshow projection *Cuts, Burns, Punctures* (2012) by Ishmael Randall Weeks (b. 1976) (fig.2.9). Weeks created a hand-altered mechanism for a slide projector that focuses alternately on the materiality of the photo slides and on the depicted images. He adapted found slides from his home country, Peru, from the 1970s and 80s by burning, cutting or drawing on them. These physical interventions, hurting or disturbing the content of these photographs, were Weeks's personalised response to Peru's history during the period of his own birth and early life, a period of extreme violence in Peru. At the same time, the interventions are more than just critique, as Weeks said in an interview on the occasion of his exhibition *Cuts, Burns, Punctures* at the Drawing Center in New York.[19] The cuts, additions, and burns do not undermine the image so much as they re-articulate it. The removal of information simultaneously brings something new, and this transforms the image. Weeks describes it as investigating a past sequence of events and their visualization so as to produce something different in the present.

This photowork brings the dialectic between haptic and optic visuality to the fore. Weeks's alterations of the slides and the slide projector direct the viewer's attention to both forms of looking. In doing so, he activates a double focus, moving back and forth between a past and a present, to unite and acknowledge two different qualities – the depiction of the sceneries in the 1970s and 80s and his later artistic additions; but also the image and the materiality of the image, also focus and out-of-focus, also opacity and transparency, and so on. When we see the scratches, burns or cuts, the image literally moves out of focus, and when we focus on the image the marks become blurred. The blur replaces every differentiation between textures – whether textures of the materials or of the photographed scenery. When the photographic image is blurred, the descriptive content of the photograph no longer obstructs the viewer's awareness of the photograph as a physical presence. Optical perception more usually privileges the representation of



FIGURES 2.9. Ishmael Randall Weeks, *Cuts, Burns, Punctures*, 2012.
Found slides from 1970s/80s Peru, Double-focus slide projection with hand-altered mechanism.

the image above the material of the image. The tangible quality of this slide-projection series transforms it into something else, an accumulation of haptic images. The film scholar Laura U. Marks has borrowed the term 'haptic' from Riegl, but develops it by focusing in on the viewers' tendencies as they perceive these haptic images: a *haptic visuality*. Although this haptic visuality involves the body of the viewer more than that of a classic optical visuality, Marks asserts that both are active in most processes of seeing, in a dialectical movement from far to near (Marks 2000, 163).

Marks also characterizes a haptic image as one that compels the viewer to reflect on the image itself, as opposed to an image that pulls the viewer into its narrative (ibid.). With *Cuts, Burns, Punctures*, Weeks is posing questions about authorship and communal mentality: how this violent revolution affected past communities, and how it can be perceived through historical writing in the present. The photographic material of the slides invites us to contemplate the visualization and textualisation of historic events. Our attention oscillates between the materiality of the photographic surface and the content of the image, and this continuous reciprocal movement embeds the entanglement of the two sites. Marks goes even further, in her final remarks, to assert that haptic visuality implies an entanglement between perceiver and object, and thereby forestalls any assumed initial separation:

> In revaluing haptic visuality I am suggesting that a sensuous response may be elicited without abstraction, through the mimetic relationship between the perceiver and a sensuous object. This relationship does not require an initial separation between perceiver and object that is mediated by representation (2000, 164).

This is true for film. In *The Tactile Eye: Touch and the Cinematic Experience* (2009), Jennifer Barker proposes that the relation between viewer and film should be regarded as a relationship of intersubjectivity and co-constitution, rather than subject and object (Barker 2009, 12–13).

The viewing conditions for photoworks are different to those of the cinematic experience, to such an extent that I wonder whether it would be possible to make the two situations more similar without transgressing practical safety restrictions. Marks's exposition of *haptic images* and *haptic visuality* is helpful in itself as a way of thinking about the many potential perceptual modes of a photowork. However, the predetermined spatial conditions in which we view a photowork might pose a challenge to the validity of her argument in the context of an exhibition. Maybe we need first to consider whether there is any "mimetic relationship between the perceiver and a sensuous object", when considering the viewer and the photowork? How could such a mutuality between viewer and photowork be achieved?

I propose that the viewer whose body is inactive in the darkened space of the cinema is more susceptible to visual haptic information than the viewer whose body is alert and in a state of awareness. Can we say that the mutuality between viewer and sensuous object, which Marks sees as essential to haptic visuality, also flows through the movement of film and the non-movement of the viewer? Is the viewer's embodied experience, while grazing the film with his/her/their eyes

only, facilitated by physical stasis? And if so, would a haptic visuality in exhibitions demand the reverse: that the viewer moves while the photowork remains static? This would then require the viewers to be aware of their real body engaging with the photowork by moving consciously around and towards it. Choosing various positions and viewing angles, but also choosing how long to remain there. This awareness of one's own moving body in opposition to the static photowork might possibly heighten one's sensitivity to the haptic visuality that is expressed by the image. When we *re-feel* what is photographed, we close the gap between us and the (spatially and temporally remote) image. In film, the camera can zoom in to heighten the impression of texture that contributes to a haptic visuality. When standing in front of a photowork, in contrast, the viewer must physically 'zoom in'. The scale of *Crowhurst II* effectively positions its viewer already in a physical close-up. The work's monumentality is necessary because it enhances this effect, triggering the viewer to move in this way: zooming-in and zooming-out to view the photowork from different distances and different angles. The embodied experience goes hand-in-hand with the immersive.

The Dutch cultural theorist Mieke Bal has written an inspiring essay, 'Exhibition as Film' (2008), in which she considers the scenography of an exhibition (objects arranged in space) as a cinematic effect. The essay reflects on *Partners*, an exhibition curated by Canadian artist and collector Ydessa Hendeles (b. 1948) at Haus der Kunst in Munich in 2003–2004. Bal characterizes it as "the most effective, gripping, and powerful" exhibition she has ever seen. Bal advocates for an exhibition model that cultivates an affective relationship between the viewer and the artwork (Bal 2008, 15–16). After receiving an invitation from Haus der Kunst, Hendeles decided to curate an exhibition inspired by the museum's own history and architecture – it was built in 1937 by Adolf Hitler to display the art that he admired. Across fourteen rooms, she juxtaposed objects in unconventional ways: not following traditional, art historical or cultural discourses, but creating new inflections and dialogues among artworks, viewers, and spaces. The featured art included works by Diane Arbus, Maurizio Cattelan, James Coleman, Hanne Darboven, Walker Evans, Luciano Fabro, Paul McCarthy, On Kawara, Giulio Paolini, Bruce Nauman, Jeff Wall, and Lawrence Weiner, as well as series of photojournalistic images, anonymous vernacular photographs, and antique vernacular objects. Photography was the dominant medium, shown together with sculpture and video. Hence, Bal makes an association between the exhibition presentation of photography as a visual storyboard and the cinematic vision. In order to achieve this affective connection between viewer and artwork, but also among artworks themselves, Bal translates between film and the exhibition space.

In this context of inciting haptic visuality, her example of the close-up best elicits my point. Bal regards the viewer's movement as the kinetic equivalent of a zoom-in, moving from long shot to close-up. "Close-ups *exaggerate* photography; they push realism to its limits, and sometimes beyond, when the view comes so close that the image ceases to be legible, that the grain of the photograph and the grain of the skin become one, whereby the object recedes behind its representation" (2008, 26, emphasis in original). Bal's comparison between the photographic close-up and the viewer's movement through the exhibition space is rooted in Marks's haptic visuality. According to Marks, a haptic work may create an image so detailed that it "pulls the viewer in close", denying the possibility of a distanced view. The result is that the viewer perceives the texture as much as the pictured objects (Marks 2000, 163). In this sense *Crowhurst II* is an excellent example of a *haptic photowork*.

For Bal, close-ups in the exhibition space are abstractions that sever the object from the space-time continuum in which the viewers are moving. "Close-ups immediately cancel the whole that precedes them, leaving us alone, thrown out of linear time, alone with a relationship to the image that is pure *affect*" (Bal 2008, 27, emphasis in original). What initially appears to be a dichotomy (between embodied and disembodied viewing modes) is rather an alternating coexistence. The viewers are affected by a haptic photowork to the extent that they forget the physical surroundings of themselves and of the artwork, *and* are emotionally and mentally touched by it.

FIGURE 2.10. Wolfgang Tillmans, *Stedelijk Room*, 2008/2012. Installation, chromogenic colour prints, inkjet prints, photocopies and tables, various sizes. Stedelijk Museum Amsterdam, acquired with the generous support of the Mondriaan Fund, The Netherlands.

THE 'HOW' OF CURATING PHOTOWORKS

Bal's conception of exhibition as film might offer some response to the rigid methodology of photography exhibition practice as critiqued by Willumson, in which photographic objects are displayed as disembodied images in an exhibition space. Bal's vision moves to the other end of the spectrum of possibility, toward a display that provokes an aesthetic experience based on interaction of the artworks with one another and the viewer. The German photographer Wolfgang Tillmans (b. 1968) has been praised for his self-curated installations in which the presentation of his photographs as objects is as relevant to the curation as the engagement with the viewer's subjectivity. For each exhibition, Tillmans responds to the spatial, personal, and sometimes even political circum-

FIGURE 2.11. Wolfgang Tillmans, *Freischwimmer 118*, 2005.
Unframed archival inkjet print on paper, 291.5×390.3cm. Edition of 1 + 1 AP (AP).
Collection Stedelijk Museum Amsterdam, The Netherlands.

stances of the moment to guide the selection of works from his vast image repertoire, and to determine the size, material, framing, and hanging of the photographs. He replaces the dispassionate displays of Willumson's history with an exhibition form that is in every sense relational. The exhibition space, the photographs, Tillmans himself, and the viewer, are all parts of an affective interplay. As Julie Ault describes in her essay 'The Subject is Exhibition':

> Tillmans's belief in collectivity is reflected in a multiplicity of images as *form*, which engages viewers' subjectivities through multiple points of entry and their navigation of relational dynamics between images. Such configurations encourage active audience engagement and require viewers to identify and project themselves into the visual and ideational world that Tillmans carefully orchestrates (Ault in Tillmans 2006, 127, emphasis in original).

These configurations are not only determined by his choice of images but also by the different means of presentation (fig. 2.10). His palette here ranges from huge unframed inkjet prints to folded photographic paper sculptures in custom-made Plexiglas cases, and much in between. The diverse spatial manifestations of his images uphold the significance of presentation as a layer of meaning that is additional to the images' content. I attend here to Tillmans's engagement with the photographic material, because his careful curatorial orchestration of photographs has been widely discussed. Tacita Dean might not be so well-known as an orchestrator or conductor of her artworks' presentation as Tillmans, but if we pay attention to the various presentational forms she chooses, we can discern a similar attitude to framing her works – one that has nothing to do with conservational concerns. We might think of her vulnerable monumental chalkboard drawings mounted 'naked' on the wall, or the framed photogravures (which materially are so much *less* sensitive than her over-painted and unframed silver gelatin photographs).

Ault invokes an experience of intimacy in the encounter with Tillmans's unprotected photographs. "By presenting photographs unglazed, simply as paper in all its vulnerability, they also function as minimal sculptural elements. This ephemeral, sculptural quality of Tillmans's installations contributes to their effective, intimate atmosphere of trust and respect" (2006, 127–128). The viewers are exposed to the 'nakedness' of the unmounted prints, which, I suggest, can stimulate active engagement as they project themselves into, or identify with, Tillmans's perspective as described by Ault.[20] As theorized by Mieke Bal and Laura Marks, pure photographic material pulls the viewers in close. To gain a visual impression of the photowork as a whole, and to experience the haptic quality of the print, the viewers move back and forth in front of the photowork. In several exhibition catalogue essays, different authors stress the affective intentions and impacts of Tillmans's photographs.[21] When he draws attention to the fragility of the photographic paper, he purposefully invokes the photograph as an "object of charge" (Tillmans). So, how might we align the relation between the charged photographic surface and the affected viewer?

If we want to link the material features of the photowork with an affective aesthetic, we first need to understand the possible range of that aesthetic. Jennifer Fisher, who works on the aesthetics of non-visual senses and display practices, has tried to conceptualize a haptic aesthetic in her essay 'Tactile Affects' (2002). For Fisher, the aesthetic experience is comprised of other modalities beside the visual. Of these modalities, the haptic plays a crucial role because it is at once sensorial and relational (Fisher 2002, 19–20). Fisher uses this form of aesthetic to "[…] clarify the *unspeakable* realms of the non-discursive and non-representational" (2002, 21, emphasis in original). But her positioning of "haptic knowledge-as-affect" (2002, 22) outside of the representational – or at least, as something that is never reducible to representation – makes me wonder whether the tactile quality of photographic material, and more specifically of its surface, belong to the non-representational, or whether they are inherently features of the representation. In her concluding paragraph, Fisher describes haptic engagement with the space-in-between as the locus of affect and becoming (2002, 27). The photographic surface is the very definition of this locus of affect and becoming, at least when considering that the image rises from plain ground. In an interview on the occasion of his exhibition at Tate Modern five years ago, Tillmans has explained how the photograph becomes an object of charge after and during its development. A blank, nondescript piece of photographic paper is "charged"

as it becomes an embodiment of the image.[22] Remind here the concept of the *photograph as charge* that I proposed in the first chapter.

Tillmans's fascination can clearly be seen in the material and images of his abstract process-based photographic works such as the *Freischwimmer* (fig. 2.11) or *Lighter* works (fig. 2.12). When shown together with his representational photographs, these abstract photographs might heighten the viewer's sensibility to the features of the photographic process and material. They bring these conventionally overlooked features of the photographic object into view, and they provide an image for the unsayable: the photographic affective. They incite the viewer's imagination, associations, and feelings, where a purely technical or semiotic analysis could only diminish their powerful abstraction. When Tillmans describes his artistic process of photographing, printing, and hanging, he says that "*How?*" is the key question and answer. This is elaborated in the following extract from a videoed interview that accompanied his 2017 exhibition at the Fondation Beyeler in Basel:

> In fact, it's always about the question of 'how'. And that's something for which there's no language. When we describe pictures, what's in them, it doesn't actually say very much about why the picture is good or interesting or bad. But we have language for speaking about something so we often look for a narrative or say what's in it. But when you ask "What is it that makes the picture special?", then the secret of the piece isn't actually described or explained by what it represents. It's more obvious in the other arts. But in the case of photography, the brain, the eye immediately finds a connection to reality and thinks that the message is somehow incorporated in the reality and in the image. The thing is that the message, if we can even call it that, is actually in the 'how', not buried, but not hidden either, just contained in it. And by 'how' I mean all qualities that determine the nature of this kind of picture (Tillmans 2017).[23]

Fisher, for her part, also states that haptic aesthetics play out as epistemological: they concern *how* we know (Fisher 2002, 20–22). Following Gregory Seigworth's assertion that affect occurs "*outside, before* and *in-between* discourse" (2002, 20, emphasis in original), Fisher situates affect outside any predetermined signification processes. She draws on Freud's use of the term as one that "describes the energy with which people relate to the world through passion, pleasure, desire or pain" (ibid.). She also clearly distinguishes her own haptic aesthetics as based on an "evaluation of sensibility" and "immersive sensory processes", which she opposes to the politics of feeling as described by Lawrence Grossberg (I will come to this shortly). Both Fisher and Tillmans would very probably affirm that modes of presentation are directly correlated with the degree of influence on the viewer's emotions – though both would avoid formulating a literal translation ratio. In the following sentences, Fisher outlines her concern most clearly:

> The rush to signification evident in the above theorizations of affect [of Seigworth and Grossberg] may be seen as symptomatic of how the habits of textual discourse – habitually driven to the closure required to produce meaning – elide a more sustained relational politics, a politics that accounts not only for the evaluation of sensibility, but that can interrogate *how* feelings are felt. And it is precisely at the level of sensorial praxis, I would like to suggest, that a haptically nuanced aesthetic can help clarify the *unspeakable* realms of the non-discursive and non-representational (2002, 21, emphasis in original).

FIGURE 2.13. Wolfgang Tillmans, *Lighter 119,* 2023.
C-print in acrylic glass hood, 61×50.8cm (framed: 64.4×54.4×6.5cm). Unique.

This also explains why it is almost impossible to get a theoretical grip on the affective power of Tillmans's photoworks: it lingers in the unspeakable and non-discursive.

Fisher positions her conception of affect in contrast to Grossberg's notion of affect, which "links an individual to socially articulated moods and feelings in the external world" (2002, 20–21). For Fisher, this notion overlooks the sensorial experience that takes place "within" the individual and is independent of the individual's environment. Later, she argues that Grossberg's conception can still be "fruitfully employed to describe the charge and intensity of an exhibition space or a particular enactment of display culture" (2002, 21). In the context of Tillmans's work, I propose that both notions can help us distinguish between the epistemological and the articulated. When Tillmans discusses the "how" for which there is "no language", this

largely concerns the choice of images that he makes as he photographs: something that, again, can affect a viewer who does not know anything of the story behind the image. Each image stands individually within Tillmans's entire oeuvre (rather than as part of a series). By carefully selecting his images in response to the spatial characteristics of the exhibition venue and to contemporary topical issues, Tillmans's arrangements influence the emotional response of the viewer. He pursues a specific intensity and achieves this through the means of presentation (size, material, position on the wall and in the space). For example, Ault describes how some of his works are framed on the wall in such a way as to emphasize that the photographs are constructed objects:

> Since 1999 he has increasingly presented framed C-prints in his exhibitions, the volume of which is now relatively equal to unframed. Within a single space this combination accentuates the connotations of each device, the paradox of photography, and the ways in which distance and intimacy, conservation and access are all negotiated (Ault 2006, 136).

This certainly aligns with Willumson's argument. Elsewhere, Ault compares the constellation of Tillmans's photographs on the wall to the vernacular forms of a teenager's bedroom, in which "images and things installed floor-to-ceiling, edge-to-edge in order to articulate, claim, and control every inch of space" (2006, 130). Already these two possible connotations of the photograph – as a constructed cultural object *or* as a wall poster expressing personal preferences – trigger different forms of affect. Focussing on the associations between the loose prints and framed C-prints, as they are exhibited together, is one way to get closer to these issues: *how* photoworks speak to us and what makes up their haptic aesthetic.

Ault conjoins these two modes of presentation through the opposing figures of permanence and ephemerality, and of distance and intimacy. She points to the paradox of the unprotected photograph, which is acquired by and installed in a museum whose interests (the print's longevity) are opposed to its very real impermanence. "Unframed inkjet prints are seductive, immediate, and ephemeral. Though reproducible they are not everlasting" (2006, 133). I still remember my first encounter with Tacita Dean's *Crowhurst II* in the exhibition space of De Pont Museum in Tilburg. It happened more than fifteen years ago, at a time when I was not even pursuing a career in photography, let alone researching this haptic experience of the photowork that I still recall with such clarity. Overwhelmed and intrigued, I felt the need to return to the photowork a couple of times during my time at the museum, as it had such a strong presence in space (like the yew tree itself in Crowhurst, I imagine). The fact that it is not framed and that it so immediately throws out its materiality was striking. I could still point to the spot where it was installed on the wall, just at the entrance of the last room, like an opening shot that left its mark on my visual memory.

In conclusion, one of the most evocative visual markers of the tactile nature of the photographic surface is the sign of a fingerprint. This is the remnant of the moment a person has touched the photograph. The various types of fingerprint that can appear on the photographic surface are *indices*, physical signals of gestures of creation (in the darkroom), handling, consumption, or affect. Marks such as fingerprints direct the beholder's attention to the (social) biography of the photograph as a material object, something that has shared and will share *haptic temporalities* with different beholders in different environments throughout its existence. They expand the subject or content of the photograph by adding layers of usage and affection, albeit whilst damaging the photographic surface. Touching the photograph can equally mean being touched by its (subject) matter, which links the physical to the psychic.

And so when we include the body's relation with the photowork, we admit the sensory appreciation and comprehension of the photographic image. Even as the exhibition environment dictates certain behaviours, nonetheless affect can be stimulated through a haptic display that acknowledges the body of the photowork *and* the body of the viewer. Thinking with *Crowhurst II,* the vulnerability of its unprotected surface can pose a threat to its permanence and stability. But at the same time, the exposedness of this *haptic photowork* stimulates an embodied and by that affected experience of perception for the viewer.

ENDNOTES

1
For more background information on the chemical composition of fingerprints, their causes and effects, see the article 'Fingerprints on Photographs' (1993) by Klaus B. Hendriks and Rüdiger Krall.

2
The tripartite book series by the famous landscape photographer Ansel Adams (1902–1984), *The Negative* (1948), *The Print* (1950), and *The Camera* (1980), sheds light on the (often hidden) craft of photography from a photographer's perspective. The series is foremost an instruction or methodology for making photographs and photographic prints, in which Adams addresses both visualization and modus operandi, or craft. Today's darkroom photographers still consult his approach.

3
Mark Paterson's book *Seeing with the Hands: Blindness, Vision and Touch after Descartes* (2016) retraces the conceptualization of tactile imagery and the spatial experience of the blind from Descartes's *Dioptrique* (1637) on. Paterson draws on this history to develop a philosophy of blindness.

4
Batchen refers to another interesting characteristic of the photogram as "a marker of the space between the object and its image, but also the temporal movement (the *spacing*) of this object's placement and setting aside – the very condition of the image's production" (Batchen 2000, 161, emphasis in original). The literal space between the object and its image, which he is referring to, is inhabited, or more precisely, *embodied* by the light sensitive surface. Through the temporary placement of objects on the blank surface, followed by exposure and development, this flat indistinct 'space' becomes a specific 'place'. Yi-Fu Tuan's philosophical differentiation between space and place in *Space and Place: the perspective of experience* (1977) has been brought into the photographic context by Helen Westgeest in 'The Concept of Place in Photography in Multimedia Artworks'. Westgeest looks at artworks that combine photographs with spatial media and considers how this combination affects the experience of place in the photographs. While her case studies are installations with photographs, I argue that her approach can be relevant here in the context of photograms. Like Westgeest, I address the direct though two-dimensional referent of a (disappeared) three-dimensional arrangement of attributes. The exposure of the partly concealed photographic paper literally allocates an image to this particular 'place', the photogram. When this transformation happens, the paper is no longer free of value and can become a place of meaning production.

5
Donald Norman uses the term "perceived affordances", appropriating Gibson's term but adding to it an extension that refers to the human actor, who will perceive and activate only some of the many affordances an object may have. Norman applied the term (in his book *The Design of Everyday Things*) especially in the context of interaction between human and machine, which explains why interaction designers popularized his conception, as he wrote in his revised and expanded edition in 2013.

6
A full bleed layout means that the image exceeds the edges of the page and so there is no visible margin between image and edge.

7
The thorough introduction 'Photographs as objects' is a key source for anyone interested in the materiality of photographs (Edwards and Hart 2004, 1–15). In this introduction, the editors write: "It is through material intervention and presentational form that people mark their own desires on the machine-produced or mass-produced object of modernity, reasserting the user as author" (Edwards and Hart 2004, 14).

8
A short statement by Dean on her mini-collections from fleamarkets accompanies the presentation of her project of overpainted deformed trees for *le point d'ironie* (an initiative of agnès b., Christian Boltanski, and Hans Ulrich Obrist), see http://www.pointdironie.com/in/36/dean_en.html (accessed September 19, 2017).

9
Two scholars from literature and comparative literature studies have established a link between the photograph's material (its texture and grains) and Barthes's idea of the punctum. See Kenneth S. Calhoon, 'Personal Effects: Rilke, Barthes, and the Matter of Photography' (1998) and Anne-Laure Fortin's research.

10
Because there is so little theorization of the haptic dimensions of photographs, Campt bases her analysis of family photographs on two approaches. One is Laura Marks's theory of the haptics of film and video, which deploys critical engagement with the surface of these visual forms in order to study the bodily relation between image and viewer (Campt 2012, 31–33). (I will address Marks in the section on 'haptic visuality'.) The other is the work of Elizabeth Edwards, as discussed above.

11
The condition mapping process of *Crowhurst II* took place on June 4 and 6, 2013 in the paper restoration studio of the Stedelijk Museum in Amsterdam, under the experienced lead of the independent photo conservator Clara von Waldthausen (fig. 1.2).

12
For a profound insight into the history, theory and practice of preventive framing as well as 'artist frames', read Marchesi's analysis and discussion oft he use of frames for one of her case studies, John Baldessari's *Virtues and Vices (for Giotto)* (Marchesi 2017, 167–181).

13
Lopes introduces the term 'tactile pictures' because spatial qualities can be perceived by more than one sense, however, it must be noted that Lopes regards the term 'picture' in a broad sense, namely as a spatial representation rather than purely visual (Zika 2005, 431). As Lopes argues: "Pictures are widely viewed as essentially and paradigmatically visual representations" (Lopes 1997, 427). Zika rightly states that using the term 'picture' for representations of and in three-dimensional spaces can only be metaphorical. As the term 'picture' aligns with vision and the tactile with touch, Zika argues that the narrow sense of the term 'picture' still holds, even with the addition of the tactile sense. She mentions, furthermore, that because Lopes argues that tactile pictures are perceived by vision as well as by touch, a 'tactile picture' would be a flat surface or a painting with visual representational content, that can also be touched. The outcome would be that the feel of its surface would not provide any extra specific information (Zika 2005, 432). Ultimately, Hopkins argues that "since tactile pictures do not 'link up' with tactile experience in the way that visual pictures link up with visual experience, they cannot engage us aesthetically in the same way since they lack the required 'link'" (2005, 428). With Lopes's notion and his criticism in mind, one might wonder whether and how physically touching a photowork could actually contribute to its reception?

14
Although some newly developed pigment ink printers can also spray special transparent finisher ink which alleviates these gloss differentials. Like a varnish, these inks are known as GO, Gloss Optimizers.

15
See the overview given by Campt in the introduction to her second chapter (Campt 2012, 31–33).

16
David Parisi's dissertation 'Touch Machines: An Archaeology of Haptic Interfacing' (New York University, 2008) notes that Riegl swapped the term *tactile* for *haptic* in a 1902 article, following the latter term's coinage by German psychologist Max Dessoir as a field of study adjacent to optics and acoustics. For Riegl, the *haptic* implied an interrelation between perceiver and perceived, whereas the *tactile* implied an oppositional relation with the object (Parisi 2008, 207–208). I will henceforward use *haptic* in my own terminology, to avoid confusion and to maintain a congruent argument.

17
The most prominent figures are: Laura U. Marks, Jennifer Barker, Vivian Sobchack and Steven Shaviro (Elsaesser and Hagener 2010, 126).

18
For further reading, see Kelsey 2015, 249–283; '8. Pressing Photography into a Modernist Mold, c. 1970'.

19
Artist interview conducted by Alex Bacon for *The Brooklyn Rail*, February 2013, http://www.brooklynrail.org/2013/02/art/ishmael-randall-weeks-with-alexnbspbacon (accessed March 10, 2017).

20
Tillmans developed his own method of hinging unmounted prints, in order to avoid any surface touching or obstruction by tape or nails. Whenever a work of his is acquired or exhibited, his studio supplies a meticulous instruction manual on how it should be hinged on the wall.

21
As an example, here are some quotes from different authors in the exhibition catalogue *Wolfgang Tillmans* to his first solo exhibition in the United States in 2006: "[…] his *intensely affecting* and unconventional images of friends and other young people […]" (Robert Fitzpatrick and Ann Philbin, 7, emphasis added); "[…] Tillmans's calculated use of scale, juxtaposition, and placement to determine the physical, psychological, and *emotional effect* of his images" (Molon and Ferguson (eds.), 9, emphasis added); "The reception of his work, particularly in the United States, has been biased toward a celebration of his ability to create *immediately affecting* views of everyday life or searching portraits […]" (Dominic Molon, 37, emphasis added); "The documentary aspect of his work is a secondary effect of the pursuit of *emotional responses* […]" (Russell Ferguson, 69, emphasis added); "Tillmans intends his work to have a liberating, authorizing *effect on people*" (Julie Ault, 126, emphasis added).

22
Tillmans explains his idea of the photograph as an "object of charge" in the interview with Lou Stoppard for *In Camera* on April 10, 2017, 1:31:00 to 1:33:00, https://www.youtube.com/watch?v=MiQKFyvHouQ.

23
Tillmans, Wolfgang, "Wolfgang Tillmans: Interview," Fondation Beyeler, Basel, Switzerland, July 26, 2017, 6:00 to 7:50, https://youtu.be/f9RrmzUXnhA.

Chapter 3

The PHOTOGRAPHIC SURFACE INTERFACING *with* SPACES

FIGURE 3.1. Ger van Elk, *Dutch Grey*, 1983–84.
Alkyd-based paint and varnish on gelatin silver prints on resin-coated paper adhered to a foamcore support, 167.7×167.7×7cm. Kröller-Müller Museum Otterlo, The Netherlands.

Over three decades following the genesis of Ger van Elk's (1941–2014) photowork *Dutch Grey* (1983–84), several visual elements came to the fore that were, initially, neither intended nor predictable. In the early 1980s, Van Elk created an abstract vision of a Dutch landscape by painting and dripping oil-based alkyd paint in several colours on four black-and-white photographs (mounted in a square of a total size of 167.7×167.7cm, two by two next to each other) (fig. 3.1). These new visual elements are striking to the viewer who look at this photowork today, forty years later: orange-brown oxidation and heavy silver-mirroring on certain parts of the black-and-white photographs (fig. 3.2). Silver particles 'inside' the print have migrated, and thus a wholly new, unintended, layer of matter has built up on top of the photographic surface. These moving particles make the viewer aware of the layers of the photograph that lie behind its visible surface – we come to see that the photographic surface is a functional interface. Seeking to establish the specifics of this transformation of the surface, and the effects it has on perception, this third chapter poses the following questions: How does the thickness of the photowork determine the photographic surface? As the photographic surface acts as an interface between substances and spaces, between the visible and the invisible, how does this affect our perception of the photowork? My use of the term *interface* refers back to the original definition of *Webster's Dictionary* in 1882, "a surface forming a common boundary between two bodies, spaces, phases" (as quoted by Seung-hoon Jeong in his book and dissertation *Cinematic Interfaces: Film Theory After New Media* (Jeong 2013, 10)).

Readings in new materialisms and conservation studies are as relevant here, as are texts from media, photography, and art theory. These intellectual contexts are drawn together with my own visual and material analyses of *Dutch Grey* and several other photoworks. The chapter focuses on the deeper material structure of the photowork and aims to extract meanings from the physical constitution and behaviours of the various layers. This aim extends beyond the conventional conception of a photograph, poignantly characterized by French philosopher and art historian Hubert Damisch in his 'Five Notes for a Phenomenology of the Photographic Image' (1978):

> A photograph is this paradoxical image, without thickness or substance (and, in a way, entirely unreal), that we read without disclaiming the notion that it retains something of the reality from which it was somehow released through its physio-chemical make-up (Damisch 1978, 71).

Damisch emphasizes that although we are aware that the photographic image emerges from a physical and chemical reaction, we deny that these substances can influence the image throughout its existence. The reality, as I will show, is that the thickness of the photograph is essential to the appearance of the photographic image throughout its lifespan. The multi-layered photowork, in particular, commands a reimagination of this idea of a flat surface. We need to bring an awareness of the physio-chemical make-up to the dominant and singular understanding of this "paradoxical image", to acknowledge the true thickness and substance of each and any photowork.

I am drawn to new materialism studies as a theoretical framework in which the primacy of matter shapes theories. Political and feminist theorists Diana Coole and Samantha Frost introduce various approaches in their edited volume *New Materialisms: Ontology, Agency, and Politics* (2010). Contributions deal with "changing conceptions of material causality and the significance of corporeality" (Coole and Frost 2010, 2) to theory. This book offers a valuable entrance to materialist thinking and will aid my clarification of the relevance of this approach to my own study. Invisible layers of materials and processes shape the photograph's surface in predictable and unpredictable ways, and this calls for a framework that can affirm "matter's immanent vitality" (2010, 8). When we look at the visible marks of degradation processes on the surface of a photograph, we can explain what reactions and movements might have taken place there – but only to a certain extent and only with some guesswork. Preventive measures (such as the regulation of temperature, light, and humidity in a museum or archive) aim to minimize these 'unintended' material changes. Of course, these regulations derive from conservation science studies and address the sensitivity of the photographic material. However, if we want to get at how the photographic material is entangled with other substances and with the passage of time, new materialisms studies offers a valuable vantage point.

> Conceiving matter as possessing its own modes of self-transformation, self-organization, and directedness, and thus no longer as simply passive or inert, disturbs the conventional sense that agents are exclusively humans who possess the cognitive abilities, intentionality, and freedom to make autonomous decisions and the corollary presumption that humans have the right or ability to master nature (2010, 10).

The first part of this chapter investigates the photographic surface-as-interface as a form of landscape. This is a landscape that unfolds when the photowork is looked at closely, both from the common frontal perspective (as when mounted on the exhibition wall) and from a bird's-eye view (as when the artwork lies horizontally in artists' and restoration studios). I regard the photowork not solely as a vertical image but also as one that is horizontal. In general, the photo itself – digitally printed or chemically developed – comes horizontally into existence either out of the printer, or in the developing and fixing bath. For as long as we regard it in this flat position, it is a processed or worked field of ink drops, silver particles, or dyes on paper. The sides that are usually considered to be the front and back of a photowork can equally then be understood as to be the above and below. This is the context for my attention to the notion and character of the horizon as represented in *Dutch Grey*. The horizon separates the visible and invisible; it is subjected to the position of the person who perceives it, or the other way round: the person's view is determined (and framed) by the horizon. As boundary between the visible and the invisible, I associate the horizon with the photographic surface, which interfaces

between the viewer and the material layers beneath it, especially when tilted. This makes the subject matter of *Dutch Grey* a compelling starting point from which to explore the visible and invisible aspects of the photowork's matter, and our relation to these aspects.

The first section asks how the photowork's surface acts as 'horizon-interface' between visible and invisible substances. I will discuss the horizon as a literal and a conceptual phenomenon, to understand the horizon-aspect of the photographic surface. By taking this approach, ultimately, I can show how my material thinking is closely related to my conceptual and theoretical thinking. Edward S. Casey's *Representing Place: Landscape Painting and Maps* has been especially helpful to my understanding of the general representation of landscape. I am interested in how Casey's approach might be applied figuratively in the context of photoworks to apprehend the geography (surface and depths) of the photowork as a form of landscape. Casey examines how place is (re-)configured through the two practices of painting and mapping. Both practices have shaped my own research – Ger van Elk's 'landscape painting', and the Science4Arts research team's 'condition mapping' of *Dutch Grey* – and I am drawn to Casey's approach because I seek to understand my subject physically as well as conceptually.

During the condition mapping process of *Dutch Grey,* the Science4Arts research team, led by photo conservator Clara von Waldthausen, tried to extract as much visual information as possible on the characteristics and condition of this photowork.[1] All observations are noted and attributed to the relevant part or area of the photowork, hence the term *condition mapping*. The subsequent phase involved the chemical analysis of material samples (including paint abrasions and crystals found on the painted and varnished surfaces) in order to discern their composition in a non-invasive manner.[2] My analysis of this photowork focused on its visible aspects. However, my attention extended across the visible borders of the surface as I worked with conservators and chemist Bas Reijers, all of whom were concerned with the various layers of the image and the possible chemical interactions between these layers.

The second section of this chapter focuses on these invisible aspects of the photowork, depths that are hidden behind or 'underneath' the surface. This is the work's *subsurface*, to borrow a term from geology. I make a theoretical and material approach to this invisible 'inside' of a photowork, in alignment with the concept of the horizon as something that separates the visible landscape from the invisible. One key question arises: how can we relate to the invisible thickness of the photowork? An element that is initially considered invisible could turn out to be visible in the respect that it materially determines surface appearances. The notion of depth plays an important role here, and I consider both the depiction of depth within an image, and the material depth of the photowork. The photo-theoretical concept *blind field* is regarded in the light of the photowork's material, to help us see and understand the entanglement of matter and image. As I renounce the oppositional approach between meaning and matter, I shift emphasis to their intertwining, a process for which feminist scientist and philosopher Karen Barad coined the term *intra-action*. As a prominent figure in new materialisms studies, and with a training in theoretical physics, Barad is particularly relevant in the context of my own work here. Her book *Meeting the Universe Halfway: Quantum Physics and the Entanglement of Matter and Meaning* (2007) appears intermittently throughout as theoretical guideline.

The chapter's third section brings together the spaces of the surface, the interface, and what I call the *extraface*. Whereas the first part of the chapter focuses on the surface's landscape and the second on the invisible interface underneath (the subsurface), this final part brings into play both pictured space *and* viewing space as extraface. Building on previous arguments, the photographic surface separates the spaces of the here-now and the there-then. This last section brings the mediating and interfacing force of the photographic surface to the fore. It is driven by the following question: How does the photographic surface mediate between different spaces and time frames? My treatment ranges across a field of theoretical texts which consider the interfacial character of the surface. These texts come from image and photo theories (Emanuel Alloa and Roland Barthes); and from studies of the materialities of photographs and photo archives (Elizabeth Edwards is the most prominent figure).

The arguments of this chapter cumulatively form a new valuation of the (internal) body of the photograph. This includes the hidden and initially overlooked material thickness that characterises the photographic surface, and therewith shapes our understanding of the photographic object and what it is depicting at the moment that we interact with it.

FIGURE 3.2. Detail of *Dutch Grey,* 1983–84. Silver mirror on photographic surface.

3.1.
THE *Photographic Surface* AS LANDSCAPE

On first seeing *Dutch Grey*, it is difficult to discern whether the four square photographic sheets that form its basis are four separate photographs, or a single photograph that has been cut into pieces. More than half of the image's surface is covered by paint, which obscures the evidence. When looking more closely, the vertical joints of the silver gelatin prints reveal that the single photographic prints are slightly mismatched. The horizontal joints of the photographs, however, are hidden beneath the alkyd paint. Only the upper part of the photowork is largely uncovered, depicting a clouded sky, and a selection of the lower part, showing some details of farmland. So, in theory at least, Van Elk could have constructed this singular landscape by combining separate black-and-white images of a sky and of farmland. This led to question myself: what was it that caused me to assume that Van Elk has created a landscape vision in the first place? Non-figurative overpainting hides more than half of the photographic image and the whole is thereby rendered a hybrid landscape, lying somewhere between abstraction and figuration. Van Elk's applications do not accentuate the vertical line, but he has drawn emphasis to 'a' horizontal line by dripping blue and green paint across the middle of the photowork, around the joints of the photographs. Apparently, the clouded sky, the farmland, and the horizontal line in the middle of the photowork, are sufficient to indicate the vision of a landscape, in combination with the colours he has used (white and blue alkyd on the upper two photographs and dark grey, black, and green on the lower two). He highlights a horizon in his landscape vision and simultaneously obscures any traceable photographic presentation of a natural horizon. In the following, I will demonstrate how Van Elk's recurrent attention to horizons can be understood as a visual entrance into the invisible matter of some of his photoworks.[3]

THE HORIZON IN AND OF THE PHOTOWORK

The horizon of a landscape, an encounter between sky and earth, manifests as two entities. Throughout Van Elk's career, as he highlighted and questioned the phenomenon of the horizon in a range of works, its 'actual' physicality became less and less concrete. The only reference-point for a landscape's horizon appears to be the viewer's position within that landscape. It is then a matter of perspective and perception. Only when photographed or painted can this immaterial horizon materialize as a division line within the image frame. In the tradition of Dutch landscape painting since the seventeenth century, this line has, naturally, been prominent, given the fact that the country is famously flat. As Van Elk undertook deep and long-term research into art history in Los Angeles and in Groningen, he was struck by the paintings of the seventeenth century. They led him, as an artist, to "re-configure, re-compose, re-assemble and re-pair" their genres (portraiture, landscape, and still life) as Jacinto Lageira has formulated poignantly in his contribution to an edited collection of essays on Van Elk (Lageira in Bloemheuvel 2009, 212). Indebted to this historical tradition, but pushing away from simple parody or pastiche, Van Elk worked with and through the artificiality and construction of historical representations. In the same collection, Dutch art historian Carel Blotkamp has characterized these historic paintings as painted collages. The individual elements are composed together in such a way that they create an illusion of reality, as exemplified by the flowers that come together in historic painted still lifes, which would not, in reality, blossom during the same period (Blotkamp in Bloemheuvel 2009, 104). In the painted photoworks, Van Elk 'stitches' separate image elements together and magnifies their interstices to such an extent that the total appearance of a landscape, a portrait, or a still life, is *at once* confirmed and dispelled. His conceptual strategy thereby involves a practice of technique and framing and also a process of image selection. It is difficult to say whether the four silver gelatin photographs of *Dutch Grey* which, in Van Elk's assemblage, make up an imaginative constructed landscape, are individual images of clouds and farmland, or whether they were taken from one and the same situation.

FIGURE 3.3. Installation view of *Hollands Landschap* at Museum Boijmans Van Beuningen Rotterdam, The Netherlands, September 25–November 28, 1999.

Dutch Grey is one of the first (if not the first) hybrid photoworks in which Van Elk elaborates on the phenomenon of the horizon in landscape paintings. When compared to the many photoworks and installations that came after, it is his most subtle work on this subject. In 1999, for instance, upon invitation from the Museum Boijmans Van Beuningen in Rotterdam, Van Elk installed a selection of paintings from the museum's collection as a kind of paraphrase of the Dutch landscape. He hung seventeenth-century land- and seascape paintings side-by-side, so closely that their frames were touching, in such a way that a single horizon line ran continually across them (fig. 3.3). A second group of nineteenth-century paintings was installed opposite, in a similar continuous line – but upside down, disorienting the viewer. Interestingly, Edward Casey has compared the depicted horizon(s) of a landscape painting with the image's frame. Both are physical bounda-

ries that terminate the spatiality of the (represented) landscape while "adumbrating something beyond the immediate presentation" (Casey 2002, 234). As 'landscape' cannot be captured within the restrictive frame of a painting, it is a subjective contemplation on the presented fragment that offers an opportunity to transcend the frame's physical limitations. Van Elk's installation in Museum Boijmans Van Beuningen demonstrates very literally this extension beyond the singular frame. The paintings' horizon becomes the reference point and common outline for this work. Using horizons from the past, Van Elk establishes a new horizon in the exhibition space. In an installation shot, this line appears to coincide with the average eye level, at a height of 160–165cm (the rule-of-thumb when hanging paintings or photographs). One could therefore question whether the horizon or the viewer is the reference point? Or both, in continuous reversal?

In his posthumous book, *The Visible and the Invisible* (1968) (original title *Le Visible et l'Invisible*, 1964), phenomenologist Maurice Merleau-Ponty wrote that the horizon always encompasses the "see-er". The person who perceives the horizon is automatically implicated in that horizon: "he who sees of it and is in it" (Merleau-Ponty 1968, 100). This statement overrides the ontological opposition between viewer and viewed, instead consolidating their entanglement. Merleau-Ponty approaches the figure of the horizon as a means of creating an awareness of one's reflection relative to one's position in the world. He writes: "For it is the horizon of the world that secretly guides us in our constructions and harbors the truth of the procedures of reflection by which we pretend to reconstitute it – a first positivity of which no negation of our doubts could be the equivalent" (1968, 51). He elaborates on this figure in the fourth and last part entitled 'The Intertwining – The Chiasm', taking up Edmund Husserl's thoughts on the horizon:

> When Husserl spoke of the horizon of things – of their exterior horizon, which everybody knows, and of their "interior horizon," that darkness stuffed with visibility of which their surface is but the limit – it is necessary to take the term seriously. No more than are the sky or the earth is the horizon a collection of things held together, or a class name, or a logical possibility of conception, or a system of "potentiality of consciousness": it is a new type of being, a being by porosity, pregnancy, or generality, and he before whom the horizon opens is caught up, included within it. His body and the distances participate in one same corporeity or visibility in general, which reigns between them and it, and even beyond the horizon, beneath his skin, unto the depths of being (1968, 148–149).

Two aspects of the horizon, as it is described in this excerpt, are crucial to my study. The horizon that holds together the visible and the invisible, embodying or (more precisely) representing their entanglement. And the inclusion of the *see-er* (to use Merleau-Ponty's term): his/her/their senses, movements, and (un-)consciousness. Ultimately, Merleau-Ponty argues that there is no single horizon, but many horizons that constitute the framework of our perception and reflection. These horizons (as they overlap) set in motion the interplay between what is visible and what is invisible. More so, for Merleau-Ponty the horizon is the (invisible) backdrop, the ground from which visible figures stand out, and through that, it is what structures visibility, as Gail Weiss explains in her essay 'Imagining the Horizon' (Weiss 2001, 250–251). Her essay pursues an argument concerning the political implications of Merleau-Ponty's conception of the horizon for a liberatory praxis in the context of New Critical Theory, however, in this context she also offers a comprehensible entrance to Merleau-Ponty's "horizonal" thinking. Referring to his essay 'Eye and Mind' (1961), Weiss writes:

> On Merleau-Ponty's account, the painter re-creates the reversible or chiasmatic relationship between visibility and invisibility that she or he experiences on canvas, so that we, the viewers, can become reacquainted with how these relationships structure our everyday perceptual experience (2001, 251).

In this essay Merleau-Ponty takes the painter and his work as a case study, arguing that the painting "[…] gives visible existence to what profane vision believes to be invisible […]" (Merleau-Ponty 1993 [1961], 127). Consequently, the painting embodies a horizon both ontologically and materially. It is then also the canvas (or in my case the photographic surface) that itself manifests as horizon, that which we are seldom aware of and that which, in turn, determines our experience of the (photographic) artwork.

Leaving the realm of the visible, a phenomenological approach to the horizon can be relevant to any hermeneutical situation. The German philosopher Hans-Georg Gadamer uses this concept to create and acknowledge an awareness that our understanding and interpretation always emerges from, and takes place within, a particular horizon which is determined by our prior involvement or engagement with the context, our history. Like the 'natural' horizon, the horizon of understanding is susceptible to change and is never static. Moreover, understanding is the process of a fusion of horizons (*Horizontverschmelzung*), which results from a dialogue between the interpreter and the interpreted. This process never achieves hermeneutical completion, it is as ongoing as the shifting horizon.[4]

The notion of the horizon is a core concept of phenomenology, which in turn intersects with other philosophical traditions. Likewise, the horizon of my analysis is here limited to Van Elk's photoworks, but it links up with studies that offer broader perspectives on this more-than-perceptual phenomenon, such as Saulius Geniusas's *The Origins of the Horizon in Husserl's Phenomenology* (2012). My detour into the meaning and relevance of the horizon here aims at a more thorough understanding of our own subjectivity and position in the encounter with a photowork's thickness and depths. In consequence, we encounter the photographic surface as an interface in the form of this thin horizon line that parts the visible landscape from the invisible beyond.

> [...] Landscape is also a creature of surface as well as depth, of visibility as well as invisibility, of image as well as world, of nature as well as culture. It can be just as well painted as mapped. In addition to being perceived, it can be actively imagined (Casey 2002, 274).

When examining *Dutch Grey* we (the team of paper, painting and photo conservators, the chemical scientist, and myself) viewed the work from many different angles so as to make a thorough observation of its condition. *Dutch Grey* lay on a table in the conservators' space, with the team encircling it as they accumulated many kinds of information, in a non-invasive manner, for the condition mapping report (fig. 3.4). It is likely that the mounted photographs were lying in a similar fashion – flat on a table or on the floor – when Ger van Elk painted and dripped the colours onto them. The team inferred this from the distribution of the dried paint, and the inference was confirmed by a film in which Van Elk is seen at work in his studio creating a similar photowork, with a slightly different title: *Dutch Gray* (1984; 35.5×42.5×162cm) (fig. 3.5).[5] This visual surface analysis was part of a conservation process that is commonly used to identify possible defects at an early stage, and to decide which aspects deserve deeper study and determination analysis. From a bird's-eye view, the photowork's material appearance was studied as a kind of landscape, built up in various layers of photographic paper, alkyd colours, and a varnish. The intention here was to discover 'new' (unintended) features of the work. Anomalies and characteristic marks were detected and then located or 'mapped' in the photowork, in the final report by Clara von Waldthausen. The research team approached the landscape as something that draws attention to what lies beneath, as is poignantly described by Casey in his epilogue:

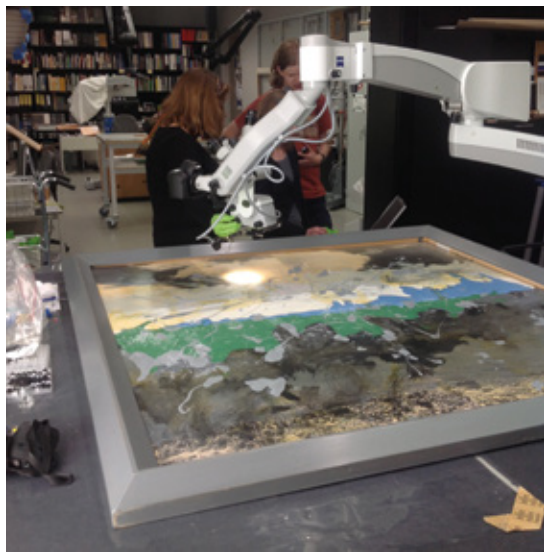


FIGURE 3.4. Condition mapping of *Dutch Grey* in the atelier of the conservation department at Kröller-Müller Museum, Otterlo, Clara von Waldthausen and Bas Reijers, June 4, 2013.

> Rather than expanding outward over the earth and across its very surface, landscape here sinks down into the earth's in gathering depths. As one geographer has put it, "visible landscapes are like icebergs: only a small proportion of their real substances lies above the surface." If landscape as prospect constitutes a world on the earth – on its own double-sided surface – landscape as refuge draws us into the earth itself (Casey 2002, 273).

By underlining the double-sidedness of landscape, Casey presents it as the pivotal point between a world *on* the earth and the inside (*into*) of the earth. This yin and yang of world and earth can also be found in Martin Heidegger's philosophical inquiry, *The Origin of the Work of Art*. This has been a key text for art theory, much discussed and analysed. However, its close bearing on *Dutch Grey*'s subject matter, and on the conception of the photowork surface as a form of landscape, suggests to me a new reading. In approaching his key question – what makes the artwork an artwork (its "work-being") – Heidegger introduces a relation and tension between earth and world. Although in diametrical opposition, in the artwork these concepts of earth and world are both inextricably linked and in constant "strife". World is "grounded" on earth. Earth on one hand "rises up through world" and on the other tends as "sheltering and concealing" "to draw the world into itself" (Heidegger 2002 [1935–36], 26). World is more "in being" (beyond the tangible and perceptible), which he describes as follows:

> Neither is world a merely imaginary framework added by our representation to the sum of things that are present. *World worlds*, and is more fully in being than all those tangible and perceptible things in the midst of which we take ourselves to be at home. World is never an object that stands before us and can be looked at. World is that always-nonobjectual to which we are subject as long as the paths of birth and death, blessing and curse, keep us transported into being (2002 [1935–36], 23, emphasis in original).

The "work-being" of an artwork lies in the fact that it "sets up a world" by "setting forth earth" (2002 [1935–36], 22-24). I am aware that I am walking a fine line by drawing Heidegger into my argument here, for at least two reasons. One is that he does not intend to pair his idea of earth with the artwork's material; the other is that his notion of earth is "essentially self-secluding" (2002 [1935–36], 25). Because of this, an analysis of the concealed (material) parts of the photowork (as is coming up in the following section) would be doubly doomed. Heidegger explains:

> It [earth] shows itself only when it remains undisclosed and unexplained. Earth shatters every attempt to penetrate it. It turns every merely calculational intrusion into an act of destruction. Though such destruction may be accompanied by the appearance of mastery and progress in the form of the technological-scientific objectification of nature, this mastery remains, nonetheless, an impotence of the will. The earth is openly illuminated as itself only where it is apprehended and preserved as the essentially undisclosable, as that which withdraws from every disclosure, in other words, keeps itself constantly closed up (2002 [1935–36], 25).

FIGURE 3.5. Ger van Elk, *Dutch Gray*, 1984.
Paint, plastic, black and white photograph and polyurethane on panel,
35.5×42.5×162cm. Museum Boijmans Van Beuningen, Rotterdam, The Netherlands.

Because Ger van Elk covers the photographs with several layers of alkyd colour and varnish, he obstructs visual penetration into the photographic depiction of a Dutch landscape. That is, he secludes the photographic representation of a landscape by creating a new landscape both in the image and of the material. The photographic depiction is not sufficient to express his idea of Dutch landscape. Covered areas remain unexplained, and exposed areas don't give away much information on place or time. Photographically, the features that rest here are tilled ground and clouds. Earth and air.

Heidegger's notion of the "work-being" of an artwork, coming through the analogy between world and earth, can nonetheless offer a new perspective on Van Elk's *Dutch Grey.* This photowork "sets up a world" by "setting forth earth". The artist expressed his idea, but this vision of Dutch landscape only truly comes into being when it is looked at. The photowork sets up a vision of a Dutch landscape by covering over most of the pictorial and material aspects (and therewith details) of the photographs. To substantiate my claim here, I will make a brief detour into the characteristics and associations of landscape photography and painting, and how the form shapes our perception.

Edward Casey distinguishes between the artist's experience of the landscape painting as a *focus memotius*, something that is remembered first-hand, and the viewer's experience of a *focus imaginarius*, something that can be imagined via the artist's perception and memory (Casey 2002, 82). The commonality between these two *foci* is their subjective nature. However, when we look at Van Elk's photowork, Casey's clear distinction blurs. The artist often goes beyond a mere representation of a landscape he has seen. Even the landscape paintings of the eighteenth- and nineteenth-century predecessors who Van Elk admired were, on occasion, *foci imaginarii* in the sense that they were more 'virtual' – depictions of imaginary spaces rather than remembered places. In this context, in contrast, a landscape photograph looks very much like a *focus memotius* for the photographer (and sometimes also for the viewer), as it refers to a specific locus.

With the invention of photography in the nineteenth century, places and landscapes could be photographically surveyed. David Bate, writing on landscape photography, has explained how this new "photographic vision" created a kind of "scientific realism" (Bate 2019, 125). This led to a new geographical imaginary for mapping purposes, and reshaped perceptions of place, as Hilde van Gelder and Helen Westgeest have explained in the context of "topographic photography" (Van Gelder and Westgeest 2011, 120–121). They also argue that this kind of landscape photography aimed "to turn unknown spaces into familiar places", and for this, the naming of photographs was as essential as taking them (2011, 124). Van Elk's photowork obstructs the photographic presentation of a concrete, specific, or singular landscape so as to express the artist's idea of a greater landscape, given geographical context by the work's title. He is not interested in pointing to a time and place. Van Elk covers most of the silver gelatin photographs' transparent surface, and renders it to opaque ground. When Heidegger refers to the process enacted by an artwork's "work-being", of setting up a world by setting forth earth, he understands the gesture of "setting forth earth" ("die Erde her-stellen") to present the earth as "self-secluding" ("das sich Verschließende") (Heidegger 2002 [1935–36], 25). The *concealing* nature of earth (on Heidegger's terms) is presented mimetically here in the opaque paint that covers the photographs. In that, this combination *reveals* the common ground of the Dutch landscape – its flat horizon – across all kinds of (artistic) visualizations spanning the centuries.

In his epilogue, entitled 'Landscape Experienced and Re-presented', Casey comes to the conclusion that landscape is

> [...] something situated at the intertwining of earth and world: at (and as) their "common outline." [...] Neither as deepgoing or reclusive as earth nor as ascendant or illuminated as world, neither self-secluded nor self-shown, landscape is the pivot of the two together. It is where earth and world meet, their shared surface (Casey 2002, 272).

When I focused on *Dutch Grey,* laid out horizontally on the table, and contemplated its surface as a metaphorical landscape, it occurred to me that this surface was the common outline or interface between the visible depiction (from which this Dutch landscape vision arises) and the invisible matter of the object's substructure. When overpainted, the photographic surface became just one of the many layers that make up the work's material landscape. To picture what I am gesturing at here, think of the bare sedimentary layers of a canyon wall, revealing the strata which (invisibly) form a landscape. *Dutch Grey*'s landscape is an accretion of heights and planes of different colours and paints, all built on top of the photographic surface and covered with a varnish veil. To a certain extent the chronology of Van Elk's colour applications can be retraced by close and deep looking (which was part of the condition mapping process). Using a brush, he first painted a mixture of white and light grey alkyd, then a mixture of grey and black or white and black; and then just white, and finally black. After that he started dripping blue and green paint, then layered dynamic grey drippings all over. Due to the time-consuming drying process of the alkyd paint, one

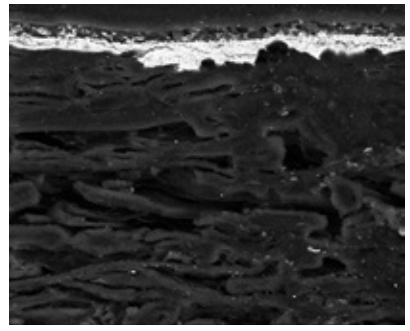
has to infer that spaces of time interposed between the applications of the different colour layers. As one of the final actions, he added a transparent glossy varnish (polyurethane) as finishing layer, brushed and dripped all over the work. This varnish, after years, remains transparent but has now turned yellowish. As we run through this cross-section of the various elements and layers of *Dutch Grey*, it is clear how each contributes to the whole, but in no way do they reflect the photowork individually. In the first chapter of *Representing Place,* Casey underlines that any representation of landscape is a difficult, if not an impossible endeavour, because of landscape's omnipresent and complex appearance. He describes landscape as:

> Composed of particular objects – of animate and inanimate entities, of discrete shapes and colors, of distinctive configurations of many kinds – it exceeds any of them. Indeed, it even exceeds their totality. In this respect, landscape is an instance of what Sartre calls a "totality detotalized" and Jaspers "the encompassing": it is something that, while being experienced as a single whole, is nevertheless not reducible to the sum of its parts (a "totalization") (2002, 6).

In their article 'Photography and painting in multi-mediating pictures' (2009), Van Gelder and Westgeest refer to the argument of the American art historian Douglas Crimp, that picture-making is always a "stratigraphic activity" of multidimensional layering (Van Gelder and Westgeest 2009, 125).[6] Crimp may not intend a literal material interpretation of the photowork's stratigraphic constitution as I do. He considers the "appropriation" of, or cross-reference to, other pictures, as layers of an artwork that lie "underneath" it, or more precisely precede it. Nevertheless, I argue that making a photowork is equally a process of material layering. It entails an accumulation of references to stages, spaces, *and* other images. These sedimentary layers must be considered if not uncovered when we seek to understand the photowork's "structures of signification" (Crimp 1979, 87 as quoted by Van Gelder and Westgeest 2009, 125). This will be the main concern of the next section. These layers usually lie beyond the horizon of our perception, and consequently beyond the horizon of our expectation, as we graze the photowork's surface.

3.2. 'UNDERNEATH' THE *Surface*: THE SUBSURFACE

The surface of the black-and-white photographs is the foundation of *Dutch Grey*'s landscape. However, the matter that shapes this landscape is inherent to the layered depths of this surface, which materially determine and constitute this photowork. The question is, how can we relate to those aspects of the photo(work) which we do not see? Are we inevitably blind to them? I will begin my consideration with the material layers of a silver gelatin photograph. This is always a composite object consisting of at least two essential layers, the support, and the binder. In *Dutch Grey,* the support layer is fibre-based paper, but it can be made of other materials such as glass, polyester (plastic film), or resin-coated paper. The binder layer is the emulsion, most commonly gelatin, which holds the image-forming substance – the final image material – made up of silver particles. If the paper is coated with baryta, this adds a third layer. A baryta layer helps to brighten the image,[7] and also to prevent paper fibre chemicals from transfusing the binder layer. Under the microscope, in a cross-section of these three layers, the baryta layer appears as a white stripe in the middle, separating the paper support from the emulsion layer (fig. 3.6). The photographs in Ger van Elk's photowork have this extra baryta layer and also a fourth layer: the super-coating or overcoat. This is a clear, hardened gelatin layer that lies on top of the emulsion or binder layer. It offers extra protection from physical damage and so it is commonly used for high-quality exhibition prints (for display and archiving purposes).



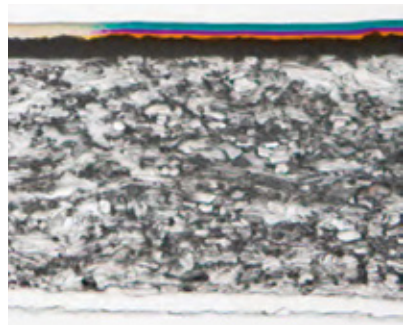


FIGURE 3.6. Cross-sectional micrograph of a silver gelatin print with white baryta layer.
FIGURE 3.7. Cross-sectional micrograph of a chromogenic photograph.

When flipping *Dutch Grey*, during the condition mapping process, we encountered four colour photographs that appeared to be mounted on its backside. These chromogenic prints have been reverse lined, using a double-sided adhesive, to a foam core. On the front, the silver gelatin prints were glued to this core before they were overpainted. The random images of the four chromogenic prints on the verso suggest that they were left over from some previous use of the foam board (fig. 3.8). Apparently, when putting together the basis of *Dutch Grey,* Van Elk recycled this foam board. By tilting and flipping the photowork, we receive here, at multi-angled perspectives on the whole object, a sandwich of multiple layers.

An imagined complete cross-section of *Dutch Grey* (fig. 3.9), which is only indicative, would enumerate eleven layers of alkyd paints and varnish (1–11) and the four layers within the silver gelatin print (layers 12–15), as well as these further (unexpected) layers of double-sided adhesive (layer 16), foam core (layer 17), another double-sided adhesive (layer 18), and the several layers of the chromogenic photographs (layers 19–25; fig. 3.7).[8] As we gain an awareness of the multi-layered object that may linger inside this 'simple' photowork, a question arises: how can we develop a theory that will engage with its invisible thickness?

FIGURE 3.8. Verso of *Dutch Grey*, 1983–84.

FIGURE 3.9. Imagined cross section of *Dutch Grey*: varnish (1), layers of the alkyd paints (2-11), four layers of the silver gelatin print (12-15), double-sided adhesive (16), foam core (17), double-sided adhesive (18), paper base including the backing of the chromogenic photograph (19), solid-liquid interface (20 &21), yellow layer (22), magenta layer (23), cyan layer (24), protective layer (25). Not included are the three thin interlayers with UV absorbers and scavenger between the layers 22 and 23, 23 and 24, and 24 and 25.

As mentioned above, Merleau-Ponty distinguishes between the interior and exterior horizons of things.[9] He bases this argument on Edmund Husserl's conception of the horizon as "a collection of things held together" (Merleau-Ponty 1968, 148–149). In the previous section, we focused on the exterior horizon of *Dutch Grey*. We turn now to its interior horizon, the subsurface. This interior horizon can be addressed via Husserl's thought, as a kind of inner consciousness that reaches out to the exterior horizon that is delimited by the surface. Merleau-Ponty states that the apprehension of a horizon of objective appearances does not prevent Husserl from arguing for a "potentiality of consciousness", a subjectivity that determines the matter of the object (ibid.). In this context a question arises as to whether we can allot any subjective agency to the invisible layers that shape the sensible, objective appearance of a photowork like *Dutch Grey*.

THICKNESS OF FIELD IN THE EMULSION

I take as my point of departure the parts of the silver gelatin prints in *Dutch Grey* that Van Elk did not cover; neither with alkyd paint nor with varnish. These unvarnished islands clearly reveal the degradation of the photographic print. In these places we see the fading of the silver, heavy silver mirroring, or a yellow-brown colouration. The image areas that are hidden beneath and therefore protected by the wooden frame expose this difference in condition (fig. 3.10). They are not oxidized to the same degree as the 'naked' parts of the photographic surface. Technically speaking, the oxidation was caused by the interaction of the (unprotected) silver gelatin prints with oxygen molecules in the ambient air, which caused a new layer of colloidal silver to form on the surface. What we witness is a surface phenomenon but it is one that concerns the whole thickness and consistency of the emulsion layer. How can we understand this interaction between air and silver particles – with the photographic surface as interface – from a theoretical perspective as well as from this chemical point of view?

In *Meeting the Universe Halfway: Quantum Physics and the Entanglement of Matter* (2007), Karen Barad proposes a new way of thinking about causality in which the object/subject differentiation is left behind. Her suggestion can offer an interesting approach, in the context of my study, to our perceptions of markers of degradation. Barad draws on her background in theoretical quantum physics (through the writings of Niels Bohr), and considers the insights of this discipline in the context of her feminist studies and philosophy. She argues that individually determinate entities do not exist (on an atomic level), and introduces the neologism *intra-action* to describe this new way of approaching causal activity. If measured, it is through intra-action that entities can be determined. Barad writes, "I introduce the term 'intra-action' in recognition of their ontological inseparability, in contrast to the usual 'interaction,' which relies on a metaphysics of individualism (in particular, the prior existence of separately determinate entities)" (Barad 2007, 128). Barad does not characterize this intra-activity as a matter of cause followed by effect. It is through the constant intra-activity of air and gelatin surface that the phenomenon of the silver mirror can appear. The gelatin's consistency changes in proportion

FIGURE 3.10. Detail of *Dutch* Grey, 1983–84.
Brown/red colouration of the silver gelatin photograph in comparison to the photograph's edge, usually covered by the frame and therefore not discoloured.

to the relative humidity and temperature of the air (as we discovered in the first chapter). As a corollary, in a hydrolysed gelatin layer the silver ions (of the developed silver grains) can migrate more easily to the surface, where, floating, they react with oxygen molecules. When conceiving the photograph's surface as inseparably entangled with ambient air, we can understand that the boundary between the one and the other is indefinite, because of the gelatin's varying states of porosity.

It will be useful here to recap the idea of the surface as horizon, especially with Casey's characterization of the horizon as boundary in mind. He writes "A *boundary* (in contrast with a strict border […]) allows for the interfusion of both sides, the inside and the outside, of the place or region that it nevertheless serves to delimit" (2002, 123, emphasis in original). The sides "meet" in the boundary. For Casey, the horizon is a type of boundary that is even "more fully" a meeting place, as sky encounters earth. "As such, it is a full-fledged place, a crossroads of the elements in which the elements themselves commingle" (ibid.). Having said this, in the same fragment he contrasts the horizon with the outer framing (of the painting, the map, or in our case of the photowork) – this framing disconnects entities and thereby disrupts the "profound continuum that exists between places that exhibit (on walls), present (on surfaces), or represent (in pictorial space)" (ibid.). More and more, I am tempted to argue that the surface as the visible landscape is

not something that shapes the photowork, but rather something that *is* its inner constitution – its "earth" – everything that lies between surface and backside. Its thickness is relevant to the external appearance of the work and it embodies the 'material depth' that we are looking for.

To understand the impact of the photowork's thickness on this notion of depth, we must return to the emulsion layer and examine the image particles that are spread throughout it. As briefly addressed in the first chapter on visual photographic textures, image particles are stacked on one another to different levels or heights in the emulsion layer(s) and this is what creates an impression of 'film grain'. What is often erroneously referred to as the film grain appears in fact to be the accumulations of silver particles (in the case of a silver gelatin photograph), spread through the full thickness of the gelatin. (This common error is noted by conservator Timothy Vitale in his article on the subject, also covered in the first chapter.) The particles stacked at different distances (in micron) from the human eye can be translated or perceived by the viewer as the grains of the photographic depiction. Consequently, we even can speak of a material depth of field in the gelatin (fig. 3.11), and I call this *thickness of field*. In comparison, ink drops – the image-forming substance of an inkjet print – are evenly distributed on the same level:

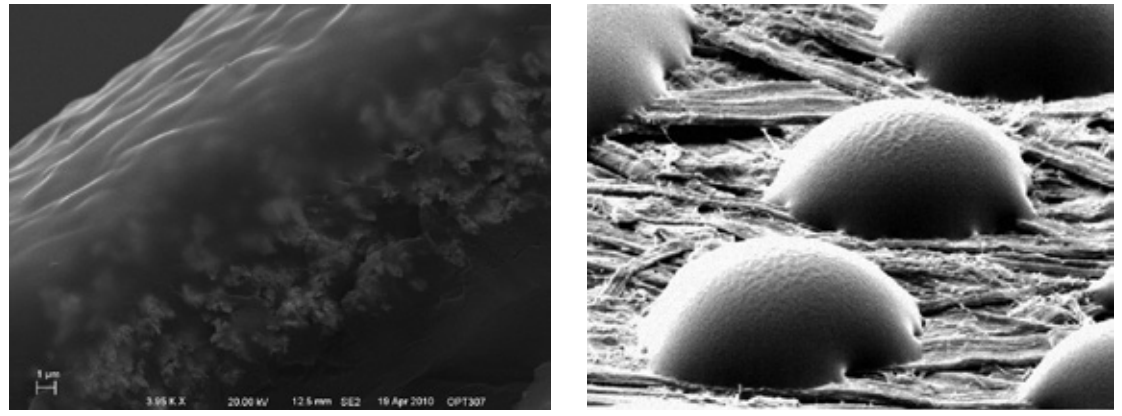


FIGURE 3.11. Silver particles dispersed throughout the gelatin layer of a silver gelatin photograph. OPT407: Electron Microscopy by Shu-Wei Hsu, University of Rochester, Materials Science Graduate Program, Spring 2010.

FIGURE 3.12. SEM photograph of phase-change ink drops on the surface of a bond paper.

on the surface of the paper. An SEM (Scanning Electronic Microscope) image of phase-change ink drops on the surface of a bond paper (fig. 3.12) clarifies this fundamental difference between film- and print-based photos.

When I quoted Damisch at the beginning of this chapter on "the photograph without thickness", I used his notion of a "constitutive deception of the photographic image" (Damisch 1978, 71), as something that separates the image from its substances, so that I could (re-)unite image and substance in the course of my own argu-

mentation. What I did not mention is that Damisch opens 'Five Notes for a Phenomenology of the Photographic Image' with the following description of photography: "Theoretically speaking, photography is nothing other than a process of recording, a technique of *inscribing,* in an emulsion of silver salts, a stable image generated by a ray of light" (Damisch 1978, 70, emphasis in original). Clearly, he distinguishes between his own understanding of photography (as the act of creating an image with the help of photo-chemical processes) and the resulting object as something that presents as a photographic image on the assumption that it is 'stable'. As previously highlighted, this notion of a stable photographic image is highly questionable in relation to the material's lifelong behaviour. Although within the studies of *Bildwissenschaft* there are many approaches to the image as something that appears and can be imagined beyond and therewith independent of its material source, I am doubtful as to whether this understanding can ever be applied to photoworks.[10]

When Damisch describes the photographic event as inscribed light, this event is not very precisely characterized as a process. Even Van Lier takes lacing and engraving to be the photographic themes par excellence (Van Lier 2007 [1983], 15). Engraving implies that something is cut or chased into a surface. Photo-graphy's suffix, deriving from the verb *graphein* (writing, γράφειν), is inherently misleading, suggesting as it does that light leaves a mark *on* the surface. Even if we regard the emulsion layer as the photograph's actual surface, the light's 'marks' are left *within* the gelatin. Hence, it is not the photographic surface that displays the image, but the emulsion's layered depths.

BLIND FIELD IN THE DEPTH OF THE PHOTOGRAPH

The photograph's thickness appears to be crucial to image display, but how does this material depth actually determine the image? One could argue that this microscopic *thickness of field* is beyond the human visual range and should therefore be considered invisible. Even with that, how might our theoretical approach take on its material awareness? The concept of the *blind field*, which has been widely used to address the invisible parts of a photograph, can be useful for us here. *Blind field* (originally *champ aveugle*) is an expression that first appeared (in the photographic context) in Roland Barthes's *Camera Lucida*. It refers to that which takes place in the spatiotemporal surroundings outside the photographic frame. Barthes draws on an article on cinema and theatre by André Bazin, in which Bazin describes how the character who has left the visual field of the camera can continue 'to live on' in a hidden part of the setting. At first glance, Barthes argues, the photograph does not offer the continuity with the world beyond the frame that Bazin describes (Barthes 1981, 55–57). A few years later, film theorist Christian Metz described the blind field as a "projective off-frame", that is, a product of the imagination – the viewer's subjectivity "dreaming the shape of this emptiness" (Metz 1985, 87). In his essay 'Photography and Fetish' (1985), Metz describes the photograph as "[…] the 'in-frame,' the abducted part-space, the place of presence and fullness – although undermined and haunted by the feeling of its exterior, of its borderlines, which are the past, the left, the lost […]" (ibid.). He claims that the off-frame in a photograph can never come into the frame, it is forever excluded. Metz's conceptualisation of the off-frame implies that the blind field cannot be found *in* the photograph and this has led to further interpretations of the off-frame as the space *around* the photo (Van Gelder and Westgeest 2011, 38; 125), or as that which invites the viewer to "re-install" the isolated photograph in a spatiotemporal continuum (Scott 1999, 163; 191). In contrast, I seek here to extend the off-frame dimension of the blind field into the very depths of the photograph itself, and into the material *behind* the photowork's surface –thereby reconceiving the blind field as a physical part of the photograph that is present in its own invisible matter.

Van Elk's *Conclusion* series (2008–2012) can clarify the point I am making here, though these photoworks are not comparable (technically and/or materially) to *Dutch Grey*. For this series, Van Elk almost entirely overpainted rectangular canvases on which colour photos of urban and rural landscapes had been printed. He chose a monochrome acrylic colour for each photowork, which derived from the palette of the respective photo. The photographed landscape can be seen only from the sides of the canvases (where the stretched textile is folded around the edges of the wooden frame), and in some cases in a

FIGURE 3.13A. Ger van Elk, *Conclusions I - New York "Dark Grey"*, 2008. Acrylic paint on photograph on canvas, 96×102×4.5cm. Grimm Gallery, Amsterdam, The Netherlands.

FIGURE 3.13B. Detail of *Conclusions II - Vejer de la Frontera "Blue"*, 2008. Grimm Gallery, Amsterdam, The Netherlands.

small stroke on the front (figs. 3.13a & b). Van Elk's conception, or rather, his interrogation of the concept of the painted horizon, is embodied here on the surface of these photoworks. A monochrome layer of paint literally and physically lies between the photographed landscape and the exhibition environment. If the term blind field is usually applied to the borders of the frame and everything off-frame, here, by contrast, the image as a whole is a monochromatic void, while the sides designate a sense of place by revealing parts of the photos.

This conversion relocates the blind field to the centre of the canvas. The paint refers to the subject matter (through the choice of colour), but what is more prominent is that it conceals the photo. This 'present absence' of the photo is what gives rise to my extension of the concept of the blind field into the (invisible) dimension of the photowork's thickness and depth. The argument is equally valid for *Dutch Grey*.

Barthes's blind field has been mostly considered in relation to the framing of the photograph as the 'around'. It stands for the invisible scene just beyond the picture frame, which can encompass almost any direction – except the depth of the photograph, as this particular field appears already to be evident in the photograph, it arrests attention and draws it away from the 'behind' (of the photographed objects as well as of the material). My extension of the term blind field relates to how the image is embedded in its spatiotemporal context, but it also acknowledges this material continuum. It directs attention to a different form of spatiality and temporality, one that emerges as meaningful for the image and must be sought in the photograph's depicted depth and in the material thickness of the photograph.

When Merleau-Ponty delves into the depths of a painting in his essay 'Eye and Mind' (1964) (original title 'L'Œil et l'Esprit', 1961), he names the subject of his enquiry the third dimension. Though he and Edward Casey both refer to the depicted and suggested depths of a painting, their discoveries take different paths. Merleau-Ponty comes to the conclusion that depth itself is not visible in the picture:

> I see objects that hide each other and that consequently I do not see; each one stands behind the other. I see depth and yet it is not visible, since it is reckoned from our bodies to things, and we are [as Cartesians] confined to our bodies. [...] I do not really see depth or, if I do, it is only another *size*. On the line from my eyes to the horizon, the foreground forever hides all the other planes, and if on either side I think I see things staggered at intervals, it is because they do not completely hide each other (Merleau-Ponty 1993 [1961], 133, emphasis in original).

The depth is obscured by the foreground, which I understand in this context to refer to (the horizon of) the painting's surface. Merleau-Ponty does not perceive physical depth, only size, and he describes the picture as a flat thing. In contrast, Casey explains how external and internal horizons bring the viewer's attention to the things they enclose (as does the frame) by creating a "framed depth". He describes the entire scene as:

> [...] it includes the various internal horizons that surrounding objects constitute vis-à-vis a thematized object around which they are arranged. Such discrete horizons create a nonrecessive depth in relation to this focal object. They are lateral in status and in this respect resemble the frame of a picture – only now the frame is *inside* the pictorial space as a whole and creates a special form of framed depth (Casey 2002, 235, emphasis in original).

Merleau-Ponty implies that depth is not visible in the painting as it is inherently framed and flattened by the foreground. Casey, in contrast, argues that depth *is* represented, along the many other horizons within the plane of the picture. He does not arrive at the conclusion that the painting's surface can, itself, be seen as a horizon. Nonetheless, in the preceding 'Interlude' chapter, he ascribes *place* to the surface: it is "the place of the painting itself", which exists as a "third thing" between the actual landscape and its representation (2002, 121). His treatment here will have my full attention in the last part of this chapter.

Merleau-Ponty comes to the conclusion that any depth exists only between the spectator's participation "[...] in a Being without restriction, first and foremost a participation in the being of space beyond every particular point of view" (1993 [1961], 134). To discern depth, he takes into account the viewer's presence as a participant within the environing space. The position of the viewer in relation to the *Conclusion* photoworks is crucial if we are seeking to describe what is actually seen: either a plain square with a rippled textured canvas (up front), or a photo printed on canvas (from the side). The viewing position, which is dependent on moving from one side of *Conclusion* to the other, exposes how the (indeterminate) horizon comes into being with and through the variable position/participation of a viewer in space. In an upfront encounter, the monochromatic colour field is 'our horizon'; stepping aside, we become aware of our horizon shift (*Horizontverschiebung*), and in so doing we become aware that the canvas' surface is itself a horizon.

In the *Conclusion* series, a monochromatic picture plane flattens perspective, while the indicative photographic sides invite the viewer to take a sidelong look. From there, the painted front appears as

a line of division between the photowork and the exhibition space – it is the photowork's horizon. Despite its abstractness, the horizon of the *Conclusion* series appears more concrete than that of *Dutch Grey*. However, the same effect is present in *Dutch Grey,* with the difference that here, the painted surface layer is not only the horizon of the photowork, it also (because it depicts a horizontal line) prevents the viewer from discovering other possible (physical) horizons. For example, we have the individual borders of the four silver gelatin photographs, some of which disappear below paint within the assembly of materials – think of Casey's comparison between the frame and the horizon. *Dutch Grey*'s painted horizon renders its viewers blind. We use the midline, where blue and green paint converge, to deduce that there is another midline running in the same place across the concealed photographs. As we do this, we 'fill in' the blind field of the photographs, which lies underneath the paint layers and we assume a relation or continuity between the photograph and its overpainting.

What we assume to be invisible to us – the interior horizon of *Dutch Grey* – forms the exterior horizon of the photowork to such an extent that we cannot characterize it as invisible so much as a matter of our own blindness: an unawareness of the photograph's status as an inherently multi-layered object whose *thickness of field* actually creates what can be seen in the image. The intra-action (between the inside and outside of the photowork) that I have demonstrated is continuous with the spaces and times of the *extraface*, that which encircles the photographic surface and which is subject of the next section.

3.3.
THE PHOTOGRAPHIC SURFACE AS *In-Between*

The purpose of this last section is to distinguish between *what* the surface interfaces with (which spaces, places, periods, persons, understandings, and so on), and *how*. I turn here to the photographic surface as the focal area for the viewer of a photowork. This surface is in relationship with the original image source (views of Dutch landscapes, photographed by the artist), with Van Elk's paint additions, with the viewing space, and with the viewer. The photograph is touched throughout its whole existence, sometimes more indirectly and metaphorically, sometimes directly and physically, as the first two chapters have explained. My attention shifts now to the *extraface* – the space(s) in which all these interactions happen. As a broad subject that is worthy of an entire dissertation in and of itself, I limit my study here to the extraface of *Dutch Grey*: that which surrounds and surrounded its surface. This concerns foremost the different physical spaces that designate particular periods and moments, but I also bring in the pictorial spaces of figuration and abstraction. The question arises: how does the photographic surface mediate between these different spaces and timeframes? And what are the consequences for our viewing perspective?

THE EXTRAFACE: HERE-NOW AND THERE-THEN

The material world of *Dutch Grey* begins with four silver gelatin prints, or more precisely, the negative(s) of those prints. As these silver gelatin prints are only encountered behind or underneath layers of paint, it is tempting to receive the photographed landscape fragments as though from a distance. They emerge as something that is 'there', while the abstract overpainting, which shares our space, is 'here'. The mediating capacity and character of the photographic surface once again becomes apparent when we detail this tension between absent and present spaces as it manifests on the interface of that surface.

In a paragraph on indices and indexes, Van Lier describes how "[a]ll photographs effectuate a terrible tension between what is near and what is distant, between the present and the past" (Van Lier 2007 [1983], 19). His argument points to the moment when photons hit light-sensitive film in relation to the moment that the photograph is viewed. The former moment is when the indices, which refer to their cause through "*monstration* and *demonstration*", are created. Although he does not delineate in detail the difference(s) between the two, he argues that "[…] the monstration effected through the photograph is simultaneously *facial* and *distant*" (ibid., emphasis in original). Both the surficial and the referential character of the photograph are addressed here. As his wording is again very particular, I include the whole fragment here, so as to avoid distorting his argument.

> […] the facial and physical character of the imprint-index makes something appear, but at the same time its characteristic distance removes me from it: it is not some thing that has touched the film but only photons that have touched this thing and the film, thereby only remotely and very abstractly linking both (ibid.).

Van Lier retrieves an experience of the "bifurcation of space (being there, not being there)" from this near-and-distant encounter with what is on the photograph, and this, in turn, leads to a "bifurcation of time" (ibid.). As the painted colour fields already prevent any full view on the photographed landscape, this experience of "not being there" is intensified in my case study: we cannot even access the focal subject(s) of the photographs.

So we can picture Van Elk coming face-to-face with the photographs' surfaces, and painting many successive layers onto them, sometimes with drying intermezzos. These overpaintings then literally become part of the viewer's physical space, as they were part of Van Elk's space in his studio. Visually, the painted additions take over the horizontal reference of the photographed landscape, without ever being absorbed as figurative presentation. The last layer of the drippings, applied in liquid form and allowed to harden while the photographs lay flat on a table, retain a particularly marked three-dimensionality and tactility – generated through the mixture of (visual) fluidity and (dried, material) rigidity. Given the form of the drippings, I argue that this painted abstract relief triggers an experience of spatial immediacy, whereas the photographs underneath can be characterised by their spatial anteriority. Considering the tradition of photography's close and longstanding theoretical relationship with indexicality, the addition of paint presents here a new indexical referent: the "*having-been-here*" of

the artist. The physicality of the paint and its reference to his movements descries how he leaned over the photowork during composition, his stance that is analogous to the viewer's frontal position when facing it. Whilst we do not share the same space, we inhabit the same hereness as we stand before *Dutch Grey*.

This aspect of my argument calls for a deeper exploration of Barthes's original and widely cited indexical characterization of the photograph: his *noeme* of photography as the "*ça a été*" – the *that-has-been*. Barthes's early formulation of the photograph as "an illogical conjunction between the *here-now* and the *there-then*" is found in his 'Rhetoric of the Image' (1982, 44, emphasis in original). In line with Van Lier's conception, quoted above, Barthes's essay names the doubled experience of temporal and spatial awareness that arises when we look at a photograph the "*having-been-there*", "[…] for in every photograph there is the always stupefying evidence of *this is how it was*, giving us, by a precious miracle, a reality from which we are sheltered" (ibid., emphasis in original). In the same passage he explains that photography brought us a "new space-time category: spatial immediacy and temporal anteriority" (ibid.). *Dutch Grey* interrogates this conception because its paint pushes the photographic depiction and surface (to the) back to such an extent that we can hardly speak of the spatial immediacy of photographs here – rather, we are confronted by their spatial anteriority. The photograph's immediacy is overwhelmed by the physicality of the paint additions. And it could shift again, in a prospective future, as the paint starts to crackle or expels crystal efflorescence. This, of course, is what has happened to *Dutch Grey*, as has been studied by Bas Reijers.[11]

Years later, Barthes adds an interesting nuance to his *noeme* of photography in *Camera Lucida*. He aligns the *that-has-been* with the "Intractable"[12], and refers to the etymological source of its Latin translation "*interfuit*" (meaning it was between). In the context of my understanding of the photographic surface as the pivotal interface between spaces, this is striking. Barthes writes:

> The name of Photography's *noeme* will therefore be: "That-has-been," or again: the Intractable. In Latin (a pedantry necessary because it illuminates certain nuances), this would doubtless be said: *interfuit*: what I see has been here, in this place which extends between infinity and the subject (*operator* or *spectator*); it has been here, and yet immediately separated; it has been absolutely, irrefutably present, and yet already deferred. It is all this which the verb *intersum* means (Barthes 1981, 77, emphasis in original).

Barthes hauls the photographed scene into the viewing space by aligning the spectator's position with that of the camera operator. I argue, conversely, that they do *not* converge because there is a different, 'extra' physical distance between spectator and the photograph (or photowork). This would be different if the viewer was looking at a photograph through the viewfinder of a stereoscope, or through a film negative viewer. Through these mediated interactions, the physical environment of the viewer vanishes in the dark and the image alone is backlit. An added distance, interposing between the spectator and the photograph/-work, is the critical difference here. In the earlier essay, 'Rhetoric of the Image', Barthes distinguished between the pure "spectatorial consciousness" of viewing a photograph, and the more projective consciousness on which (moving) film largely depends (Barthes 1982, 44–45). He argued here that the "temporal equilibrium" of the having-been-there diminishes the projective power of the image: "[…] the *this was so* easily defeats the *it's me*" (ibid., emphasis in original). During the seventeen years between 'The Rhetoric of the Image' and *Camera Lucida*, he revised this understanding of the photograph, coming to believe that it was a phenomenon which had greater projective power than he had asserted in earlier work.

Our conception of the photographic surface as 'being between' (not *interfuit*, but *interesse* as it sustains presence now and in the future) holds in view the inaccessibility or, as Barthes would say, the intractability, of the photographed scene: that which was in front of the lens at the moment of capture. We can only witness the photographer's vision in a very distanced way, we cannot emotionally claim to inhabit or share the same hereness with him/her/them. In brief, I do not depart from Barthes's earlier characterization of the photograph as something that portrays a subject's having-been-*there*. The physicality of the photographic print, and the viewer's alignment towards it, determine it as a remote, anterior, and therefore abstracted space. This emerges in stark contrast to the concrete, almost tangible corporeality of the colour drops on the photographs of *Dutch Grey*. Here, the viewer encounters a double inversion: the figurative becomes abstracted and distant, whereas the abstract becomes concrete and present. Still, our perspective on the photowork is limited to its frontal appearance in relation to different times and spaces. How can we complete this vision by including the backface as a real and equal part of *Dutch Grey*'s extraface?

THE BACKFACE AND -*Space*

Van Elk expanded the notion of the horizon into the third dimension by 'spatializing' the flat picture plane of the many photoworks he made between 1984 and 2014 that depict the Kinselmeer, a lake in the north of Amsterdam (fig. 3.16).[13] He created a series of Kinselmeer waterscapes, each of which used two separate long strokes of overpainted photographs. The first photowork entitled *Kinselmeer* (1984) (fig. 3.15a) was made in the same year as *Dutch Grey* and, despite *Kinselmeer*'s long, stretched form, the two works share some interesting characteristics which place them in direct relationship with one another.

Whereas in *Dutch Grey* the horizontal joint is covered by paint, Van Elk counter-staggers the two photographs of *Kinselmeer,* piecing them together in such a way as to emphasize a horizontal cut. Physically, the two strokes that comprise the image only 'meet' at the very midpoint of the central axis of the photowork, while ascending and descending away from one another between the vertical sides of the frame (fig. 3.14). In these photoworks, then, the physical separation of the two photographs literally 'opens' spatiality between surfaces, versos, and frame. Thus, the back-and-forth gesture of the counter-staggered mount invites reflection on the spaces that surround the photographic surface – its extraface – while the surface comes to the fore as the 'in between'.

FIGURE 3.14. Detail of Ger van Elk, *Untitled II (Kinselmeer)*, 2013.
Retouched with ink on colour photograph between plexiglass, 47×90×5.5cm.
Grimm Gallery, Amsterdam, The Netherlands.

In the 1990s, Van Elk started to use different photographic and framing techniques for his *Kinselmeer* series, however, he retained this practice of reverse mounting the two image halves through the years to come. This aesthetic act opens the space between the image parts, invoking an awareness of the intangible and evanescent character of the horizon as a concrete place between the two expansive elements of water and air. However, the physical splicing of this horizon portrayal does not converge with the natural division of water and land in the photographs, nor does it match the horizon between sky and earth. As with *Dutch Grey*, we can understand this to emphasize the nature of the horizon as a representational convention and perceptual phenomenon. We are preconditioned to perceive the unity of the waterscape, however, it is in fact a composite of two separate images here. Upon closer inspection, the upper and lower parts of the work may even not derive from one single photo, but from two different perspectives, assembled or juxtaposed.

Emanuel Alloa's essay 'Seeing-as, Seeing-in, Seeing-with: Looking through Images' (2011) differentiates between three given modes of vision. Alloa's terms can be useful for us here, as we seek to understand the different spaces of *Dutch Grey* and how they are bundled together in perception to form an all-encompassing whole. Alloa, a philosopher, pays tribute to previous discourses of modes of viewing (artistic) images, as shaped by prominent figures including Ernst Gombrich, Richard Wollheim, and Nelson Goodman, and through subsequent interpretations by Alloa's contemporaries. He makes his own contribution to the tradition in the proposal of a notion and practice of "seeing-with". The second part of his title, 'Looking through Images', refers at once to the transparency claim of images as windows, and to his proposal that images can offer potential visions. The familiar theoretical concept of *seeing-in* disregards the material configuration of the image because it activates a perception that focuses foremost on pictorial space. In contrast, Alloa's *seeing-with* does not single out one formal or figural aspect but rather offers an inclusive mode of seeing. "In other words, we do not only see *in* images, rather seldom *as* images, never *despite* them but always *with* them and *through* them" (Alloa 2011, 186, emphasis in original). Further on, he explains what "seeing-with images" means to him.

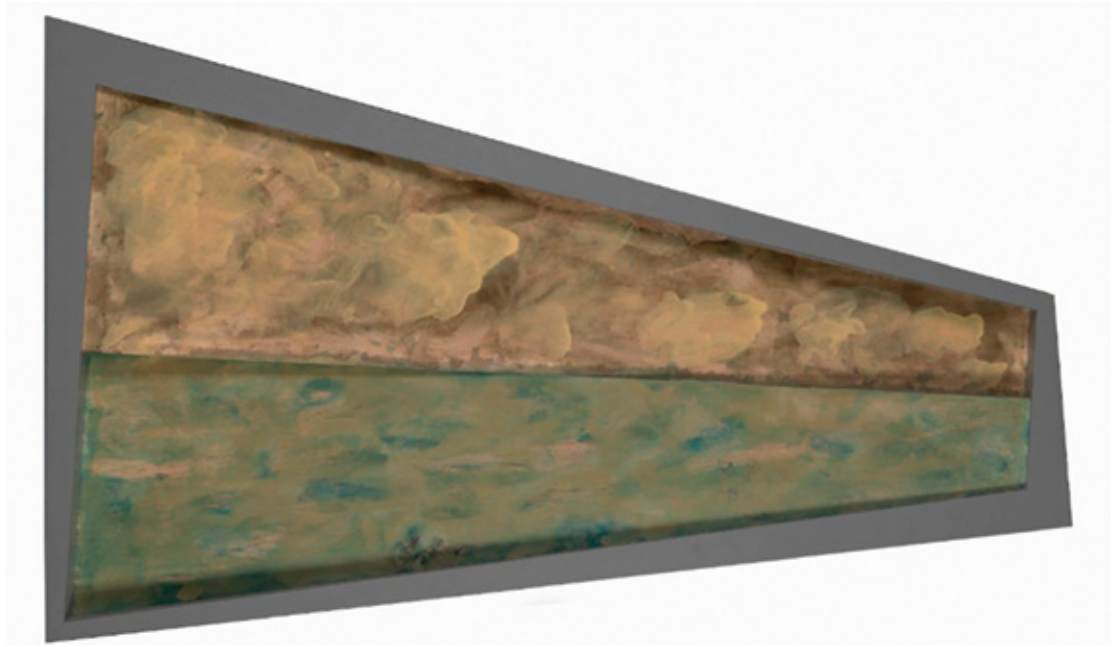


FIGURE 3.15A. Ger van Elk, *Kinselmeer*, 1984.
Gelatin silver print, paint, varnish, 104.5×175.5×6.5cm with frame.
Museum De Lakenhal, Leiden, The Netherlands.

> [...R]ather than being neutral surfaces of the beholder's projection, images *generate* gazes that, although never ultimately fixed, are by no means arbitrary. The form of the image, its figural organization, its material ridges, dales and crests, open up a space for potential vision (2011, 188, emphasis in original).

Van Elk's *Kinselmeer* works can generate a gaze that initially perceives classical horizontal waterscapes, in spite of all the artist's gestures of deconstruction: the abstract over-painting; the bisection (or more precisely assemblage) of two photographs; the reprinting of retouched photographs as glossy Cibachromes (in the later photoworks); and the perspectival framing. The unifying force is so powerful that several illusions are sustained in this deconstructed image, though their combination instils an unsettling sense of confusion. At second sight, the viewer becomes more aware of these disruptive elements. Where can our perception alight and rest? The depiction, the frame's perspective, the splice between the photographs? The interplay of these elements interrogates genre, as well as the viewer's perceptual expectations when he/she/they approaches the photowork on the wall.

The spatialization of a flat picture plane is one of Van Elk's artistic concerns, and it creates an experience of reciprocity between pictorial and actual space, as the curators of the exhibition *Broken landscapes: Ger Dekkers, Jan Dibbets, Ger van Elk, Jaap van den Ende* (2014–2015) have argued (Von Berswordt-Wallrabe et al. 2014, 95). But which characteristics can be attributed to (actual) environing space, and which to pictorial space? Is this bivalent distinction really viable, or are the elements intertwined to such an extent that we are really talking about another form of intra-action? In the *Kinselmeer* works, the back-

FIGURE 3.15B. Ger van Elk, *Kinselmeer,* 1985.
Information on material and technique not available, 185×292×12cm. Stedelijk Museum Amsterdam, The Netherlands.

and-forth bending of the two strokes belongs to the actual space (which is in itself a changing variable). The photowork's divergent angles cause the photographic surface to interfere with the viewer's space (in front), and also with the backspace between photowork and (gallery) wall. As I have shown, the accumulation of material layers in a photowork can be described as its obscured *subsurface*. I turn now to the obscured backface of the photowork: the behind, a mixture of backface and backspace.

The gap along the horizontal centreline of the photowork refers the viewer to the space behind the photowork. As a pictorial and spatial reference, it tempts us to look and think beyond its horizon. Without losing myself in thorny questions concerning what is inside or outside, intrinsic or extrinsic to the *Kinselmeer* works, I argue that the photographic surface would not mediate physically between front-space and backspace of the photowork, if the two strokes did not spatially divide the canvas in this way. So what can be said about this backface and -space of the photoworks and of the photograph? The example of *Dutch Grey*, which has several other photographs on its backface, reveals how new revelations can occur when we flip the canvas. Unfortunately something like this can only happen under the supervision of conservators, either in a storage space or in the atelier, but never in a public space. Often called the *verso*, I use the pun *backface* because it brings connotations of its own potential *as* a face, as it moves into the limelight now.

FIGURE 3.16. Ger van Elk, *Het Kinselmeer (Stompe Toren Bij Ransdorp)*, 1996.
Reversal film of ink retouched colour photo on Cibachrome, set in perspex, 76×145cm including frame. Van Abbemuseum, Eindhoven, acquired with support of the Mondriaan Fund, The Netherlands.

I have already mentioned and analysed the social biography of a (photographic) object (whether artistic, reportage, documenting or vernacular), in the second chapter in the context of *Crowhurst II*. Since the beginning of the twenty-first century, with the material turn in photography studies, this narrative concept has become a subject of particular interest for academics, as has been outlined by Costanza Caraffa in 'Photographic Itineraries in Time and Space', a contribution to *The Handbook of Photography Studies* (2020) edited by Gil Pasternak. The social biography of a photograph is often best deciphered on the backface which could bear, for example, the artist's signature, the photographer's wet studio stamps, captions, a date, or other identifying marks (fig. 3.17). However, many further non-photographical indexicalities can manifest on the verso. Steven Manford, a Man Ray specialist, describes the treasury of forms that he encountered in a book dedicated to the artist's versos:

> On the back of a Man Ray photograph one might find: his handwriting, signatures, monograms, grease pencil marks, pricing notations, customs and collector stamps, exhibition labels, dealer inventory numbers, handling, framing, and mounting instructions, glue stains, fingerprints, mount board remains, mount tissue, retouching instructions, registrar's notations, handwritten letters, printer instructions, dedications, directional notations, cropping marks, certifications, random

FIGURE 3.17. Verso of a Man Ray photograph of the 1930s.

numbers with circles and dashes, and of course the stamps: originals and copies, lifetime and posthumous, in pink, blue, purple, red, black, bold or faded, or embossed (Manford 2022, unpaged).

This extensive list of traces testifies to the 'multiple lives' that a photograph can have as it travels through many hands and spaces for different purposes. This passage is central to Julia Bärnighausen's dissertation, which studies photographs as travelling objects that circulate through various routes, accumulating traces of their journeys and so retrospectively becoming their own itineraries (Bärnighausen et al. 2019, 33).[14] Unfortunately, the backface is rarely presented to the public in photography exhibitions. I can vividly remember the handful of versos that were included as framed photo-objects in a travelling exhibition on the oeuvres of the two Magnum photographers Robert Capa and Gerda Taro (produced by the International Center of Photography), which I mounted and co-curated in 2009 at the Nederlands Fotomuseum (Rotterdam). These versos caused a personal revelation. To me, the (in)scribed itineraries of some of Capa's and Taro's most iconographic images were as mesmerizing as the image content. These surfaced backfaces had an astonishing sense of immediacy. Accumulations of stamps, inscriptions, cropping and retouching notes (written by news agents and editors, if not the photographers themselves), all gave insight into the works' biographies, and a glimpse into their "photography complex". This is a term and concept coined by James Hevia in 2009 and I will attend to it in the last section, where I focus on this relational characterisation of the photographic surface as something that inter-faces not only between times and spaces but also with multiple persons (and beliefs).

In 1971, Ger van Elk created another photowork in which he literally represents and disrupts conventions of display by exhibiting a photograph of the backface of Pierre Bonnard's 1917 painting *L'Estérel* to the public (fig. 3.18).[15] The verso of this historic painting holds a couple of stickers that refer to its exhibition history. In exhibition, Van Elk hung a mirror on the wall facing the verso of the photographed painting verso. Through the tilted, juxtaposed hanging of the photowork, we see in the mirror the reflection of a photographic reproduction of Bonnard's painting. What, then, do we *see with* (in Alloa's terms) Van Elk's *The Return of Pierre Bonnard, 1917–1971* (1971)? We see that the backface, just like the front, is a surface that can offer insights into the encompassing processes of visualization and framing (in the broadest sense). It exposes how a viewer's interaction with Bonnard's painting, and by extension other artworks, is framed by the viewer's expectations and by institutional decisions. Naturally, this often leads to a one-sided view, merely scratching the surface of the artwork. Today, when most images lack a back (a device's back doesn't count), I argue that we need to be more alert to, and suspicious of, the "regimes of visibility" to which we are subjected.[16]

FIGURE 3.18. Ger van Elk, *The Return of Pierre Bonnard, 1917–1971*, 1971 [Reprint 1999]. Information on material and technique not available, 52.5×60.5cm. Stedelijk Museum Amsterdam, The Netherlands.

An equivalent regime that applies to photographs and photoworks held in archives and museum collections involves the approach to the photograph's surface. Reproductions and digitalisations are seen as valuable alternatives to deteriorating images – and as solutions to overflowing archival in-trays. For almost twenty years now, this perception has been critiqued by scholars in the field of material (photography) studies. Joanna Sassoon's 'Photographic Materiality in the Age of Digital Reproduction', in the edited volume *Photographs Objects Histories* (2004), is one key text (as is the edited book as a whole, and other publications by Elizabeth Edwards). Sassoon explains, that "[i]n this new digital context with its concomitant focus on image content, institutions are redefining the key features of the photographic object" (Sassoon 2004, 196). She refers to Patricia Hayes (known for her contributions to the critical analysis of colonial photography), who claims that this shift in thinking and handling contributes to "a massive dehistoricisation and decontextualisation, which, if it had occurred with documents, would create a massive scandal" (ibid. quoted from Hartmann et al. 1998, 6). Focusing exclusively on the photograph's surface in reproduction or digitalization processes means losing the object's many material and contextual layers, of which the backface is one of the most valuable and potentially informative. Sassoon therefore views the "translatability" of a photograph as highly questionable in her comparison between the photographic object and its digital referent (2004, 198). She comes to the conclusion that a most appropriate understanding is "[…] to consider a photograph as a layered laminated object in which meaning is derived from a symbiotic relationship between materiality, content and context" (2004, 199). In that sense it is never a superficial image, nor a passive object (2004, 210), but a "dynamic object of the present" (Geismar 2006, 556 as quoted by Caraffa 2020, 90). Even when held in an archive or museum collection, it continues to acquire contextual biographical information as it travels back and forth between archival disclosure and public exposure, or between collection storage and management. I will consider this latter example more extensively in the last section, as it arises naturally in connection with arguments here on the backface. The fluid transition between the three sections of this chapter shows how they are open to one another and closely linked.

From the foregoing discussion, it is easy to see that the photographic surface is far from the only mediator between times and mediums, within any process of image transfer (whether digitisation or reproduction). It cannot alone do justice to the complexity of photographic objects. There are many layered accumulations on the backface – inscriptions, annotations, stickers, and stamps – each with its own origin, testifying to different spaces and times. These accumulations can "give a glimpse into the mental and visual 'laboratory' of the art historian" (Caraffa 2011, 32). To Caraffa's art historian, I would like to add the conservator, the registrar, the archivist, or the artist. Picturing the backface of *Dutch Grey*: we see a coloured assemblage of two studio portraits and two fragments of images (of a taxi driver and a taxi window reflecting New York), all joined by a wooden cross for stability (fig. 3.8). We might infer that this verso refers to the artist's laboratory (the process of making the photowork), because this is not typical visual imagery for Van Elk. However, as he plays with conventions of representations, displays, horizons, versos, and rectos, we must remain alert to what we see. The two pairs (the upper taxi photographs and the two portraits) do not even relate with each other stylistically, and so we might assume that the images choices were made for practical reasons. It could even have been a mounting assistant or photo-lab specialist who used or suggested the reuse of these chromogenic prints to back *Dutch Grey* – we simply do not know. Von Waldthausen, in her condition mapping report, suggests a pragmatic explanation: that the back mount of the four chromogenic prints could have been chosen as a stability measure, to prevent the silver gelatin photographs on the front from pulling or arching. Furthermore, three paper stickers on the frame recount the artist's name, the title, year of origin, scanning codes, and technique, and the inventory number is written directly on the wooden frame.

Research has been conducted on photographs that are neither framed nor mounted and where additional information has been placed directly on the back. Studies investigate how these processes might affect the object – and particularly the surface – through ink migration or fading related to glue application. 'Marking Photographs: The Impact of Ink Stamping Practices' (2007), a research report by conservators at The Metropolitan Museum of Art, gives a sense of how an ink stamp, applied to mark the museum's ownership of a newly acquisitioned collection of 8,500 (precious) photographs, interacts with the objects. From what I could find, the only negative impact of the application of adhesives to the verso was a result of the application of animal-based glue, used in the mounting of photographs, rather than sticker applications. The damage was caused in places on the surface behind the glued area, where severe image fade occurred (Norris and Gutierrez 2010, 232–233).

There is, of course, a self-evident difference between photographs that were initially intended as documents for scientific research (for art history, archaeology, anthropology, et al.), and artistic photoworks held in art collections. However, the central argument here is valid for all: they are layered objects with a surface, a subsurface, and a backface all telling their biography, which needs to be considered and preserved as well as the other areas.

INTERFACING WITH CHANGING VIEWS

Having considered *Dutch Grey*'s surface (3.1), its sideface and subsurface (3.2), and its extraface (including the backface), what remains for me to consider in this section is the meaning, or meanings, of this photowork as *inter-face*. As I frequently use the term *interface* to describe the photographic surface, I need to clearly define what, precisely, I mean when I use this term. At the very beginning of this chapter I briefly referred to an original definition in Webster's 1882 dictionary: "a surface forming a common boundary between two bodies, spaces, phases", found in Seung-hoon Jeong's book *Cinematic Interfaces: Film Theory After New Media* (Jeong 2013, 10). While this definition resonates with my discussion, it is not my concern here. In his own introduction, Jeong poses several key questions that will structure the book,

two of which are "what is interface?" and "why interface (theory)?". His responses offer a condensed overview of various interpretations of interfaces. 'Humanities Approaches to Interface Theory' (2011), an article by the American book artist and visual (design) theorist Johanna Drucker, offers similar guidelines. Both authors refer to the prevalent application of the term *interface* as a communication boundary in computer science since the 1960s, concerning Human-Computer Interfaces (HCI), or interfaces between hardware and software (Jeong 2013, 3 and Drucker 2011, 1). However, they also introduce many other examples, including the notion of *cultural interface* which corresponds most directly to the general drive of this section.

In the previous two sections, interaction between viewer and photowork was instrumental to our focus on the extraface of the backface and the space(s) it inhabits. As the backface has granted a first insight into the social biography of the photowork, this section will now unfold and expand the photowork's different relations through its production, presentation, and conservation. Interfacing with many different actors, the photowork is subject to technological advancements, tastes, (systemic) beliefs, decision makers, personal and institutional motivations, among other things. Through these encounters we can see it as an interface that ultimately, at the end of the chain, inter-faces with a viewer, without necessarily revealing the network behind it. Media theorist Lev Manovich's broad notion of the *cultural interface* points at all kinds of material devices such as books, cinema, or frame culture, that shape our cultural interactions (as described by Jeong 2013, 4). The cultural interface is therefore automatically a social interface. It represents and organizes knowledge, filtering information, generating communication relationships, and influencing our daily lives (ibid.). As such, I want to conceive of the interface of *Dutch Grey* "as a dynamic space of relations, rather than as a 'thing'", to borrow Drucker's characterization (Drucker 2011, 3).

In concrete terms, *Dutch Grey* entered the museum network in the 1980s, when it was purchased by the Kröller-Müller Museum in Otterlo, the Netherlands. The museum's *Search the Collection* web page displays it without its grey frame and it is double-tagged here as belonging to the collection of 'paintings' and to the 'twentieth century' (fig. 3.19). All of the museum's other works by Van Elk are presented online in close-up installation shots that include a possible frame or framing device.[17] Of these, the photoworks which have roughly the same composition as *Dutch Grey* (over-painted photographs of one form or another) are either attributed to the paintings collection, or to the collection of works on paper – but never to photographs.[18] The online presentation of, or more accurately reference to, *Dutch Grey*, can be considered as another form of interface with which the viewer can engage. This triggers critical questions concerning how this photowork was assigned these visual and textual characteristics. How and by whom is it shaped? And conversely, how does this ultimately influence our relation with this photowork? To highlight the urgency of my point here, I want to include an apt if more general description of interfaces from Drucker:

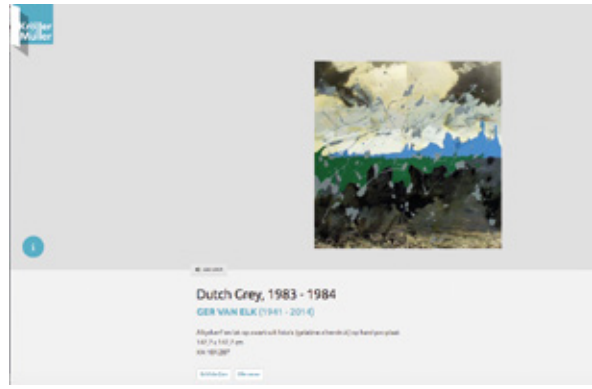


FIGURE 3.19. Screenshot of the "Search the Collection" webpage of *Dutch Grey* by the Kröller-Müller Museum, Otterlo, The Netherlands.

> The surface of the screen is not merely a portal for access to something that lies beyond or behind this display. Intellectual content and activities do not exist independent of these embodied representations. Interface, like any other component of computational systems, is an artifact of complex processes and protocols, a zone in which our behaviors and actions take place. Interface *is what we read* and *how we read* combined through engagement (2011, 9, emphasis in orginal).

There may be a simple explanation for why Van Elk's photoworks are characterised as part of the painting collection, but the decision has disastrous consequences for the photographic material. In the past, (photo)works by Van Elk were perceived as conceptual art, and therefore, logically, acquisitioned by the curatorial department of paintings and sculpture. In the book *Fotografie in het Stedelijk* (2009), which reflects on the history of the photography collection of the Stedelijk Museum Amsterdam, former curator Hripsimé Visser discusses this conundrum. Her account of the Stedelijk Museum can exemplify the institutional categorization of *Dutch Grey* (and many other works) as painting – as the problem pertains to many museums beyond Visser's subject. She explains that the Stedelijk Museum aligns its collection policy with the artist's own conception of his/her/their practice. The intention is to move beyond restrictive modernist categories, to address the hybridity of art forms – the different forms that can present themselves in a single work. Where the artist regards him/her/themself as painter, though working almost exclusively with photographs, his/her/their artworks will be held in the storage space for paintings (Visser 2009, 175).[19] Visser concedes that the museum attached such importance to this policy that it completely disregarded the specific conservational needs of artworks (ibid.). Its rigid policy has led to the serious photographic degradation of some of Van Elk's photoworks, including the striking discolouration of *Russian Diplomacy*, the case study in my last chapter. Van Elk's photoworks were (and are still) held for over thirty years in conditions appropriate for paintings, but in no way generative to the conservation of silver gelatin photographs or chromogenic photographs, which demand much cooler storage space.

The Stedelijk Museum occupies a special position as the first museum of modern art on the European continent to collect photography. It started acquiring photographs in 1958, taking direct inspiration from the Department of Photography of The Museum of Modern Art in New York, instituted in 1940. In consequence, photography inhabits an important role at the Stedelijk Museum. There are cooled storage spaces specifically designed for the conservation of photographs. Other art museums, such as the Kröller-Müller Museum, cannot offer this. Collecting photographs is a young endeavour when compared to the collection of other artistic disciplines. Moreover, the scientific study of photographic archives and collections, and the academic discipline of photography conservation, have only really emerged since the millennium – they are still evolving.

The photograph as collectable object is remarkable for several reasons. Here I will pick out the most prominent three. First, as Elizabeth Edwards describes:

> Photographs are the only class of museum object that is simultaneously a collectable item (a significant object) and a tool of management (used to record and present objects within the museum from conservation reports to websites), whether we are considering the 1860s or contemporary uses (Edwards in Bärnighausen et al. 2019, 68).

This double presence of photographs within a museum is interesting, as in some cases the status of certain photographs has shifted from categorization as documentation material to categorization as object. Edwards therefore writes of the "fluidity of the collection" (ibid.). In this fluidity, the photograph manifests as something that interfaces with different approaches throughout the years. A Stedelijk librarian, Louis Kloet, was the initiator of the museum's photography collection – in the beginning, the museum saw their photography holdings as belonging to the basic range of tasks of the library and documentation department (Visser 2009, 104). Kloet initially chose to organize the photographs on card indexes listing the subject-matter(s) and the photographer's name. Visitors to the reading room would have access to these cards and could use them to request the photograph for study (ibid.). Over time, Kloet collaborated with the museum's director Willem Sandberg to develop a system in which photographs were mounted on cardboard and subsequently on aluminium plates which could be attached to the exhibition wall with suction cups (2009, 108). Photographs could be stored in the archive or exhibited like this, without needing passe-partouts or other framing media. Nevertheless, this approach involved the collection and exhibition of the photographic *image* – not so much of a photograph as an object. To return then to Edwards's description of "the museum effect" (Edwards 2019, 70), we can see here how institutional decision-making creates a certain way of seeing the photographs by making, translating, and consolidating them into a particular kind of object (or document). Caraffa warns us of the "uncertain status of photographs in museums: objects? documents? artistic statements? mere information?" (Caraffa 2020, 91), as an epistemological uncertainty that puts them very low on the hierarchical ranking of museum values.

The second remarkable trait of the photograph as collectable object is that a photograph, or more precisely, a photographic image, can pass through multiple lives as it exists across several collections, taking on different dimensions and materializations. One example involves an experiment that was conducted in the context of MoMA's research project Object:Photo (see also chapter 1). Ten image pairs of duplicate prints were selected from two American photography collections (The Thomas Walther Collection at The Museum of Modern Art, and the photography collection of The Museum of Fine Arts, Houston), and carefully compared with each other. Paul Messier's article 'Image Isn't Everything: Revealing Affinities across Collections through the Language of the Photographic Print' (2014) offers a profound insight (both visual and analytical) into the process and the discoveries of this comparative analysis (fig. 3.20). Most pairs revealed manifold variations: in cropping, colour, size, title, and even dating. One of the researchers' concerns was "whether or not the paired prints share the same or a substantially different material history, and thus were the product of different intentions on the part of the photographer" (Messier 2014, 2). Messier concludes that

FIGURE 3.20. The prints of five identical or very similar photographs in the collections of the Museum of Fine Arts, Houston (left), and The Museum of Modern Art, New York (right). Shown to scale. In "Image Isn't Everything: Revealing Affinities across Collections through the Language of the Photographic Print" by Paul Messier, 3. New York: The Museum of Modern Art, 2014.

> [...] the basic visual characteristics of a gelatin silver paper can be used to reveal shared material histories of prints across collections. The similarities observed and measured through this work remained discoverable despite impacts of natural aging, deterioration, and possible conservation treatment, all of which can alter highlight color, gloss, and possibly surface texture (2014, 10).

Here he addresses how differing conservational circumstances and treatments can lead to differences between prints that were initially produced to be "similar" objects. These marks refer the viewer to the prints' different itineraries through spaces and convictions.

The third remarkable feature of the photograph as a collectable object is its ontological potential for (technical) reproduction. The potential to reproduce the image lasts for as long as the negative is available, and often also for as long as there is a photographer or artist, or an appointed proxy, who can give consent. This is the case despite the many considerations that mitigate this potential in the context of collection and conservation management. Monica Marchesi's dissertation 'Forever Young: The Reproduction of Photographic Artworks as a Conservation Strategy' (University of Leiden, 2017) critically analyses reproduction potentiality both theoretically and practically, drawing on her professional background as a conservator. When considering the interfacial character of the photowork in this context, what consequences do protective measures such as those as studied by Marchesi have on the photograph's itinerary through time and space? Can this itinerary be said to end when the photograph is replaced by a new print? The question confronts us with the vulnerability of the photowork as interface, not solely as material, but also in its engagement(s) with decision-makers.[20] Sometimes, a reproduction is realized, as with a photowork that Ger van Elk produced for the Stedelijk Museum, *C'est moi qui fais la musique* (1973), or his photo sculpture *The wider the flatter* (1972, reproduced in 2007), now held in the Kröller-Müller Museum (and critically discussed by conservator Sanneke Stigter in an article 'To replace or not to replace? Photographic material in site-specific conceptual art', 2005). In these cases, reproduction techniques differ from the original processes to such an extent that we must speak of a new object with a new itinerary. The 'old' discarded photowork, if retained by the museum, continues on its itinerary as an archival referent, hidden from public display. As Marchesi writes, it undergoes a "[...] subsequent demotion of status from artwork to archival reference" (Marchesi 2017, 260). In a coda, she recounts the history of a set of reproductions of works by Dutch photographer Rineke Dijkstra that originated as chromogenic prints in the 1990s and have now being reproduced as inkjet prints. As part of her practice, Dijkstra often chooses to have the original discoloured prints of her works destroyed in her own presence, however, Marchesi suggests that "[i]n the event of the reproduction within a museum setting, she might contemplate the possibility of the original versions being kept as documentation" (ibid.). Keeping a photowork in the dark of the archive might be preferable to its complete annihilation. But in light of my treatment and appreciation of the photograph as object versus as document, the irony speaks for itself.

These three facets of the photograph as interface, in a network of changing collection and conservation strategies, offer incontrovertible testimony to James Hevia's *photography complex* as something that extends beyond the photograph's genesis and past influence to reach into its present and future. Although his argument concerns documentary photographs of the Boxer-Era in China (1900–1901), the photography complex has become a theoretical landmark in the study of photo archives and archived photographs, and it is equally appropriate for photoworks in artistic contexts. For Hevia, the photograph is "a kind of metonymic sign of the photography complex in operation" (Hevia 2009, 81). Any Latourian-inspired actants (human or nonhuman) who contribute to its shooting, production, dissemination, and preservation, are contributors to its photography complex. All these elements of the photography complex become necessary when we seek to extend the (often very limiting) tripartite appellation of the process: photographer, camera, and photograph. They posit "a more intricate set of relationships" (ibid.).

Jeong, in his introduction, suggests that the window can be regarded as "a primal, primitive, precinematic interface that invites the viewer to pass from inside to outside" (Jeong 2013, 5). With photography's transparency claim in mind, the photograph is often aligned with the window. I would tend to have reservations about this comparison. But thinking of how the photowork (and its surface) mediates between many spaces, times, and relations, it might help to consider it as this window interface. The content 'behind' moves with the changing environment and the person who looks at it. Jeong describes the modern view of the window as an analogy to seeing: "[it] sheds light on the physiological interaction between the observer's body and the street's commotion" (ibid.). And as Emmanuel Alloa has proposed, the photographic object offers us potential visions. When we *see-with* the photowork, in its all-encompassing appearance, there is always the possibility of an ideal vision, where the viewers discern new horizons – those of the photowork's very personal itineraries – as they look.

To summarise, then, the image we see on a photograph is not so much a surface phenomenon, but rather the result of our perception of the accumulation of miniscule image particles, stacked over one another on different levels *within* various gelatin layers. This stacking happens across the entire thickness and consistency of the emulsion layer, constituting a material *thickness of field* that creates the image of any and every analogue photograph. The applications that are made to a photograph in a photowork (paint, other photographs, or even (back)mounting) will contribute not only to the photograph's thickness but also to its temporal layering. While the photograph bears a visible reference to a particular past situation, the hybrid additions trigger other temporalities, ranging from the creation process of the photowork right up to the present moment in which the viewer confronts the work. These temporal strata are always linked to the spaces in which the photowork's biography is inscribed.

Whereas the surface of a photowork is manifestly unique (like a painting's surface), the photographic surface is also unique –

even when considering multiple prints from the same negative – as I have demonstrated in the course of this chapter. Both the photograph and the photowork register, interiorize, and exteriorize, all their temporal and local circumstances. The inside was never invisible, but we need visible outer phenomena, such as photographic degradation, to open a more comprehensive perception of photographic sediments. In the next and final chapter, I will suggest how we might adapt our perception to apprehend the clues given by our mutative photographic material.

ENDNOTES

1
See the detailed report '*Dutch Grey* Condition Mapping' by Clara von Waldthausen, June 4 and 6, 2013.

2
This can be read in the third and fourth chapter of Bas Reijers's Ph.D. thesis: 'How to Preserve Photographic Artworks for the Future: Chemical and Physical Interactions and Implications for Conservation Strategies' (University of Utrecht, 2017).

3
Several exhibitions were dedicated to Van Elk's concern for the horizon, including *The Horizon: A Mental Perspective* at Van Abbemuseum, Eindhoven in 1999, *Search for a Horizon* at Museum Boijmans Van Beuningen, Rotterdam also in 1999, and *The Horizon and Beyond* in 2015, at Van Elk's gallery, Borzo in Amsterdam.

4
For further reading on Hans-Georg Gadamer's take on the phenomenological concept of the horizon, see the section '3.2 The Happening of Tradition' of the entry on Gadamer on the webpage of Stanford Encyclopedia of Philosophy, first published March 3, 2003; substantive revision August 22, 2022, https://plato.stanford.edu/entries/gadamer/ (accessed August 7, 2020).

5
Visser, Jeroen, "Ger van Elk, kunstenaar," 1986, 16:39 to 18:08, https://vimeo.com/104600912 (accessed December 27, 2020).
Framed in a grey-coloured wooden frame, similarities form an association between the two works (same subject, similar materials used), but with the latter, Van Elk is more obviously toying with perspective: he uses an asymmetrical frame. While the overpainted photowork consists of two parallel mounted rectangular strokes of silver gelatin paper, the frame is moulded in perspective. On the right, the width of the frame is much wider than it is on the left. This creates a perspectival impression, as though the viewer was peering via a side-angled view while standing directly in front of the image. It creates an unsettling visual effect by provoking a question over which perspectival reference point to take: the horizontal line of the Dutch landscape, or the side-view suggested by the framing? It seems impossible to take in both at once – as with the famous duck/rabbit image, initially published in the late nineteenth-century humour magazine *Fliegende Blätter* and later used by Wittgenstein, in which we see either a rabbit or a duck, but never both.

6
Crimp calls for the uncovering of these "strata of representation" for the following reason: "It is in this sense that the radically new approach to mediums is important. If it had been characteristic of the formal descriptions of modernist art that they were topographical, that they mapped the surfaces of artworks in order to determine their structures, then it has now become necessary to think of description as a stratigraphic activity. Those processes of quotation, excerptation, framing, and staging that constitute the strategies of the work I have been discussing necessitate uncovering strata of representation. Needless to say, we are not in search of sources or origins, but of structures of signification: underneath each picture there is always another picture" (Crimp 1979, 87).

7
The brightening occurs because barium sulphate is present in the form of a fine precipitate that scatters light back through the silver image layer.

8
The layers of a very simplified chromogenic print are three colour emulsion layers (cyan, magenta, and yellow), plus a paper layer (fig.3.7), which is most likely sealed by two polyethylene layers (layers 20 & 21). If not, an overcoat is also added (layer 25).

9
This is not to be conflated with Edward Casey's distinction between internal and external horizons.

10
Edmund Husserl's philosophy of images, set out in his lecture series of 1904–5, *Phantasie und Bildbewusstsein,* delineates a tripartite structure of image constitution: the physical image-thing (*Bildträger*); the image-object (*Bildobjekt*), that which represents something; and the image-subject (*Bildsubjekt*), that which is represented. In his dissertation on the materiality of the image and the body in the artistic practice of Francis Bacon, Marcel Finke has conducted a thorough analysis of Husserl's theoretical division (Finke 2015, 169–238). His third chapter on Bacon and image theory considers the problematic conception of the image's duplicity. Finke's argument leans on Bacon's practice of drawing inspiration from photographs that he modified (folded, cut, assembled, et cetera), for his paintings. Finke's treatment uses these fragmented photographs to reveal the practical difficulty of a twofold separation 'in' the image, for the sake of theory. He discusses and criticizes the concept of the image's duplicity, as differently formulated by Hans Belting, Hans Jonas, Reinhard Brandt, Lambert Wiesing, Edmund Husserl, and Richard Wollheim. Finke's final argument is that the stable image and its unstable material carrier are inseparable (2015, 28). Ultimately, I seek to extend this argument through application to deteriorating photographs.

11
For further reading on free fatty acid efflorescences on *Dutch Grey* and other photoworks by Ger van Elk, see the third and fourth chapters of Bas Reijers's dissertation 'How to Preserve Photographic Artworks for the Future: Chemical and Physical Interactions and Implications for Conservation Strategies' (University of Utrecht, 2017).

12
The other moment in *Camera Lucida* in which Barthes explicitly considers the intractable character of photography is right at the beginning. Barthes here admits that his attempt to theoretically investigate the essence of photography is inherently paradoxical (Barthes 1981, 20).

13
Here follows a selected overview of *Kinselmeer* works, with size and technical details if/as provided by the collection or gallery, or from the exhibition catalogue *The Horizon, a Mental Perspective* (Van Abbemuseum Eindhoven, 1999): *Kinselmeer*, 1984, gelatin silver prints, paint and varnish, 104.5×175.5×6.5cm, Museum De Lakenhal Leiden; *Kinselmeer,* 1985, polyurethane paint on b/w photo, in wooden frame, 185×292×12cm, Stedelijk Museum Amsterdam (fig. 3.15b); *Het Kinselmeer (Stompe Toren bij Ransdorp),* 1996, Cibachrome rolled in Plexiglass, 76×145×6.5cm, Van Abbemuseum, Eindhoven; *Kinselmeer, Rode wolken (Transparant 1),* 1997, retouch ink on colour photo on cibachrome between plexiglas, 39×154.5×6.5cm, Rabo Kunstcollectie; *Kinselmeer (Transparent #3),* 1997, colour on Cibachrome between Plexiglass, 40×155×7cm, SMAK, Ghent; *Kinselmeer,* 1997, Cibachrome between Plexiglass, 100×191.8×9cm, Van Abbemuseum, Eindhoven; *Kinselmeer (Kinsel Sea)*, 1997, overpainted Cibachrome photograph inside plexiglass, 100.5×192×8.5cm (as displayed in the exhibition catalogue of *Broken landscapes: Ger Dekkers, Jan Dibbets, Ger van Elk, Jaap van den Ende*, 2015); *Kinselmeer (Transparant 4) K-97-9T*, 1997, retouche ink on colour photo on cibachrome between plexiglas, 39×154.5×4.5cm, mBochum Vermittlung, Bochum; *Kinselmeer, Stompe Toren,* 1998, overpainted Cibachrome between Plexiglass, 76×145 x 6.5cm, private collection Germany; *Kinselmeer, Stompe Toren, ex'99 1b, K-99-3T*, 1999, retouche ink on cibachrome between Plexiglas, 39×154.5×6.5cm;, private collection Amsterdam; *Kinselmeer*, 2000, Amsterdam Museum; *Kinselmeer Watou,* 2000, gouache and ink on Cibachrome, 77×145cm, private collection (sold by BorzoGallery); *Untitled (Kinselmeer)*, 2007, retouched with ink on colour photograph between Plexiglass in two parts, 74×170×7.4cm, Grimm Gallery; *Untitled II (Kinselmeer)*, 2013–2015, retouched with ink on colour photograph between plexiglass, 47×90×5.5cm, Grimm Gallery; *Untitled III (Kinselmeer)*, 2013–2015, Retouched with ink on colour photograph between plexiglass, 47×90×5.5cm, Grimm Gallery; *Untitled IV (Kinselmeer)*, 2013–2015, 47×90×5.5cm, BorzoGallery.

14
Her argument is developed in the second chapter of the open access publication *Photo-Objects: On the Materiality of Photographs and Photo Archives in the Humanities and Sciences* (2019), written with three co-authors.

15
After *The Return of Pierre Bonnard, 1917–1971,* Van Elk presented some other works in which the back appears to be the front. One of these is *The Last Adieu* (1975), three paintings shown from the back only. As Dutch art historian José Boyens explains in her article 'Ger van Elk Was Here', published in the magazine *The Low Countries* (1994, No. 2, 215–222), this was the point from which Van Elk developed a concept of the "sandwich", which he employed in many works from 1991 onwards (1994, 221).

16
A brief reference to Camiel van Winkel's book *The Regime of Visibility* (2005).

17
This is interesting as it assumes that the frame is not part of the photowork, which is likely to be a mistaken assumption given that Van Elk handcrafted the frame himself. With other similar photoworks in mind (*Dutch Gray,* 1984 and *Kinselmeer*, 1985) including their distinct perspectival frames, I would even argue that *Dutch Grey*'s frame is an "intra-compositional" frame (conceived as part of the work) as Monica Marchesi explains the differences by basing her arguments on the dissertation 'The Reconfigured Frame: Various Forms and Functions of the Physical Frame in Contemporary Art' by Ian Geraghty (2008) (Marchesi 2017, 170–171).

18
One paradoxical exception exists: *Black Landscape (Clermont Ferrand-10 JPG)*, 2008, from the *Conclusion* series. This photowork is tagged only under *photographs,* yet technically/materially it is an inkjet print on linen canvas overpainted with acrylic paint. This means that it is far less sensitive to higher temperature or light than *Dutch Grey*, which of course has silver gelatin photographs as basis.

19
Visser identifies another reason why an artist who worked with photography might have chosen to call him/her/themself a conceptual artist or painter: for a long time, Dutch state funding excluded (documentary) photography, while 'art-with-photography' and film could be endowed with financial support (Visser 2009, 175).

20
For this reason Marchesi developed a 'Conservation Stakeholders' Identification Form' as part of her research. The intention was "to systematically organize and determine the individuals that are involved or should ideally be involved in the decision-making concerning a conservation treatment" (Marchesi 2017, 303).

Chapter 4

The PHOTOGRAPHIC SURFACE *as* PROCESSUAL INTERFACE

FIGURE 4.1. Ger van Elk, *Russian Diplomacy*, 1974.
Acrylic paint on chromogenic photograph mounted on Perspex, housed in a black triangular wooden frame with matte PMMA glazing, 159×298cm. Stedelijk Museum Amsterdam, The Netherlands.

Almost half a century after its genesis, the colour palette of *Russian Diplomacy* (1974) (fig. 4.1), a triangular overpainted photowork by Ger van Elk, has changed to such an extent that the impression of the image as a whole has been disturbed. These changes have disrupted an original continuity between paint and chromogenic print. The subjects of the photograph, two men who are embracing and whose faces are almost entirely obscured, rise out of painted colour clouds that meet on a 'neutral' white background. Initially, the gentleman on the left was dressed in a beige suit and was stepping through a painted colour cloud of exactly the same yellow ochre tone. He held the arm of a man dressed in black, who came out of the right-hand side of the image and trailed behind him a dark grey painted cloud. Van Elk's colour choice derived from the colour palette of the photograph, it was intended to merge the photograph with the painted additions.

FIGURE 4.2. Detail of *Russian Diplomacy*, 1974.

Over the following years and decades, the dyes of the chromogenic photographs (the work consists of two horizontal bands of colour photo-paper) have changed tremendously (fig. 4.2). The blue dye in particular has lost density and the photograph has taken on a red-tinted appearance, no longer corresponding to the painted colour clouds.

From a curatorial and art historical perspective, the artist's concept is no longer reflected by the materials' condition.[1] From a theoretical point of view, the photograph's surface makes manifest the passage of time, starting at the moment of its creation. Through and beyond the détente of the Cold War (1969–1975), as diplomatic relations, world powers, and world orders, have changed over decades, so too the colours of the photograph have shifted. As the political climate has changed over the years, why not allow the photographic reflection to fade correspondingly? To accept the changing appearance of a photowork would mean accepting that the photograph is an object in constant transformation.[2] My intention in this last chapter is to understand the processual character of the photographic material through different periods of its existence: during processes of creation, and then as it is archived or exhibited.

In the very early days of chemical photography, the inventors' main challenge was how to 'fix' the processes that create photographic images.[3] Henri Damisch rightly states that the history of photographic inventions was not only determined by discoveries of 'writing with light', but more significantly, by this question of how to fix the image (Damisch 1978, 71). Attempts to capture photographic images date all the way back to the eighteenth century, but these workings of light had no durability because the image-makers lacked the means and the knowledge to fix them. And in any photochemical process, image-fixing solutions are as important as image-creating substances. Recalling the distinction between the short-term and long-term reactions of photographic agents, as we discovered in the first chapter, the material is not necessarily stable and therefore its future is unpredictable. The photograph's reaction to internal as well as external factors is 'lifelong': its nature is not constant but processual.

In this final chapter, my intention is not to reduce the behaviours of the photographic surface to such processes, but to consider the surface itself as a *processual interface* that relates and acts according to various phases of the photographic process, encounters, and material conditions. As those processes can be conducted intentionally by artists and other people, but also by non-human beings and circumstances, I come to the following question: How does the photographic surface transform through processes with and without the intervention of human beings, therewith itself becoming a processual interface?

Three aspects are particularly relevant to my analysis. First, we have the materialization and visualization of the various imaging phases through which photoworks can come into existence. I focus on chemical based photographic techniques from the 1970s (the period from which Ger van Elk's photoworks originate), up to the deployment of (historic) chemical processes by contemporary artists working now. My question is: how and in what form are these developing phases present in the final photowork? This concerns the 'choreography' of photographing and developing the photographs, the movements prior to and during the processes of image-making which are neither visible to us (usually), nor a part of the photowork. (I do discuss one photographic installation, which is an exception to this.) Secondly, my attention shifts to the processual character of the photographic surface itself.

What happens when the surface is no longer perceived as mere reflector or receiver of (light) information, but as an active force in and of itself?[4] My final concern then uses the insights of the previous to create an inclusive understanding of the photograph as a transformative phenomenon, both in artistic and in conservation contexts.

In the preface to his book *The Interface Effect* (2012), writer, programmer, artist, and activist Alexander Galloway sets out his understanding of interfaces as effects that cause "transformations in material states" (Galloway 2012, vii), rather than as things. He looks beyond "the threshold theory of interfaces", challenging the approach to the interface as a "significant surface" or a portal (2012, 30–33). Thinking with a 'digital' point of view, he explains how theoretical engagement with interfaces can help us to understand contemporary culture:

> While readily evident in things like screens and surfaces, the interface is ultimately something beyond the screen. It has only a superficial relationship to the surfaces of digital devices, those skins that beg to be touched. Rather, the interface is a general technique of mediation evident at all levels; indeed it facilitates the way of thinking that tends to pitch things in terms of "levels" or "layers" in the first place. These levels, these many interfaces, are the subject of analysis not so much to explain what they are, but to show that the social field itself constitutes a grand interface, an interface between subject and world, between surface and source, and between critique and the objects of criticism. Hence the interface is above all an allegorical device that will help us gain some perspective on culture in the age of information (2012, 54).

With this broad scope in mind, as described by Galloway, I will now characterise the "grand interface" of the photographic process, by which I mean the various transformative phases of image making that highlight the processual character of the photographic surface. *Art Beyond Representation: The Performative Power of the Image* (2004), Australian artist and art theorist Barbara Bolt's materialist ontology of the work of art, serves as a theoretical guideline. Her conception of the work of art as a performative process, rather than a merely representational practice, might help me to open new ways to view photographs as performing and transforming objects, beyond their predominantly representational function.

4.1.
THE *Photographic Surface* IN PHASES

At the beginning of this millennium, another photowork by Ger van Elk, *C'est moi qui fais la musique* (1973) (fig. 4.3), was treated for serious discolouration problems. The work underwent a complex conservation treatment involving a complete remake, supervised by the artist. Art historian and modern art conservator Sanneke Stigter, who has collaborated with the artist on various damaged photoworks over the years, has critically reflected on the implications and consequences of this particular reproduction. In terms of materials, this photowork is similar to *Russian Diplomacy* (1974), despite the fact the paint is applied with an airbrush. *C'est moi qui fais la musique* depicts the artist playing a grand piano. The outer ends of his tailcoat and the piano bend with the shape of the triangular frame. This whole image has been broken up by the different ageing behaviours of colour dyes and paint.

FIGURE 4.3. Ger van Elk, *C'est moi qui fait la musique,* 1973.
Collage of three chromogenic photographs, airbrushed dilute acrylics and felt-tip pen, mounted on cardboard, housed in a black triangular wooden frame, 60×120cm. Stedelijk Museum Amsterdam, The Netherlands.

One interesting element of Stigter's narrative is her evident discomfort about reproducing the work as a one-piece glossy Cibachrome print, treated by a professional airbrush expert, given that the initial photowork was a collage of three chromogenic colour photographs with a matt finish, airbrushed by the artist himself. For the artist, the materials were of minor importance beside the more significant (visual) conception. However, the conservator claims that "[t]he materials and techniques employed by the artist contribute significantly to the meaning of many of Van Elk's works and furthermore they reflect the imaging techniques of the day" (Stigter 2004, 107). I consider here these two versions of *C'est moi qui fais la musique,* together with the discolouring of *Russian Diplomacy,* so as to make us aware not only of their material and visual differences, but also of how both works came into being – their phases of creation. How, if at all, are their steps of creation (visually) present in the final photoworks? Do they matter?

According to Stigter, Van Elk chose his materials carefully, selecting Kodak's chromogenic prints above Cibachrome's silver dye-bleach process in the 1970s:

> [...] he disliked the harsh colours, the unnatural, vivid red and the glossy surface that characterized Cibachrome at that time. The chromogenic prints that Van Elk chose often had a silkscreened surface, typical of matt photographs in the early 1970s. Photographs with this finish were less vulnerable to scratches than glossy paper and this suited his unconventional use of photographs in sculpture and installations (2004, 105).

Where the chromogenic process involves colour couplers in developer liquid, the dyes here are already incorporated within the three emulsion layers of the silver dye-bleach material. The top layer is sensitized to blue light, the middle to green and the bottom to red; within each, the dyes of the respective opposing colour are dispersed. Unlike the chromogenic (and silver gelatin) process's negative/positive procedure, this is a positive direct process and the print is made from positive colour transparencies. As the colour development is not part of the silver-dye bleach process, it is said that these prints have enhanced and more durable resistance to colour fading and chemical contamination. The sharpness and colour richness of Cibachromes, which Van Elk initially perceived as too harsh, is a product of the fact that the irradiation within each emulsion layer of the silver dye bleach material is minimal, when compared to silver-based light-sensitive materials. In the latter process (of chromogenic as well as silver gelatin materials), minimal light is always scattered by reflection during exposure as it passes through overlapping silver grains, thereby creating less sharp images.[5] The glossiness of silver dye-bleach prints results from the difference in carrier material. As the name suggests, dyes are bleached in a bath with such high acidity that a standard paper carrier would be corroded and so it is replaced here by a cellulose triacetate base.

Twenty years later, in the 1990s, Van Elk's taste and the means had changed. He chose Cibachromes above chromogenic prints not only for the reproductions of his 1970s photoworks, but also for his newer ones, as we see in the later *Kinselmeer* works. From the 1980s on, Van Elk deployed the technique of *Dutch Grey* (as discussed in section 3.3) to make his *Kinselmeer* waterscapes. With the technical means of the 1990s, he developed a more complex pathway, creating layered representations of the lake using many (invisible) steps that were pursued repeatedly. He photographed the Kinselmeer shores again and again, then digitally retouched them on computer, then printed the photos in black-and-white, only to overpaint them by hand and in colour. He subsequently re-photographed these overpainted black-and-white prints as colour diapositives (using reversal film), and developed them as Cibachromes. Combining two halves of the Cibachromes horizontally, he framed them individually in a wedge-shaped Plexiglass box and mounted them counter staggered (fig. 3.16), as he did his very first *Kinselmeer* photoworks in 1984 (figs. 3.15a & b).

The many stages Van Elk evolved for the creation of one of the later *Kinselmeer* works is by no means unique. Many other contemporary artists and photographers have experimented with different imaging, developing, and printing processes within a single body of work.[6] When creating complex photoworks, indeed, the immaterial and material processes of digital and film-based techniques are often mixed and entangled to such an extent that a dissection becomes useless if not impossible. Still, seeking to understand how the many imaging phases (and therewith actions) relate to the final photowork, I wonder how the photowork's surface reflects those visible and invisible processes that shape its appearance.

LAYERS OF PROCESSES

Initially, the most prominent traces of processes on *Russian Diplomacy* were the sloppy painted colour fields that were created by Van Elk's brush movements. Over the years, the colouration of the chromogenic dyes has itself become a trace. It has morphed into an indexical reference to the chromogenic process, which Van Elk chose in the 1970s as the basis of this photowork. Both subject matter *and* material degradation, then, refer to the moment of the photowork's creation. Monica Marchesi's dissertation characterizes the colouration as a photographic patina – a degradation index for the print. "It confirms the viewers' expectation of looking at something aged that has altered due to the passage of time, and this is charged with positive connotations" (Marchesi 2017, 116). In a footnote she states that

> [...] the reddish colour shift typical of the 1960s and 1970s chromogenic prints, are nowadays often perceived as a kind of patina, as an index that indicates past times. In many instances the red tint is not associated with degradation, and many digital camera applications try to mimic this nostalgic look with red filters that give a '1970s vintage look' to modern digital images (ibid.).

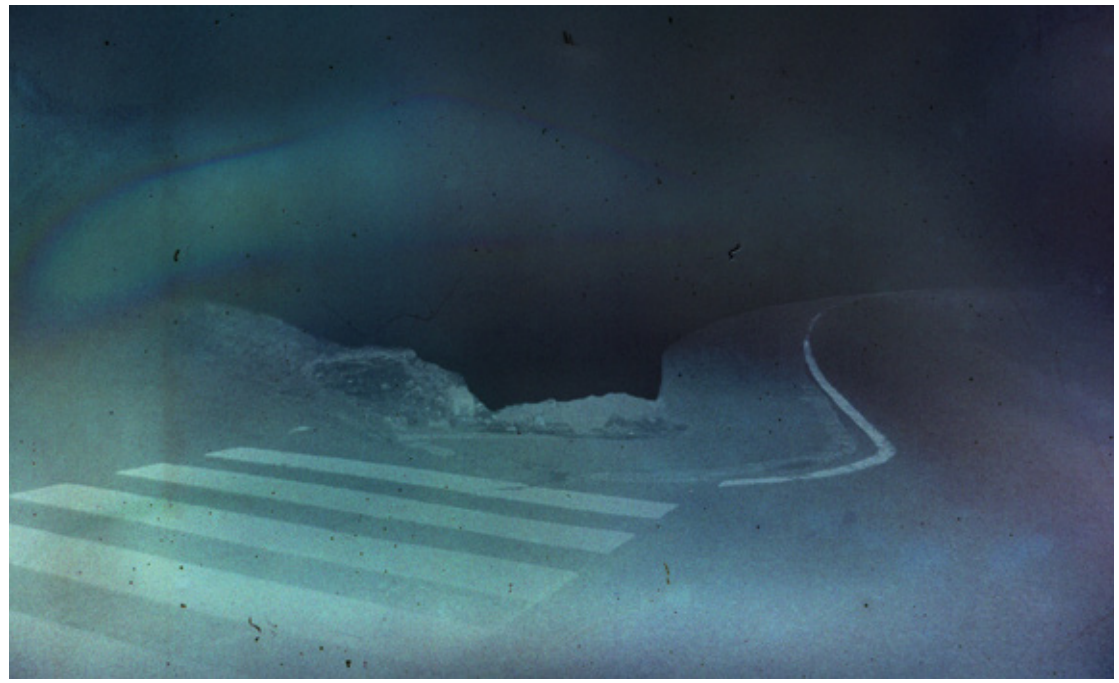


FIGURE 4.4. Daisuke Yokota, *Untitled 2* from the series *site/cloud*, 2013. Inkjet print, size unknown.

I would like to understand how the photograph's colour shift, as rooted in the matter of the photowork, affects our perception of the processual nature of the photographic material. It is for this reason that I turn now to photoworks by several contemporary artists (of a younger generation than Ger van Elk) whose works deliberately manifest the forces of materialisation and the signs of image-creating processes.

Japanese photographer Daisuke Yokota (b. 1983) pushes photographic image-making processes to an extreme. Viewers will lose their way if they attempt to distinguish the various stages of Yokota's creation process for the series *Site/Cloud* (2013, fig. 4.4). He uses time and technique to extend the process, beginning, for instance, with a compact digital camera; printing the photo as an inkjet print; re-photographing it with a camera using colour film; experimenting with the temperature during the developing process – and all the while, aiming, ultimately, for a black-and-white photowork: Yokota passes through many stages of the photo, as he shares his approach in an interview (Crabbé 2015, unpaged).

As we move along this path on which he 'translates' the image, passing through the darkroom, through Photoshop, via various imaging devices such as scanners or photocopiers, traces accumulate and these traces refer to the different materials, spaces, and devices. A friction comes to dominate the final photowork: it visually reveals various (material) phases while, at the same time, physically concealing them. That is, the surface of the previous print is visually narrated, but it is physically replaced by a new texture. By the end, the viewer is dealing with a layered photowork that has gathered and concentrated many references to various successive 'image carriers' that have contributed to its form. In some of Yokota's works, it seems that the initial photo loses its meaning en route to the final artwork. That is, the layers of processes and materials cover over the photo's initial subject matter, as these layers themselves become the focal content of the photowork. Barthes's *noeme* of photography as the manifestation of that which has been, shifts here from the photographic image to the traces of the various image carriers. In Yokota's works, as they admit all kinds of traces left by devices and material processes, the proof of 'that-has-been' is proof of the physical and digital image-making processes.

For example, the typical texturing of the gelatin's micro-cracking pattern can be perceived on the left side of *site/cloud no.11* (fig. 4.5). The negative of this photowork must have been developed in liquids of different temperatures. By changing the temperature of the developer and the stabilizer (which should usually have a relatively stable temperature), the gelatin was made to harden too quickly, bursting into these little visible cracks which are a known symptom of gelatin degradation. Another visual reference to the analogue process can be identified in the little mots (see, for example, in the upper left corner), which can rest on negative film and will come to the fore when enlarged (as digital scan or developed print). However, if Yokota had used a negative slide, the colour of the mots on the final print would have been white – not black, as is seen here. And so I must conclude that one of his many and various stages of production involved his digitally inverting the photographic image.

FIGURE 4.5. Daisuke Yokota, *site/cloud no.11*, 2013.
Inkjet print, size unknown.

When, at the beginning of *Philosophy of Photography*, Van Lier considers the photograph as an "abstractive imprint", he isolates eight different categories of imprints, one of which is the "positive-negative imprint". He describes the positive print as a negative of the negative. The many (more) conversions that precede Yokota's photoworks draw the viewer's attention to this ontological characterization of any film-based photographic print, which "[…] retains a hesitance between darkness and light, the opaque and the transparent, the convex and the concave […]" (Van Lier 2007 [1983], 15). Van Lier speaks of this doubled presence of apparent opposites within a single photographic print as a "pulsation". The analogy can help us to think about the processual character of the photographic surface as interface. The simultaneity of opposites is not only woven into the many successive phases of photographic picture-making, it is also present in each form that the image takes (negatives, transparencies etc.), as well as in the final photograph.

Immaterial imaging processes can only be visually retraced if the final photowork has a pixelated surface texture or marks that can be linked to certain tools of image software such as Photoshop (for example, photoworks by Lucas Blalock manifest a 'clone stamp' tool; fig. 4.6). By the end of Yokota's process, the subject is foremost the material process itself, formed by image capturing devices and through his many manual and chemical interventions. The penultimate outcome is a digital image

FIGURE 4.6. Lucas Blalock, *Lite Blues*, 2017.
Archival inkjet print, framed, unique, 154.5×192cm.

file of this 'multi-mediated' photo, which materialises as an inkjet print when exhibited. As inkjet print, the final photowork does not materially relate to its analogue predecessors, nor to the initial photo. In his article 'Die Simulation von Fotografie. Konzeptuelle Überlegungen zum Zusammenhang von Materialität und digitaler Bildlichkeit' ('The Simulation of Photography. Conceptual Reflections on the Interrelation Between Materiality and Digital Imagery'), media studies theorist Stefan Meier argues that digital photographs do not create a material image, rather, data files produce "potential imagery" (Meier 2012, 136). Due to the essential separation between the units that structure the surface (pixels) and the carrier medium, we can no longer regard the digital image as an autonomous feature; its material form is dependent on data formatting and on the output medium (Meier 2012, 137; 142). In brief, the surface of Yokota's inkjet does not at all materially present the processes of its making. Alternating between analogue and digital processes, his engagement with the image does not concern one single surface. There is no single material surface that we can regard as a processual interface. Instead, actions and handling, which occur throughout the different (temporal and practical) stages of the various intermediary forms, are the true processual interface, or better, interfacial processes.

The series *Smoke* (2011–) by New York-based artist Lisa Oppenheim (b.1975) re-establishes a relationship between the material and the subject matter (the digital image) (fig. 4.7). For this series, Oppenheim created transparencies or "inter-negatives" from digital image files of fires that she sourced from online image databases by performing generic searches on 'bombing attacks', 'volcano' or 'industrial pollution'. She then cropped these images so that only the smoke of the events was in the frame, thus dismantling the documentary legibility of the photographs to explore a tension between the presence and absence of the photographed events. One by one, photosensitive papers were exposed to her transparencies with the flame of a lit match (rather than an enlarger's light).[7] Oppenheim consciously embraces the irregularity of this process. Variations in time and studio debris mean that the outcome is a series of handcrafted, unique photographic prints. The bodiless digital image files are rendered and reframed in a new physicality

FIGURE 4.7. Lisa Oppenheim, *Billowing. As we were driving up to Norfolk yesterday I saw the Enfield fire; where a Sony distribution centre set ablaze by rioters was just pouring out smoke over the motorway. The sheer amount of smoke was quite surprising, and today smoke was still covering the motorway. I feel such despair at people who have taken to looting; so angry at the destruction people can cause,* 2011–2012 (Tiled Version II).
Silver gelatin photograph on bromide paper, exposed and solarized by firelight, 94×117cm.

that hides the light source (of both the pictured fires and the lit matchsticks), therein, paradoxically, renewing the value of the photographic process – writing with light.

We can approximately subdivide the imaging phases and therewith timeframes for the creation of one of the *Smoke* photoworks, seeing it in four stages or more. The process begins with the actual moment of photographing a scene that involved smoke (this is an image taken by an unknown photographer, who uploaded and shared his/her/their image selection online). After this, Oppenheim consults online image databases, selects and downloads image files. In the third phase she crops the image on her computer, removing everything except the depiction of smoke, reversing the colours and therewith generating a digital file as a 'negative'. The actual materialization of this digital image begins after that, when the cropped image file is printed on transparent foil. The fourth and last stage takes place in the dark room. Oppenheim lights up matches to solarize the photo-sensitive paper that lies under the negative transparency. Not only the light of the matchsticks, but also the smoke it leaves behind (after burning out) could, theoretically, be absorbed into the material of the photographic print. All this heightens the relation between subject matter and material matter. In contrast to Yokota's work, the surfaces of Oppenheim's gelatin silver prints *do* embed the visible and invisible processes of this last stage of exposure and development. Yokota's complex process of image creation can be characterised in its entirety as a form of interface that leads to a depiction, ultimately presented as inkjet print. In contrast, the material surface of Oppenheim's print can itself be considered a processual interface.

So, there is a crucial difference between the traces of processes in Yokota's and in Oppenheim's works. When applying this distinction to *Russian Diplomacy*, we can see that Van Elk's photowork tends ontologically toward the latter. The appearance of the photographic surface of the chromogenic prints has been determined by the time and the spaces it has passed through. However, the reproduction of *C'est moi qui fais la musique* is cognate with Yokota's works: it materially inhabits no relation to the original's process. The second version of *C'est moi qui fais la musique* represents the original photowork conceptually and visually, but its material surface has nothing to do with the processes that created the original. To summarize, then, the photographic surface itself can only be regarded as a processual interface when it is the element of the photowork that has passed through processes, spaces, and time. To deepen this understanding of the surface as key element, I turn now to the movements 'around' the light-sensitive surface prior to, and during, the process of creation.

GESTURES AND MOVEMENTS OF IMAGE-MAKING

The processes that give rise to photographic images are primarily mechanical, chemical, or electronic, so it can be easy to overlook the human gestures that are hidden within them. *Russian Diplomacy* is, before anything else, a portrait of a gesture – a hug between two men – and I want to give centre stage to the various gestures that precede the final photowork. Van Elk staged the photograph to mimic a practice of (Russian) politicians of the time: performatively embracing, in front of the press, for diplomatic reasons. He extracts this gesture from, or better, empties it of, any political connotation. Here, floating on a white background, the two figures become symbolic rather than political. Van Elk said that he was not interested in commenting on a political climate, rather, he plays with the genre of this particular strand of press photography (*Op het Tweede Gezicht* 1979, 29). Today, 'hug diplomacy' is less associated with Russian politicians than with Narendra Modi, the current prime minister of India, who is known for embracing other world leaders. The hug that Van Elk captures is therefore a form of emotional diplomacy – a political deployment of emotional display (and the feelings they can invoke), as Todd H. Hall writes in *Emotional Diplomacy: Official Emotion on the International Stage* (Hall 2015, 26). The press photographs that Van Elk references here are aimed at external audiences. Hall describes them as something that "state actors can employ to frame issues, to maintain or alter their own image, and even to transform the character of relationships […]" (ibid.). *Russian Diplomacy* presents the 'shell' of the diplomatic hug and enables us viewers to observe, with closer inspection, how this gesture is already intrinsically emptied of any heartfelt significance. If we regard the photowork and in particular the photograph as a husk or shell – as a remnant – what does this reveal and what does it hide, of the physical gestures through which the artist brought it into being?

When a photograph is combined with other imaging techniques such as Van Elk's or Tacita Dean's painting, our attention to the human contribution to the photowork is heightened. As briefly discussed in the second chapter on haptic interactions with the photographic surface, traces of these gestures are part of Gwenneth Boelens's installation *Exposure Piece (Sensitizing)* (2010) (fig. 2.3a). This photowork magnifies the process and its forms to convey the physical movements that give shape to a chemically created photograph. Although there is a world of difference between Boelens's wet collodion process and the chromogenic process used by Van Elk for *Russian Diplomacy, Exposure Piece (Sensitizing)* reveals the darkroom's insights to us outsiders. The fact that chromogenic prints are developed in total darkness, as was explained in the first chapter, means that this photowork is revelatory. For instance, the German photographer Jessica Backhaus (b. 1970), who used to develop and expose her own colourful chromogenic photographs, compared the bodily actions that she used in the darkroom to those of an acrobat. According to her, the perfect print can be achieved only through an extreme discipline of body knowledge and control.[8]

The outsize dimensions of the glass plate that Boelens chose for her photowork not only enlarges the picture, it also expands the field of the gestures and movements that are involved in the wet collodion process (which was invented around 1850). The work captures the bodily movements on the white vinyl flooring (the viewer does not know whether these movements were conscious or unconscious), and thereby brings the performative aspects of making and developing a photographic print into the exhibition space. In normal circumstances, these specific gestures and movements remain hidden in the intimacy of the darkroom. Yet in film-based photography these 'invisible' gestures and decisions are

instrumental to the picture's coming-into-being, just as much as the shutter release or the photographer's eye.

The title *Exposure Piece (Sensitizing)* may at first evoke the object quality of this installation. Boelens's addition of the verb – the *act* of sensitizing – shifts its meaning. The idea of a performance begins to emerge, a performance that has been recorded, and which extends beyond the spatial zone of the static installation. It is not just a piece of materialized exposure to light, but a choreographic piece which deals with the dynamics of the picture-making process. Nickel van Duijvenboden, who edited Boelens's artist book, characterizes the photowork as "a lucid, impulsive action performed on an impossibly large and unwieldly material, lending the gesture a solemn permanence" (Boelens 2014, 75). When talking to photographers who still develop their photographs in the darkroom, one often hears about the practice and skill needed to strike the delicate balance between repeatable, precisely timed, and spatially defined routines, and unrepeatable, improvised elements or outside factors such as temperature, humidity, and water hardness. The choreography of *Exposure Piece (Sensitizing)* thus does not stand solely for itself, but epitomizes this interaction of light, light-sensitive materials, chemical solutions, human gestures, and time, which goes into every analogue photograph.

Choreography derives from root words meaning writing and movement, and is classically understood to be the written notation of (bodily) actions. Photographers who develop their own photos know their own darkroom choreography. The development of chromogenic colour prints takes place in a completely darkened room and thus involves a blind, haptic acrobatics. Would it then be appropriate to expand our understanding of photography to a broader concept of *photochoreography*? Choreography means also "writing in space with the moving body" (Barthel 2017, 31). It exists not only as danced inscription, but also as moving presence. Boelens's work can herein be understood in two senses: as writing, in the notation of scuffmarks on the floor (fig. 2.3b), and as a choreography of the installation, drawing in all the parts that stand or lie within the space. These parts elicit new movements from the visitor and are thus restaged and enacted in a new narrative context. In his publications on contemporary dance and social criticism, Flemish cultural sociologist Rudi Laermans has developed an expanded concept of choreography. Freed from its narrow association with dance and bodily movement, this conception views assemblages of heterogeneous materials, for instance, as choreography. Artefacts become performers, too. Performances combine installations, human and non-human movements, and material and immaterial elements (such as light and sound). The central ground and commonality of these choreographies is always space. Laermans thus describes choreography in broad terms as "the space in which dance is written" (Laermans 2015, 195).

The space in which photography is written is usually associated with a closed-off darkness. But the darkroom became part of standard photographic practice only at the start of the twentieth century, when photographic paper became widely available on the market. This industrially manufactured paper was much more light-sensitive than its nineteenth-century precursors. Yet before the rise of darkroom photography, there was a move in precisely the opposite direction. During the 1840s, when the Daguerreotype was pioneered, glasshouses were built in large numbers (sometimes on the roofs of buildings) in the great urban centres of Europe and the United States. The intention was to capture as much light as possible for the long exposure times required for the process.[9] In this age of *Daguerreomania*, multitudes of people had themselves immortalized on this unique silver-plated copper plate, despite the fact that it meant having to sit still for 15 to 20 minutes.

Whereas the 'enlarged' physical movements and (dis)placements of Boelens's photoworks might be exceptional in contemporary photography, it was quite normal for nineteenth-century photographers to haul cumbersome photographic equipment on expeditions. Before the invention of dry plate negatives in 1871, this could include heavy plate cameras, tripods, glass plates, and chemicals. Today we can hardly imagine the physical effort and movements required to create those images. For example, Boelens refers to and makes use of the wet collodion process in her performance/installation. Historically, the photographer who elected to use this process had to prepare collodion wet plates onsite, probably in a small tent he had brought with him, before sliding them into his plate camera, exposing them to light, developing them, allowing them to dry, and finally placing them on prepared albumen paper to create a positive image, which he would later develop. This effort makes those historic photographs especially impressive, despite their humble size.

To be aware of the physical engagements that are involved in the exposure practices of the photoworks discussed here is to value the key role of the photographic surface as interface, as it passes through many stages and encounters, and is transformed. There are some photoworks, like Boelens's, Oppenheim's, and Van Elk's from the 1970s and 1980s, in which one single surface transfers and transforms throughout the whole picture-making process. In these cases, clearly, we can speak of this surface as a processual interface that reflects the material's physical engagement with chemicals and human handling throughout its period of existence. However, other works such as Van Elk's Cibachromes (the remake and the later *Kinselmeer* works) and Yokota's photoworks have a surface that is materially characterized by the final phase of development – even when it visually references earlier image-creating stages. Van Elk's remake does not refer materially to the many different actions and phases of its original coming-into-being. This underlines how the *final* physicality of the photowork is a decisive factor when considering whether we can speak of the surface as a processual interface. Nevertheless, recapitulating Alexander Galloway's approach, we might see the entire image-creating process (including the temporal extension that can lead to [dis]colouration) as the "grand interface" of the photowork, in which a mediation at all levels and times is apparent.

A visually mimetic remake of the discussed photoworks which removes the gestures, phases, spaces, and tools involved, would annihilate their essence. Shaping the photowork visibly or not, these processes convey far more than just the representation of an image. What is notable, though, is that Boelens's photoworks in general are ex-

plicitly sculptural photographic objects whose depictions are abstract. This makes me wonder whether the photographic surface also acts as a processual interface in figurative photoworks. This, in turn, led me to the multi-exposure works of Canadian photographer Jessica Eaton (b. 1977). In the next section, my discussion of Eaton's works supports an approach to the surface as performing interface within the grand interface of the studio space and contemporary screen culture.

4.2.
THE *Surface* PERFORMING AS INTERFACE

As we magnify the stages and phases that the photographic surface passes through before a photowork is 'finished' and ready for exhibition, we explore a realm of intention. The actions, gestures, and circumstances 'around' or with the photographic surface are (more or less) the grounds of the artists' conception and intention – even when these intentions involve choosing to work with unpredictable materials. And so I suggest we see the photographic surface as the central *reflector* of these elements and intentions, something that accumulates and processes external influences.

In this section, I take this approach one step further by considering the surface as the central *actor*. The notion is especially relevant to historic photoworks which can look back on (exhibition) history and are stored in archives or collections. In the present, the only external intention that is projected onto these works is that of the gatekeeper who wishes to keep the work in the optimal conditions so that it can be viewed by future generations. Enduringly, such a photowork has its own life, (inter-)acting with room temperatures and humidities, insects, damps, light, etc., and also its viewers and handlers. Even where there is no single clear external reason, photoworks like the overpainted chromogenic prints of Van Elk's *Russian Diplomacy* can alter their appearance simply because they are what they are: unstable media. Or, more truly, live, as endlessly transforming media.

Despite the close relation between my argument here and my preceding thinking, this shift, from thinking about the photographic surface as reflector to thinking of it as actor, opens new angles on its processual character. The question that arises is: which processes characterize the photographic surface as an acting force (and interface) in the context of its own appearance and therewith our viewing experience?

To help us see and understand the photographic surface as actor, I turn to Jessica Eaton's work to clarify what happens when a surface (like that of *Russian Diplomacy)* changes its appearance. This second part of my fourth chapter should therefore be taken as an intermediate analysis of image creation, exploring the processual capacity of the photographic negative in the context of contemporary (digital) image creation and presentation. This may suggest questions as to how this section relates and can contribute to an overall analysis of *Russian Diplomacy*. My response is that we will understand the transforming nature of such a historic photowork only when we understand the contemporary (photographic) culture in which we perceive it, and which colours our perception or gaze. For this reason, I pause here, turning my attention away from direct analysis of the discoloured photowork, so as to examine those contemporary photographic interfaces.

In film-based practice, the surface retains ongoing receptiveness to new photons right up to the moment it is developed and fixed. This is a key characteristic of the practice, when considering the surface as processual interface – and it is not comparable with digital image creation. The following analysis of the insides of digital cameras and (touch-)screens offers an understanding of the intrinsic difference between these omnipresent contemporary surfaces, which mediate most of our daily (image) experiences, and the photographic surfaces of Van Elk's and Eaton's photoworks.

INTERFACE EFFECTS ON THE *Surface*

Jessica Eaton's photographs of geometric compositions in saturated hues are deeply rooted in a process whose visible effects are not accessible to the senses until the moment that the sheet of film is developed. For each photograph in her series *Cubes for Albers and LeWitt* (2010–ongoing; often abbreviated as *cfaal*) (fig. 4.8), she photographed a sequence of wooden cubes that had been painted in various shades of white, grey, and black, and placed against a monochromatic background on a single sheet of colour film. She created rich colours by placing different colour separation filters over the lens for each successive exposure. The dark cubes, reflecting the least light, leave the negative almost untouched. The lighter the cubes, the more light they reflect. Increased light reflection diminishes the negative's capacity to register. There are three variables here: the cubes' differing positions in front of the camera; their reflective value; and the colour filters. Eaton has described her practice as a "strategy game", involving the manipulation of these variables over several timeframes. The camera and the large single sheet of film are her constants, and the cubes and filters her variables.[10] Although Eaton tries to conceptualize and to track the exposures in order to predict how each exposure will affect the other(s), the process of creating a single photowork involves a high failure rate and long periods of waiting.

The photographs that result from Eaton's repeatedly looking through the 'window' of the viewfinder can be seen to reveal the inadequacy of the transparency paradigm when it comes to the camera's mediation of the cubes. The many colour-filtered exposures produce the geometric colour constructions on film, but only in-camera. Hence, Eaton's photographs are not merely reflections of the painted cubes. Rather, they present optical phenomena that are created through the intra-action of the many exposures. As the negative is multiply exposed, single images commingle to such an extent that a distinction between the exposures becomes obsolete: it manifests in the common materiality of the silver halides. The final visual outcome only becomes visible after the film negative has left the black box and is chemically developed. What happens in the camera during the process of the multiple exposures can be steered, but is not accessible to Eaton as she works. Consequently, the camera's inside can be characterised as an interface.

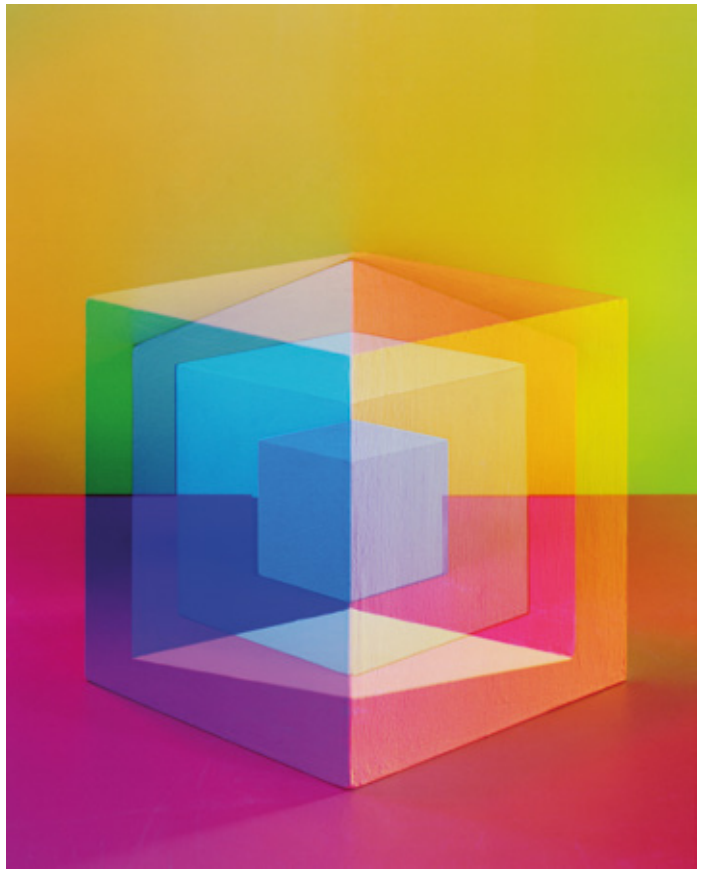


FIGURE 4.8. Jessica Eaton, *cfaal 346*, 2013.
Archival pigment print, 127×101.5cm. National Gallery of Canada, Ottawa, Canada.

In *The Interface Effect,* Alexander Galloway argues that the interface shouldn't be seen as a doorway or a window, because a window does not testify to the mode of representation that it imposes on anything that passes through it (Galloway 2012, 39–40). In contrast, he defines the interface as a "fertile nexus". He quotes and reflects on the French philosopher François Dagognet:

> 'The interface [...] consists essentially of an area of choice. It both separates and mixes the two worlds that meet together there, that run into it. It becomes a fertile nexus.' Dagognet presents the expected themes of thresholds, doorways, and windows. But he complicates the story a little bit in admitting that there are complex things that take place inside that threshold; the interface is not simple and transparent but a 'fertile nexus.' He is more Flusser and less McLuhan. The interface for Dagognet is a special place with its own autonomy, its own ability to generate new results and consequences. [The interface] is that moment where one significant material is understood as distinct from another significant material. In other words, an interface is not a thing, an interface is always an effect. It is always a process or a translation (2012, 32–33).

Whereas the shutter (release) of the camera could be considered a threshold (to a photon, it grants access to the inside of the camera), the photographic surface of the film negative is the real "fertile" ground that generates Eaton's colour constructions. This is what processes every light particle that enters the black box. Through Eaton's additive process, overlapping colours become brighter, sometimes to the extreme of blanching out altogether – and thus running counter to the subtractive colour theory of many printing and painting techniques (fig. 4.9). The centre of the geometric figure is therefore – especially in the earlier (and simpler) works of the *cfaal* series – the brightest part of the photograph.

In *Meeting the Universe Halfway,* Karen Barad introduces the notion of *diffraction* as a physical phenomenon that can be a metaphorical tool of analysis for understanding differences and their effects. She explores *diffraction* as a useful analytical counter-point to *reflection*, because for her, reflection implies mirroring and sameness whereas diffraction includes patterns of difference (Barad 2007, 71–73). She draws on Donna Haraway's use of diffraction as a metaphor to rethink "the geometry and optics of relationality" and brings the "effects of differences"– rather than simply differences – into focus (Barad 2003, 803).

We need here to understand the intra-action of the silver halides and their entanglement, as triggered by the various colour lights: how they are temporally layered, without automatically accumulating (physical and spatial) layers. To do so, I want to consider this physical and optical phenomenon in more detail. In a classical sense, a

FIGURE 4.9. Subtractive (left) and additive (right) colour interactions.

diffraction (pattern) is created by waves that overlap, appear to bend, and spread, as they combine or as they encounter an obstruction (Barad 2007, 74). Many kinds of waves, including light waves, create patterns of diffraction. The photographic process is induced by the reflection of light from the photographed objects, and accordingly, notions of reflection and of indexical mirroring tend to dominate photo-theoretical discourse. Of course, Barad's intention in using diffraction as a metaphor for analysis "in order to study the entangled effects differences make" (ibid.) aims at a far wider scope than mine here.[11] Nevertheless, in this context it enables us to think about the processual character of multiple exposures, not from a single linear point of view but as an entangled pattern of viewing-points.

This can be applied to the additive colour system on which Eaton's works rely. And as a perceptual system, it is also the basis of the

process through which we see colours on a device screen, where the display is comprised of three illuminating colours (red, green, and blue, hence RGB) in combination.[12] Eaton's approach is often placed in relationship with her historic predecessors (such as the photographer and inventor William Henry Fox Talbot; Josef Albers, who undertook colour studies; and the methodical minimalist Sol LeWitt). However, her additive process technically corresponds more directly to the workings of contemporary screens and screen devices. Critics who have written about Eaton's work have not picked up on this, but in the context of my study it can offer a valuable entrance to the surface as (processual) interface. As we (inter)face with and are immersed in a dominant electronic culture, it feels necessary to side-step towards this culture in our exploration of Eaton's film-based photoworks. New 'techno-logics' begin "to alter our perceptual orientation in and toward the world, ourselves, and others" as film and media scholar Vivian Sobchack writes in '2.1 The Scene of the Screen: Envisioning Photographic, Cinematic, and Electronic "Presence"' (Sobchack 2016, 91). Sobchack's writings are essential to the phenomenological discourse on cinema and film studies, but in this particular article she builds a helpful bridge between the three perceptual and representational technologies of photography, motion pictures, and computers.

CONTEMPORARY SCREENS AS INTERFACES

To confirm (or dispel) the parallelism between Eaton's colour constructions and the functioning of screens, it is necessary to think about the role and workings of contemporary screens as interfaces. Stephen Monteiro, who edited *The Screen Media Reader* (2017), has argued in his article 'Fit to frame: image and edge in contemporary interfaces' (2014) that the screen's form (its size and rectangular shape) preoccupies and dominates contemporary images *and* our visual experiences. As digital images are meant to fit screens, regardless of their own specificities, he proposes that the screen itself becomes the message, one that is shaped by frame and surface (Monteiro 2014, 361–362). Monteiro asserts a parallel between this contemporary "frame-oriented image processing", and modernist image-making, because of a common guiding concern for the "the relationship between image and surface, or the material interface of canvas and paint" (2014, 363). However, what may be more relevant here is his analysis of the relationship between these forms, as determined by a screen-dominated culture and the forms of 1960s minimalist painting. With the latter, he argues, the exploration of the image field was wholly determined – and therewith dependent upon – the shape of the object that supported it (2014, 373). This analogy offers a surprising angle, particularly in the context of Eaton's own reference to minimalism. Her colour constructions explore the negative's potential to act as a canvas for the light that enters in. The negative is of course delimited by its rectangular frame, but it is also defined by its capacity to be receptive to the multiple exposures of Eaton's additive colour system.

However, Monteiro does not consider the role of the screen as mediator of light – and this, in my opinion, is its most essential characteristic, affecting how we see the image just as the frame and the surface do. While Monteiro concentrates on the screen as 'hardware', an object that relates to and interacts with users, I would argue that the workings of the light projections in, behind or against the screen, determine the true edges of the screen's interface. In 'Mediations of Light: Screens as Information Surfaces', new media scholar and curator Christiane Paul distinguishes between screens which are technically 'just' display mechanisms for software-driven processes, and other (touch) screens that are receptive interfaces: the latter will 'read' and 'react' to their viewer/user and/or environment (Paul in Cubitt 2015, 184; 191). By questioning what exactly is being interfaced by the screen, Paul provides a simple but helpful distinction between different contemporary interfaces. Drawing on Florian Cramer's work, she states that an interface can operate "between hardware to hardware; hardware to software; software to hardware; software to software; humans to hardware; humans to software" (Paul in Cubitt 2015, 184). With these various interfaces in mind, Monteiro's argument then offers a telling insight into the interface between the screen device as hardware, and the software that moulds the image.[13]

In the contemporary world, the surface has acquired an unprecedented centrality to the experience and modification of images. These things happen with, through, and on screens, many of which are responsive to touch. Monteiro describes how the stretching and over-magnification of digital images can reveal how the image remains an animated performance for as long as it is on screen: "The image is animated, even if visibly still, within the flux of the system as data are continually received, sent and processed by the screen device and network to produce and sustain this visual performance" (Monteiro 2014, 376). Any notion of an entirely stable image belongs to the past: it has become a production of continuously operating devices. These operations are driven by complexities which are not necessary understood by the viewer, beyond a basic understanding of the creation or imitation of an image by the light in the screen. Sean Cubitt who co-edited *Digital Light* (2015) (in which Paul's article can also be found) contributed an essay, 'Coherent Light from Projector to Fibre Optics', in which he outlines the history of the technical development of visual displays, focusing on the workings of the light.[14] A passage on Digital Light Programming (Cubitt 2015, 48–51) focuses on the functioning of today's most-used projection technologies: DLP (Digital Light Programming), LCD (liquid crystal display), and LCOS (liquid crystal on silicon). While DLP and LCOS technologies are used mainly in projectors, LCD technology is in a wide range of devices such as computer screens, tablets, digital cameras, mobile phones, smartphones, digital watches, televisions, projectors, and other forms of displays.

A very simplified account of how these technologies works is as follows: each sends three versions of an image in red, green, and blue (RGB) to the screen.[15] Each pixel (in the many image-building arrays of pixels of LCD and LCOS screens) is built of the three colours red, green, and blue (RGB). The intensity of each colour is created by the quantity of electronic light waves sent to the individual pixel. Intensity value ranges between 0 and 255, with 255 admitting the maximum

light and zero not letting any light waves pass through from the LED backlight source.[16] If the red and the green, for instance, are at full value, while the blue is at a value of 50, the pixel will appear yellow. Where all colour values stand at 0, the pixel is black, and where all are at 255 the display colour is white. The liquid crystal layer is responsible for determining how many electronic waves actually reach the three colour filters for each pixel. This is positioned between the LED backlight and the pixel layer (fig. 4.10).

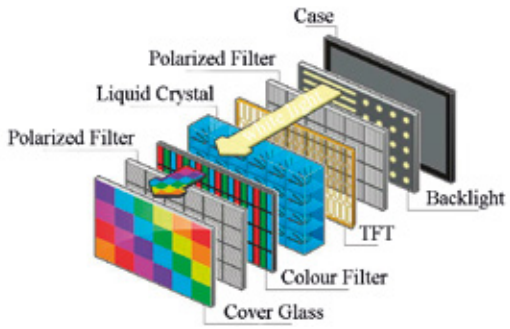


FIGURE 4.10. Layers of Liquid Crystal Display (LCD) screen.

A *Surface's* STRETCHED TEMPORALITY IN MULTI-EXPOSURE PHOTOWORKS

Like the screen, Eaton's negative operates as an interface. She 'sends' different colour lights to it by changing the filters over the lenses and the shutter of the camera. The receptive layers of the chromogenic colour negative react selectively and successively to the colour-filtered light waves. The chromogenic film negative holds three coupler-incorporated colour layers separated by interlayers which ensure that the blue, green, and red lights react only with each specific colour-sensitive layer. From top to bottom, the order of emulsion layers on negative is as follows: the blue-sensitive layer (with a yellow-coupler), the green-sensitive layer (with a magenta-coupler), and the red-sensitive layer (with a cyan-coupler). The negative remains in a susceptive state and its material will register any encounter with light, right up to the moment when it is enveloped by the colour developer that will ultimately react with the couplers. In its initial state, the negative retains the capacity to react fully with the three primary light colours (RGB), so as to produce the primary pigment colours (cyan, magenta, yellow, or CMY). Multiple

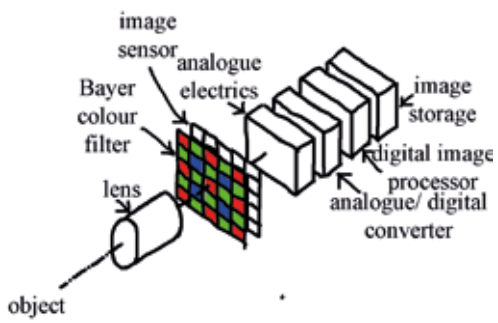


FIGURE 4.11. Processing layers inside the digital camera.

exposures are rooted in film-based practice because they arise from this feature of the negative – its ongoing receptiveness to new photons. A single exposure doesn't 'freeze' or max out the receptor's potential. In comparison, when the shutter of a digital camera closes, the numeric code of each individual pixel in the image field is saved to the flash memory card (fig. 4.11).

Here, the process of reading and storing the reflected light passes through several steps and therewith layers, of which – again, much simplified – the first is the lens, the second an infrared filter (which keeps harmful light out of the camera), and the last, just above the image sensor, the Bayer colour filter. The Bayer colour filter is particularly interesting in our context. It is a mosaic of tiny red, green, and blue colour filters, which splits the light into primary colours before the information reaches the image sensor. Each of these little RGB-filters covers one pixel. On reception, the sensor transforms the photons into analogue electronic signals. Up to this moment, when the electrons reach the digital converter, all of the image's information is transferred in analogue. From here on, however, it is a matter of numeric codes that are 'developed' by a digital image processor which acquires the numerical information that has been created by the Bayer colour filter and the individual pixels, and mosaics this information in grid-form. This processor also averages the information (via a software algorithm) to make the image smoother. Afterwards it is stored on a memory buffer and flash memory card.

Although there are several transformation processes involved, the pixel's information itself is not held in a consistent state. Once that information has been set, it cannot be receptive to further information from another exposure. In a temporal as well as a spatial sense, the pixel is limited to its individual position. Sobchack describes this characteristic of the pixel as follows:

> Digital electronic technology atomizes and abstractly schematizes the analogic quality of the photographic and cinematic into discrete pixels and bits of information that are then transmitted serially, each bit discontinuous, discontiguous, and absolute – each bit 'being-in-itself' even as it is part of a system (Sobchack 2016, 109).

This "being-in-itself" excludes any modification at the time of shooting. The pixel can be processed afterwards, which means that it is erased and supplanted by a new pixel that has no reference to the previous one. This quality reminded me of the distinction between particles and waves that Karen Barad makes – as a form of crash course in quantum physics and diffraction theory – in an interview for *New Materialism: Interviews & Cartographies* (edited by Rick Dolphijn and Iris van der Tuin, 2012). Here Barad explains:

> According to classical physics, there are only two kinds of entities in the world; there are particles and there are waves. Particles are very different from waves. Particles are localized entities that occupy a particular place in space and in time, and you cannot have two particles in the same place at the same time. On the other hand, there are waves, and waves are

FIGURE 4.12. Tacita Dean, *FILM*, 2011.
35 mm colour and black and white portrait format anamorphic film with hand-tinted sequences, silent, 11 minutes, continuous loop. Large front projection, projection booth, free-standing screen, loop system. Installation view Turbine Hall, Tate Modern, London, 2011.

> not entities at all. Waves are disturbances in fields (Barad in Dolphijn and Van der Tuin 2012, 60).

The pixel occupies a single and particular place in space and time, a place which cannot be 'inhabited' simultaneously by another pixel, unlike any spot on the film negative, which can receive new light input even after previous exposures. The consequence is that the already-exposed silver halides of a particular colour commingle with the newly exposed particles. This unique characteristic of film, its openness to multiple exposures, is explored by Tacita Dean in many of her cinematic works. In *FILM* (2011) and *Antigone* (2018), for example, she exposed 35mm films several times, using a complex masking system over the camera's lens to make a kind of collage of moving images within the camera (fig. 4.12). Both Dean's and Eaton's work have a mesmerizing effect on the viewer who is accustomed to digital post-production image manipulation. It is almost impossible to believe that these artists create their complex images purely 'in analogue' on film.

The consistent presence of the exposed silver halides (and of the non-exposed areas) from previous exposure(s), throughout a series of multiple exposures, gives the photographic surface of the negative a processual character. When viewed together with the pixel (grid), it immediately becomes apparent that the negative's material has a comparatively stretched temporality. Sobchack argues that "the primary value of electronic temporality is the discrete temporal bit of instant present" (Sobchack 2016, 112). This exists in opposition to photographic and cinematic temporality. In an earlier passage, she describes the electronic as something that has absolute presence in the present, in contrast to the enduring character of the photographic, having presence in a present that is always past (2016, 101). When considering photographic material, its presence in the present is not only determined by the photographed past, but also by the period of its existence. This means that the photograph's appearance is subject to the (ageing) processes that I will turn to in the next passages.

It is not possible to predict the behaviour, over time, of the primary pigment colours cyan, magenta, yellow (CMY) of a chromogenic photograph. Therefore we can say that the photographic surface acts according to its own internal processes. It is, to use Galloway's phrase, a "fertile nexus", autonomous in the sense that it has its own ability to generate new effects. The effects we witness on *Russian Diplomacy* include its fading to magenta and the yellowish discolouration of the white background. When we acknowledge the photographic surface of *Russian Diplomacy* as the photowork's fertile nexus that processes, translates, and mediates throughout its existence, we become aware that to witness the fading is to perceive, momentarily, an ongoing effect which lies outside the realm of the intentional.

4.3.
THE TRANSFORMING PHOTOGRAPH

In the concluding remarks of his essay 'Image as Trace: Speculations about an Undead Paradigm' (2007), German art historian Peter Geimer calls for an analysis of the unforeseeable or unintentional in images, which he opposes to the study of meaningful and intentional pictures:

> Especially against the background of an art-historical and cultural tradition of interpretation that has developed its methods above all through the analysis of intentional, composed, and "meaningful" pictures, the question still remains: what place will the study of images concede to contingency, to the unforeseeable event, to that which is unsusceptible to being composed – that is, the trace? (Geimer 2007, 24)

His analysis of the (photographic) image as trace concerns both the material coming into being of a photograph, and also those unexpected visual elements that converge with the photographer's artistic intention as they press the shutter (2007, 19). For Geimer, photographic traces "are not 'produced'; rather, they are brought about deliberately but in an uncontrolled way" (2007, 20). Returning to his call for an analysis

of the unintentional and unforeseeable in pictures, it strikes me that photography theory's concern with the notion of the trace focuses foremost on the photographic event: the encounter between light-sensitive material and light emitted from the photographed objects. And yet, this figure of the trace can also be of value when we consider the photograph's full lifespan. While certain dyes vanish, silver particles oxidize, surface textures change, the photograph remains a trace of a trace of a trace of… It does not transform into non-material, the non-photographic, but it is 'alive'. We need a term that can do justice to the precarious nature of photographic material in its continuous development, without implying the extreme end-point, destruction. I suggest the *transforming* photograph.[17]

The previous sections adumbrated an understanding that the photographic surface can be considered as a processual interface not only in the creation of the photowork but also after it has left the artist studio or darkroom. Here, in this final section, this processual passage itself comes centre-stage, to take my full attention. The aim that now I permit myself is to see how the changing photographic surface can ontologically shift our understanding of, and engagement with, photographs.

The reality of objects is blurred by expectations of visual accuracy, and contrived institutional narratives that seek to preserve the unpreservable or to present the impeccable. One of the editors of the volume *The Permanence of the Transient* (2014), which addresses precariousness in art, describes precariousness as something that can be inherent to many different facets of an artwork including "form, material, method of production, medium, presentation, reception, documentation, narration, collection, and conservation"(Maroja, Menezes, and Poltronieri 2014, xvi). Without going into the fine detail of what, precisely, the precarious nature of photoworks could entail, this angle raises an awareness of the ways in which institutions and artistic frameworks can misunderstand photoworks. In the real world, such misunderstanding can lead to situations in which the very collections that aim to protect photoworks for future generations can be destructive. Institutions become enemies of photoworks when they apply policies of reproduction and replacement – or even, in the worst cases, systematically destroy originals. This is, after all, a very delicate matter. Nearly fifteen years ago, the acclaimed French curator Nicolas Bourriaud alleged that endurance, whether of objects or relations, has become a rare thing, and this made him advocate for an appreciation of the transitory:

> Today, we need to reconsider culture (and ethics) on the basis of a positive idea of the *transitory*, instead of holding on to the opposition between the ephemeral and the durable and seeing the latter as the touchstone of true art and the former as a sign of barbarism. Hannah Arendt: 'An object is cultural to the extent that it can endure; its durability is the very opposite of functionality, which is the quality which makes it disappear again from the phenomenal world by being used and used up.' In this new configuration, the physical duration of the artwork is dissociated from its duration as information and its conceptual and/or material precariousness is associated with new ethical and aesthetic values that establish a new approach to culture and art (Bourriaud 2009, 23 and 32, emphasis in original).

Although Bourriaud's argument exceeds any medium specific boundaries, it can inspire us to throw wide our narrow understanding of what a photowork must be. In the following passages I discuss a number of contemporary photoworks which are unusual in that they expose their processual and transitory character when exhibited. By apprehending and enlarging this aspect of these works – an aspect that is present, to a greater or lesser degree, in any chemical based photograph – we can become aware of how every analogue photograph is a transforming photograph.

A CONTINUOUS STATE OF BECOMING

American artist Meghann Riepenhoff (b. 1979) is known for her site-specific photoworks. She sensitizes and develops photographs in particular natural locations, therein embracing and drawing attention to elements of chance and transience. For Riepenhoff, time and natural phenomena, as well as the photographic materials, are ingredients of her photographic process. When 'finishing' a body of work, she documents the outcome with digital photographs, thereby acknowledging that the photowork she has created is not fully fixed and will change its appearance over time. She sees the resulting digital files as documenta-

FIGURE 4.13. Meghann Riepenhoff, *Littoral Drift Nearshore #209 (Springridge Road, Bainbridge Island, WA 02.12.15, Fletcher Bay Water Poured and Fletcher Bay and Fay Bainbridge Silt Scattered)*, 2015.
63 cyanotypes, 289.6 × 548.6 cm. SFMOMA, Accessions Committee Fund purchase, San Francisco, United States.

tion material, meanwhile, the photoworks take on their own lives after leaving the artist's hands.[18] For the series *Littoral Drift* (2013–2017) (fig. 4.13), she used the cyanotype process, sensitizing sheets of paper with a mixture of an iron complex and citric acid, which become light-sensitive and are ready for exposure when dry. She placed her prepared sheets on the shores of various lakes and of the Pacific, then poured over and/or partially buried the sheets under sand, exposing them for a period that was measured in breaking waves (a duration of between one and five waves per exposure). Thus Riepenhoff registered all of it: time, place, light, water, sand, salt, silt, and her all-embracing gestures.

The developing and fixing of cyanotypes happens as a single step: with washing in water. This removes the soluble chemicals, leaving the blue image embedded in the structure of the paper's fibre. Riepenhoff's reawakening of this historic process is what draws these photographs into the contemporary world. Beyond that, their material and subject matter recall a rather dateless being, images that are still changing, as the seawater did not fully 'fix' or stabilize them – hence her term "dynamic cyanotypes". These dynamic photoworks admit their changing character, and so bring the processual quality of their creation and of their existence to the fore. Riepenhoff shares her thinking:

> Photochemically, the pieces are never wholly processed; they will continue to change over time in response to environments that they encounter. As part of the larger project, I selectively re-photograph moments in the evolution of the images, to generate a series of static records of a transitory process. [...] Perhaps where the fugitive cyanotypes are analogies for a terrifyingly fleeting and beautiful existence, the process of re-photographing them is a metaphor for the incorporation and mediation of photography in the contemporary human experience (Riepenhoff n.d., unpaged).[19]

The creation of the photoworks is as important to her as their longer evolution. After washing her exposed sheets of paper, Riepenhoff no longer intervenes in the development of the material; she leaves it up to the matter to change in natural response to encounters with its environment. In the fifth and final chapter 'Working Hot: A Materialist Ontology' of *Art Beyond Representation*, Barbara Bolt develops a theory of practice that accounts for the matter (of bodies and objects) that is involved in a process of creation. Herein, she refers to a characterisation of the aesthetic object by W.J.T. Mitchell in his article 'Representation' (1995) in order to alter it. Mitchell argued that "the aesthetic object does not 'represent' something, except incidentally; it 'is' something, an object with an indwelling spirit, a trace in matter of the activity of the immaterial" (Mitchell 1995, 16). While Mitchell regards the matter itself as "*not* eloquent" (Bolt), and the aesthetic object as "only" a trace "of the activity of the immaterial on matter", Bolt herself suggests that the object is a trace of the activity of matter *itself*, both human and non-human and "not a trace *in* or an impress *on* matter" (Bolt 2004, 170–171, emphasis in original). Here, Bolt develops an understanding of the work of art as a process that includes the mutable nature of the materials (and therewith matter) that the artist uses and which we witness in Riepenhoff's work.

When contemporary artists play with the impermanence of the photographic material, the game is consciously conceptual. The work *Standards & Poors* (2013), by French artist Sylvain Couzinet-Jacques (b.1983), is a series of Polaroids and silver gelatin photographs of abandoned construction sites in Spain, taken after the housing market had collapsed due to forecasts of real estate and financial crises between 2008 and 2011 (fig. 4.14). Couzinet-Jacques presented the photographs in rooms illuminated with UV lighting, which caused the Polaroids to darken, while the silver gelatin photographs were mounted in frames behind various colour-tinted glasses. In some cases, the colouration of these glasses protected the photographs' being affected by the UV light, while others were completely destroyed during the exhibition period. The destructive effect of UV lighting on photographic material becomes a metaphor for the Spanish sun and for the devastation of the financial crisis. More broadly, the installation is a meditation on the temporality of the material, the image, and life. Both Riepenhoff and Couzinet-Jacques use the transformative nature of the photographic surface to materially reflect their respective subjects. Both artists embrace the malleability of photographs (through internal and external factors), opening space for a more inclusive reception of life, afterlife, and the transcendent. The morphic quality of the analogue material is the metaphor for – or synedoche of – the relentless progression of nature. These works evaporate a kind of material immediacy. They touch us through their genesis as well as in their continuous and receptive 'exposedness'.

When Bolt broadens the 'representationalist' logic of the work of art by drawing such processes of transformation into it, "the body becomes language rather than merely inscribed by language" (Bolt 2004, 171). This sentence hints at a later concern of hers: how to theorize this entanglement of materiality and signification (she delves into the writings of several semioticians to work out her own answer). Her main interest, here, is the continuity between a work of art (the process of creation) and an artwork. However, her arguments can also be applied to the unfolding and extensive process of transformation that an artwork undergoes throughout its existence. Assuming such continuity, Bolt asks rhetorically whether "it is possible to argue that an image can exceed its structure as representation in a radical material performativity where it performs rather than stands for its object" (2004, 173)? This brings her to her materialist ontology of the work of art in which "the materialisation is not just enacted discursively" but "more radically, through material and somatic processes, materialisation implicates the life of matter" (ibid.). Such thinking is still provocative in the photographic context, where representationalist logic tends to dominate the general understandings of photoworks or, in Bolt's reverse formulation, of "the work of photography". In this last chapter, I introduce photoworks whose changing nature is part of the artist's conception. These works might engage us in a more inclusive understanding of the changing character of photographic materials in general, while also helping us to see how the matter *performs* the image, as opposed to *being* that which it depicts.

FIGURES 4.14. Sylvain Couzinet-Jacques, *Standards & Poors*, December 13, *2013*–January 12, 2014. Photographs and installation view, Le Bal, Paris, France.

PROCESSES OF (DIS)COLOURATION

Historic photographs and photoworks that visually age are usually seen as troublemakers by photographers and photo conservators in archives and museums. For the sake of preserving these sensitive objects of cultural heritage, acclaimed research centres like the Image Permanence Institute in Rochester, the Getty Research Institute in Los Angeles, or the Icon Photographic Materials Group (PhMG), assemble new research-based insights to develop methods and practices which can ensure the survival of these unstable artefacts. The Science4Arts research project to which this dissertation contributes was initiated after Monica Marchesi, paper conservator at the Stedelijk Museum, discovered the drastic discolouration of *Russian Diplomacy* while making a general inventory of photoworks in the collection. Van Elk's photoworks, in particular, led to an investigation of the problematic issue of photographic instability in mixed-media artworks.

The fading of *Russian Diplomacy*'s photographs to magenta, and the yellowing of the white background, are exemplary of the (dis)colouration of chromogenic prints from the 1970s and 1980s. This form of deterioration is familiar as the reddish cast that historic colour photographs sometimes take on in our family albums. It is fading not in the sense of bleaching out (which causes a loss of detail or contrast) but as an odd, complete, shift in the colour palette, through the (partial) lack of one or more of the three dyes. The reason it happens is that the cyan dye is the least stable of the three, which fade at different speeds. Counterintuitively, this disappearance of the blue dye, which is termed *dark fading*, has nothing to do with the overdose or lack of light (as is the case with *light fade* that arises through ultraviolet radiation and light). Dark fading is caused by the ambient temperature of the storage space. When it arises, there is an overall colour shift but not necessarily any loss of highlight detail. The recommended conditions for the dark storage of chromogenic prints are around 2°C temperature at a humidity level of 40 per cent (Pénichon 2013, 205; 231).[20] However, *Russian Diplomacy* was and is stored in a space with a temperature around 20°C (Winter: 18°C ± 2°C / Summer: 20°C ± 2°C) and a relative humidity of 50% ± 5%. As I explained in section 3.3., the mismatch is a consequence of the Stedelijk Museum policy wherein artworks are catalogued and stored in accordance with the artist's identity as photographer, conceptual artist, painter, or other. Van Elk regarded himself as a conceptual artist and his works were acquired by the department of paintings. Ultimately, this led to the destruction of this photowork, which has been held under "works on paper and mixed-media works (objects made from a combination of materials, such as paintings, installation art, or furniture)".[21]

In conservation terms, the current condition of the chromogenic photographs of *Russian Diplomacy,* like the contemporary photoworks made by Riepenhoff and Couzinet-Jacques, could well be identified as "chemically damaged", as described in Kristel van Camp's extensive 'Damage Atlas for Photographic Materials' (2010). I will now give a brief account of this conservational approach, with a view to proposing a new theoretical take on (dis)colouration – one that offers a different angle on visual and material changes to photographs.

"Chemical damage", as Van Camp defines it, is when the chemical constitution of a photograph has undergone change on an atomic and molecular level. It can be caused by hydrolysis, oxidation, or photochemical processes. As substances and/or gasses interact, certain chemical bonds in the photographic material are broken, and/or compounds change. Temperature and light can provoke and accelerate these molecular alterations, as is made particularly apparent in Couzinet-Jacques's exhibition. Such damage visually manifests foremost as material decomposition or a change of colour. However, as Van Camp states, chemical changes in the first phase are difficult to detect. One reason for this is that the causes are both external and internal. In certain photographic processes, such as the chromogenic process, there is always a possibility that the appearance will change over time because of the inherent instability of the dyes. Internal causes reside in the material itself, though they depend on many factors during the production of the photographic material and through its development following exposure.[22] Geimer refers to this inherent material changeability as the "original accident", something that he describes in detail in the context of inadvertent texture phenomena:

> The possible destruction is not an event that suddenly befalls a technological product – or a technique of depiction – from somewhere else. The accident is original. To manufacture an apparatus and set it in operation is also to produce "a specific failure, or even a partial or total destruction". By consequence, it is virtually impossible to maintain a systematic distinction between internal and external, immediate and subsequent, agents of destruction (Geimer 2018 [2010], 34).

Hence, characterizing these changes as forms of damage should always be queried.[23] This is a process that concerns internal qualities of the material, qualities that naturally change over the lifespan of the photograph, and it doesn't seem appropriate (outside the conservation context) to define these internal, even inevitable processes as damage. In the beginning of her damage atlas, Van Camp herself addresses the imprecision of definitions of damage (and by extension of the undamaged).[24] Later, she questions whether natural ageing should be seen as damage, and concludes that a decrease and therewith deterioration in condition – albeit through inevitable ageing processes – can nonetheless be seen damage. However, the internal or external causes "are not always clear-cut". In a concluding remark she asks: "If natural aging can not be considered as damage, then where is the thin line between the two and who decides on the context and the interpretation?" (Van Camp 2010, 14). The context and interpretation usually falls to photographers, curators, and conservators and they are, accordingly, dictated by practical and preservative concerns, based on an artist's intention or an audience's values and expectations.

In an article in the *Journal of the American Institute of Conservation,* philosopher Kayley Vernallis extrapolates from the impact of colour fading to consider the meaning of photographs within aesthetic theory. This is a more reflective side of the discourse concerned with the changing appearances of photographs, and it is a quieter side – often underexposed. Vernallis described how, on one side, philosophical literature has not tended to address specific practical problems such as the colour fading of images, and on the other side, the conservational judgment and treatment of photographs doesn't tend to accommodate (or afford) philosophical reflection (Vernallis 1999, 475). Vernallis asks *why* the ageing of colour photographs is conflated with a loss of meaning. As response, she investigates the consequences of colour fading for the representational and intentional meaning of photographs, and considers the formalist aspects of photographs, before additionally discussing the *virtues* of colour changes. Opinions on how to deal with a changing photographic surface are subject to present opinions; just like photographic materials and technologies, they change with times and (cultural) environments. In a contribution to the 2008 ICOM CC conference[25], 'Changing perspectives on color photography', Peter Mustardo and Nora Kennedy (of The Better Image photo restoration company) assert that in general, audiences are becoming used to certain 'patinas' in/on/of photographs:

> Just as we have grown to favor salted paper prints with yellowed highlights and gelatin silver developed-out images with a silver mirror sheen in the maximum density or dark areas as acceptable and even desirable signs of age, unbalanced color (or color-shifted) images are gaining a certain charm that their creators never intended and in many cases are horrified by (Kennedy and Mustardo 2008, 693).

Nowadays, in many cases, a whiff of nostalgia adds value to ageing photographs. There is a blossoming market for, and interest in, *vintage prints*, and this doesn't necessarily align with conservational sorrows. Of course, a dramatic change of colour is usually still a big loss, but as with photographs from the nineteenth century, certain effects of deterioration are tolerated, if not appreciated, and can be seen to add the value of singularity to the artefact (2008, 694). Kennedy and Mustardo relate this change in attitude to the increasing rarity of original works "from the heyday of chemical colour photography". Vernallis frames things a little differently, but she too thinks of the precariousness of photographs that have been passed down, and will continue to travel through the generations, and she sees this precariousness as something that will affect opinions about the condition of these photographs:

> [...] while it does seem plausible that *today* our hopes of grasping a color photographer's vision depends upon arresting fading, the situation may be different for viewers late next century, especially since effective conservation measures would undoubtedly affect only a small percentage of color photographs, while the vast remainder of fading photographs may set the paradigm for future viewers' sense of the photographic look most conducive to retrieving the intentions of 20th-century photographers (Vernallis 1999, 472, emphasis in original).

In Geimer's essay on the trace, we find a fruitful characterization of historic (dis)coloured photographs as "evidence for an archaeology of photography" (Virilio, quoted by Geimer 2007, 9). This might explain our interest in them. As the editors of *Materialities of Passing: Explorations in Transformations, Transitions and Transience* (2016) explain, the *raison d'être* of archaeology is not only in the objects of study as remnants of the past, but also in their function as compasses with the potential to help us navigate the present and the future (Bjerregaard et al. 2016, 4). The mobile or motional aspect of this passing of photographic objects will be elaborated in the next and final part of this section. To return to the processual nature of colouring photographs, we must first understand our perception of the colours they hold and present.

Given that the colours of a chromogenic photograph are only ever an approximation of the photographed objects' reflected colours, and limited by technical means, why would we necessarily characterize any change as *dis*-colouration?[26] In this context, Sean Cubitt's genealogy of visual technologies can once again offer a useful overview into the nature of colour in the realm of print and digital media. For Cubitt, colour is neither subjective nor objective, but projective. It comes about through the synergy of our cerebral perceptions and wavelengths, or, as Cubitt puts it, "[n]either produced by us alone nor an exclusive property of the world, it belongs to the intersection, the mutual greeting of human and universe" (Cubitt 2014, 112).[27]

The consequence is that colour as a variable is inherently processual – it is not a static parameter: "[...] the complexity of colour

perception at the brain end of the process and the equally immense complexity of light sources and spectral and specular reflection suggest that colour may well be unrepeatable" (2014, 112).[28] The photographic recording of light not only gathers light, but processes it according to the configurations of the techniques and the apparatuses used. Cubitt explains that there are some sixty thousand elements of photoreceptors per square millimetre at the centre of the human retina. Colour photographs, by comparison, have about thirty thousand (and digital cameras, twenty thousand) (2014, 113). The reduction leads to *new* colours every time, thus making every photograph an ontological "evidence of the gap between the light of the world, the light in our eyes, and the light reflected from a photo" (ibid.).[29] As the colours of the photograph change over time, the gap between the initial reflected light, and the picture's current light, widens – and is naturally bridged by the viewer's imagination and/or memory. We even might argue that intra-action (between our perception, the processing of the visual information offered by the photograph, and the transformational power of imagination and memory) is the true processual interface in this encounter between (dis)coloured photograph and viewer.[30]

"Discolouration requires seeing them [things] in another light", writes the philosopher Eli Friedlander, in his analysis of Walter Benjamin's autobiographical text *Berlin Childhood around 1900* (in which there is a passage entitled 'Color') (Friedlander 2011, 45). Friedlander, seeking to understand the relationship between mood and the experience of colour in childhood, touches briefly on the phenomenon of discolouration. He considers the mood created by looking at colour as an experience of *immersion,* and suggests in opposition to this, a vision of discolouration as causing a *detachment*.[31] Discolouration means "a falling out of attunement with the world, as though by losing the texture that makes a being belong to its world" (ibid.). When photographs lose their colour reference to the depicted past, a similar anxiousness might creep into our veins. The lost dyes are as irretrievable as

FIGURE 4.15A. Louis Jacques Mandé Daguerre, *Boulevard du temple*, 1838. Image from reproductions, originally Daguerreotypie, 15×18.5cm. Bayerisches Nationalmuseum, Munich, Germany.

FIGURE 4.15B. Sylvia Ballhause, *The Munich Daguerre-Triptych (left)*, 2010 (2014). C-print, 72×90cm. Detail of Louis Jacques Mandé Daguerre's *Boulevard du temple*, 1838 (in current state).

the moment that has passed. I want Friedlander's and Benjamin's take to exemplify here how discolouration is entangled with emotions and associations of affect.

But as Friedlander says, "not to see things is different than seeing them discoloured" (ibid.). One extremity of photographic (dis)colouration manifests as a monochromatic (sometimes speckled) surface where both contrast and colours have evened out. As Geimer recounts, the very first iconic photographic images (such as Daguerre's *Boulevard du Temple* (ca. 1838), or the images in Talbot's *Pencil of Nature* (1844–46)) populate photo history compendiums as phantom images. Meanwhile, the archived originals are now plates or papers with an abstract patterned surface beyond any subject recognition (fig. 4.15a & b). "So the surviving pictorial inventory of the history of photography stands in for a larger reservoir of effaced and vanishing images" (Geimer 2018, 32). A metaphorical and literal "fog" surrounds the beginnings of photography (to borrow from Walter Benjamin's *Kleine Geschichte der Fotografie,* 1931) and this fog will also suffuse the beginnings of chemical colour photography of the more recent past. And on it goes, as representations (will) vanish from the photographic surface, the surface itself continues its transformative processes. Continual

movement is the emergent property of this processual characteristic of photographic surfaces. This movement lingers in the – for the present – static appearance of photographic objects. Only by comparing of two or more moments of apparent stasis from different points on the trajectory of a single photograph can one intimate the material's *motional* change in between.

TRANS- (TRANSFORMATION, TRANSIENCE, TRANSITION): MOVEMENT IN PHOTOGRAPHS – PHOTOGRAPHS IN MOVEMENT

In photography, permanence and transience go side by side. Both are intrinsic to almost every photo that holds a fraction of a passed moment. "Photography […] is the uneasy maintenance of binary relationships; it is the desire to represent an impossible conjunction of transience and fixity" (Batchen 2000, 11) writes Geoffrey Batchen, in pursuit of Talbot's metaphorical take on the (at that time) "new medium". The frozen subject matter refers naturally to the passing of time and metaphorically to our own mortality, and because of this, photography is widely discussed in analogy with death. In this last section, I focus instead on processes of passing *within* a photograph, processes that connote some intrinsic movement which can be opposed to a static existence. But what movements can we think of? And how might we address them theoretically?

As previous sections and chapters have revealed, there can be an upwards migration of silver particles during the various phases of developing silver gelatin and chromogenic prints (through washing and bleaching). In this migration, the particles 'leave' the photographic surface. And later, silver particles can travel through the gelatin emulsion of an ageing photograph, up to the surface, where they form a silver mirror or oxidize (as described in chapter three). In deteriorating chromogenic prints, dyes (or dye couplers) can react with external chemicals to cause the formation of stains. All of these (molecular) movements (and many others, dependent on material and photographic processes) are closely related to the consistency of the gelatin layer, which is determined by temperatures and humidity (as described in chapter one). Beside the motions of particles, we also have the flexibility of the gelatin layer, which can swell and shrink when soaked or dried. The effects of this spreading and upward movement become especially visible when juxtaposed with craquelure paintwork, which is more rigid when dried (as in Dean's *Crowhurst II,* chapter one), or, when the gelatin takes on its own micro-cracked pattern following extreme temperature differences during development (as in Yokota's s*ite/cloud no.11,* section 4.1). The passage of time manifests in space.

The prefix trans- is common to the closely linked processual phenomena of transformation, transition, and transience. It implies movement beyond or across, a point of attention in my third chapter, in which I discussed the biography and itineraries of photographs. In this last chapter, the temporality of movement joins the previously discussed spatial aspects. Through this, we can understand the various forms of interfaces (as dynamic spaces of relations, again following Johanna Drucker's characterization) that play a role in a photograph's life. Batchen, quoting Talbot, characterizes the photograph as "[…] an emblematic something/sometime, a 'space of a single minute,' in which space becomes time, and time space" (2000, 11). I read Batchen here as saying that the photographed moment in space is condensed in the form of a flattened fraction of time. And also, this slice of time is spatially stretched through the photograph's existence. The space and time of the photograph's passing are nevertheless hardly perceivable, as any time we experience them they are fragmented, like snapshots of snapshots. To convey what I mean here, I would like to invoke Tim Ingold's description of the temporality of landscape in *The Perception of the Environment*:

> […] what appear to us as the fixed forms of the landscape, passive and unchanging unless acted upon from outside, are themselves in motion, albeit on a scale immeasurably slower and more majestic than that on which our own activities are conducted. Imagine a film of the landscape, shot over years, centuries, even millennia (Ingold 2000, 201).

The pace of a changing landscape might appear incomparable to the photograph's pace, but it exemplifies the shortfall of human perception when attempting to track these kinds of long-term mutations.[32] The only act of transition *in* the photograph that can be witnessed by human perception is the moment when a latent image appears within the developer bath in the darkroom. Rising slowly through the liquid from the plain ground of the exposed support, this is the most visible gesture of the photographic surface as a processual interface. When we think of the *dark fading* of chromogenic photographs in darkened storage spaces (as was and is the case in *Russian Diplomacy*), a dialectical parallelism is striking. With both, the appearing and fading movements of the dyes are manifestations of passing; they are equally acts of transition. As the editors of *Materialities of Passing* explain, these "materialities of passing" can sometimes offer us an understanding or conception of time and temporality, even though time and death have no intrinsic materialities (Bjerregaard et al. 2016, 1). They argue that

> […] particular sensuous and material qualities constitute frameworks for reflecting on or understanding the temporality of death and decay. In different ways, time and temporality assume pace, scale or volume, and essentially become available to the senses and not simply to abstract reflection (2016, 7).

The continuously changing matter of photographs can (at once referentially and metaphorically) trigger reflections on the binary relations between life and death, impermanence and permanence, transience and fixation, and, as Talbot adds, the momentary and the eternal (Batchen 2000, 11). I argue that a photograph moves in the interface between these opposites – as if it were itself a dynamic space – by never quite relating fully to one or to the other. For this reason I am inclined to see the photograph through analogy with the vicissitude of passing, rather than the more prevalent analogy which considers the photograph's relation with the stasis of death. Many ontological writings on photography return to this analogy. But a photograph is a transforming object, not a dead one; although depicting one moment in time, it lives on materially.

Anca Cristofovici's *Touching Surfaces: Photographic Aesthetics, Temporality, Aging* (2009) argues that the photographic me-

dium is able to construct visual analogies to inner psychic experiences by illuminating reciprocal relations between photography and ageing. A photo of ourselves reveals us as alike subject to transcendent physical processes. There seems to be some deep human urge to freeze aspects of our fleeting life, to extend its singularity. This urge manifests in photo preservation just as it does when we preserve ourselves through contemporary (digital imaging) technology.[33]

Absence of Existence (2016), a work that Dutch photographer Phelim Hoey (b. 1984) produced for his degree show, comes to mind here. Hoey portrayed cryonicists and other people who wish to be (cryo)preserved after death. The subjects contract American companies such as Alcor and CI to store their bodies in extreme cold conditions after legal death, in the hope that advances in science will make it possible to revive them and restore them to health in the future: the possibility of a new (immortal) life. The method that Hoey used to 'preserve' these persons in his photos is rather peculiar. He collaborated with Chris Voigt, a synthetic biologist who manipulates cells in order to fight diseases (that is, to extend life). Voigt offered Hoey a modified E.coli bacteria to which he had added a photosensitive gene, which he had extracted from a photosynthesizing blue-green algae. In brief, Hoey suspended colonies of this light-sensitive bacteria in flat glass petri dishes, and then exposed them, to create portraits of the cryonicists (fig. 4.16). These living photos are now stored in the cooling cells of the laboratory at Wageningen University in the Netherlands (after exposure they were not allowed to leave this regulated secure space). But their images live on in the digital realm, assuming a ghostly new afterlife just like the phantom images of the earliest photographs whose originals are

FIGURE 4.16. Phelim Hoey, *Garret* from the series *Absence of Existence*, 2016.
Image retrieved from a solution of light-sensitive E. coli bacteria exposed under a negative.

FIGURE 4.17. Julia Margaret Cameron, *Sir John Frederick William Herschel, 1st Bt,* 1867.
Albumen Silver Print, 35.4×27.3cm. NPG P201, National Portrait Gallery, London, United Kingdom.

safe behind closed rooms, away from public view. One of Hoey's photos reminds me of Sir Herschel's iconic albumen silver print portrait that was made from a glass negative in 1867 (fig. 4.17) by Julia Margaret Cameron (1815–1879). 155 years old, this Cameron portrait is kept in the cooled dark storage of the National Portrait Gallery in London. The images are associated in my mind because both depict a male subject, rising out of a dark background, with a concerned expression on his face. There was also something else that gave me a sense of *déjà-vu*: the visual edges of the photosensitive emulsions that present themselves in the upper part of both photographs. In Herschel's portrait we see that Cameron did not apply the emulsion of egg white (the albumen) over the whole glass plate, or perhaps the emulsion of the glass negative was abraded along the edges before the albumen paper was exposed to it. In the Hoey portrait, ruptures in the bacterial emulsion visually reveal the image carrier – the petri glass.

These signs – abrasions, ruptures, stains, mirrors, or colour changes – in short, any and all traces of the photograph's processual nature, take us not only "beyond the sign to the facts of matter", as Barbara Bolt has phrased it (Bolt 2004, 179–180), but to the movement of transforming matter.

In the mid-nineteenth century, soon after the introduction of albumen paper (on which Herschel's portrait was developed), many photographers were surprised to observe that their photographs were fading and yellowing. Photos that were exhibited were vanishing even before the end of the show. To arrest this disappearance, a Fading Committee was established in England in 1855, and there were similar initiatives throughout Europe, as has been recounted by Geimer (2018, 32). This history indicates that the changing nature of photographs is itself a phenomenon that has endured across history. To be aware of it is to acknowledge and perhaps even to value the reality that matter *performs* an image, rather than *becomes* that which it depicts. Ageing continuously, we move along with these artefacts of passage. We bear witness to the fact that they belong to a temporality that is suspended in a movement which stems from their own inner matter. As we look at these transforming photographic surfaces with different lights and angles, there is so much we can learn about our own becoming, being, and passing.

In conclusion, the photographic surface becomes a processual interface through the many stages and encounters it passes through – from its initiation, via exposure and development, and through to its existence in the world. The *last* physicality of the photograph is particularly significant to my concluding argument: I am thinking here with this singular photographic surface that transfers and transforms throughout the whole picture-making process. The famous ability of a photograph to show that has been, Barthes's *ça a été*, is also present as accumulated visual traces (from the artist's gestures, various image devices and carriers, or chemical intra-actions), along the path of its processing. A surface's ongoing receptiveness to new photons (over multiple exposures), right up to the moment at which it is developed and fixed, is a key characteristic of this processual interface. Our consideration of the negative through comparison with the digital process has revealed how the negative's receptive material contains a temporality that can be far more stretched than that of the pixel, which is temporally and spatially limited to its individual position.

If the material itself does not physically carry all the successive states of its coming-into-being, nonetheless, we can still speak of the entire image-creating process – including the continuation that can lead to (dis)colouration – as the photowork's "grand interface" (Galloway). Here, the photographic surface can be encountered as a force that *reflects* as well as a force that *acts*: something that (re)acts to both internal and external processes (and chemical bonds) which contribute to it embodying a "fertile nexus" (Galloway), as we witness in *Russian Diplomacy*'s 'processing'. The long-term development of the photograph underlines the fact that its surface *performs* the image, as opposed to *being* that which it depicts. A continual movement springs from this processual characteristic and the motion lingers in the – for the present – static appearance of photographic objects. If we were to speed up a film recording of the photograph's full life, from the process of development through to its final existence in storage spaces – passing through the transformative movements of becoming and passing, or appearing and fading – we would witness what a "dynamic space" (Drucker) the surface truly is. In this movement, photography's analogy with death becomes obsolete.

ENDNOTES

1
During his lifetime Van Elk consented to replace other deteriorated photoworks with completely new photoworks. This has been documented and theoretically discussed by art historian and modern art conservator Sanneke Stigter in two articles (Stigter 2004 and 2005).

2
For a conservator, the question of how to deal with ageing photographs is even more difficult when the photographic surface is partly painted or permanently covered through face mounting or plastic lamination. A replacement of the photograph is then an even more delicate matter, if not an impossible endeavour.

3
Sir John Herschel introduced the term 'photography' to the Royal Society of London (and thereby to the world), in a lecture on March 14, 1839. The ensuing excitement concerned the possibility of fixing a silver image, rather than the possibility of creating one. Herschel found that sodium thiosulfate was a perfect solvent of silver halides. He introduced it to the photographic process as an essential fixing agent: it was able to wash away non-exposed halides after exposure, thereby stabilizing the latent image. Halides continue to be susceptible to light if this susceptibility is not removed. Without Herschel's panacea, therefore, the whole image would soon vanish into black oblivion.

4
I also consider the interior of the camera as a form of interface, through comparison with contemporary interface theories. In this context of electronic cultural dominance, it is important to relate to digital technologies as they alter our perceptual orientation in and toward the world, and therewith also to the chemical-based photographs that take centre-stage in this dissertation.

5
For in-depth reading on the (historical) development of Cibachrome print materials and their specifics, including their image sharpness, see Michael Talbert's https://www.photomemorabilia.co.uk/Ilford/Cibachrome.html (accessed March 10, 2019).

6
See, for example, the list of artists in the catalogue *Light, Paper, Process: Reinventing Photography* (2015) by Virginia Heckert.

7
Information retrieved from an email interview with the artist, July 2014.

8
Information retrieved from a conversation with the photographer on February 3, 2017.

9
For further reading see the subsection 'Studios: Dark Rooms, Glass Houses, Black Tunnels' in Noam Elcott's *Artificial Darkness – An Obscure History of Modern Art and Media* (Elcott 2016, 34–46).

10
This is the case, unless she were to flip the film holder at the back of her large format camera.

11
Barad describes the mystery of diffraction in quantum physics as follows: "So while it is true that diffraction apparatuses measure the effects of difference, even more profoundly they highlight, exhibit, and make evident the entangled structure of the changing and contingent ontology of the world, including the ontology of knowing. In fact, diffraction not only brings the reality of entanglements to light, it is itself an entangled phenomenon" (Barad 2007, 73).

12
Light is made up of the respective wavelengths of the different colour. The negative, like the eye, 'reads' the wavelengths that are reflected from the photographed or seen object as colours. The visible spectrum runs from dark red at 700nm, red (665 nm), orange (630 nm), yellow (600 nm), green (550 nm), blue (470 nm), Indigo (425 nm), to violet at 400 nm.

13
With touchscreens, this can include the interface between humans and hardware *and* software.

14
This text is also included in the fourth chapter of *The Practice of Light: A Genealogy of Visual Technologies from Prints to Pixels* (2014).

15
Single-chip projectors do this sequentially, so that the three versions mix optically in the viewer's eye and create an image there. More complex and expensive three-chip systems do it simultaneously: there is one chip for each of the three colours; the image is then sent 'at once' to the screen. The difference between DLP technology and LCD/ LCOS technologies is that DLP uses rotating filters to achieve the threefold colour projection.

16
Cubitt mentions how difficult, if not impossible, it is to achieve perfect black or dark. He explains why: "The distinction, read in machine code as that between ones and zeros, is however less clear in engineering terms, where the residual refracted light of a previous 'one' will always interfere with the present 'zero': absolute dark, like the absolute absence of electrical charge, is a physical possibility only under extreme laboratory conditions. To produce the effect of difference, which is the crucial feature of digital information, requires careful manipulation of the material form of the wave constituting the passage of a photon through the fibre" (Cubitt 2014, 57).

17
Changes to the photograph that are produced by mechanical damage due to harmful treatment by people (such as folding, fingerprints, stains, or other forms of vandalism), are not included in my argumentation.

18
To assist my consideration of the changing nature of *Russian Diplomacy*, I want to zoom in on Riepenhoff's practice of digitally photographing her photoworks. Artists including Sylvain Couzinet-Jacques and Riepenhoff visually 'preserve' fractions of their photoworks's lives when documenting them like this (either in exhibition shots or in digital photographs of single works). Their practice suggests another possibility for the conception of a discolouring photowork such as *Russian Diplomacy*. Taking, or having taken part in, the photowork's biography, these documentary photographs are not part of the actual photowork but rather, references to points along the axis of its existence. Van Elk made several studies leading up to *Russian Diplomacy*. One of these studies, made with pencil and gouache on colour photograph, is held in the collection of the Kröller-Müller Museum, Otterlo (53 x 50cm). Six others, on a single sheet of sketching paper (75 x 103cm, at that time in the hands of the artist himself), are displayed in the four-page brochure for *Russian Diplomacy* that was published by the Stedelijk Museum, Amsterdam. In those six studies, Van Elk experiments most prominently with the angle of the triangular frame and the positions of the figures within it. He uses (coloured) pencil on paper and colour photographs. In 1977, Van Elk made another photowork, with the same title and same technique as our case study, but with a more acute angle on the upper part of the frame. All of these photoworks can be seen as references to the coloured *Russian Diplomacy,* along with the various photographs of it that were taken by the staff of the Stedelijk Museum for publication and registration purposes. And when there is a new (reproduced) version of the work, as with *C'est moi, qui fais la musique,* the original photowork is kept as reference material 'underneath'. A paradoxical shift.

19
For Riepenhoff's complete statement on *Littoral Drift* see http://meghannriepenhoff.com/project/littoral-drift/ (accessed November 15, 2018).

20
Whereas for silver dye-bleach prints, for instance, a temperature below 20°C and humidity between 30 and 50 per cent are sufficient for a stable environment. See also Marchesi 2017, 236.

21
For further reference on the storage policy of the Stedelijk Museum see https://www.stedelijk.nl/en/dig-deeper/collection-care-conservation/collection-care/storage (accessed January 23, 2023).

22
We have a substrate and emulsion, chemicals and tools (machinery, pincers, hands etc.), all of which can be used when making the photographic object (Van Camp 2010, 17–19) – and any of which can be contaminated.

23
Perhaps the term failure would be more appropriate? See the introduction to *Photography and Failure: One Medium's Entanglement with Flops, Underdogs and*

Disappointments (2017), edited by Kris Belden-Adams.

24
Van Camp's solution fuses two descriptions of damage, one from a conservation perspective, the other from a juridical. Her description reads as follows: "Damage is something that by an effect on our level of understanding and enjoyment or on the object's life-span causes a decrease in condition. It can be determined by comparing two states, the actual state after the wrongful action and the initial state where the damage has not yet occurred" (Van Camp 2010, 11).

25
Abbreviation for International Council Of Museums – Committee of Conservation.

26
Relatedly, Geimer questions the characterization of chemical failure in the second chapter 'Visibility by Destruction/ Disturbance: Incidents of Photography' of *Inadvertent Images: A History of Photographic Apparitions* (2018): "The chemical and physical processes as such cannot be described in these terms. What happens in the developing bath is what happens; there are no correct or incorrect outcomes; the chemical behaviour of an emulsion knows neither success nor failure" (Geimer 2018, 48).

27
Karen Barad's conception of intra-action is again relevant, here showing how a differentiation between subject and object is obsolete.

28
Generally, as Cubitt rightly asks, the critical question concerns whether colour as perception is communicable at all, and to what degree – given that everyone seems to see slightly differently, or even, in the case of colour-blind people, extremely differently (Cubitt 2014, 113). When we grant that the senses themselves are products of cultural conditioning, as Cubitt says (citing historian of colour John Gage), we realize that we are always already in a speculative domain when it comes to judging the colours of a photowork.

29
An alternative conservational treatment, briefly examined by Stigter, is particularly interesting in this context. Photoworks can be retouched within the exhibition space with the use of specific coloured lighting, like theatrical stage lighting. Projected coloured light visually absorbs (dis)coloured parts of the photowork and thereby 'recovers' the colour balance in the photograph, without harming its material condition (Stigter 2004, 107–108). This is an example of an intra-action between the gallery's lighting, the viewer's perception and the photowork's appearance.

30
See Johanna Drucker's reference to Donald Hoffman's "interface theory of perception" in *Humanities Approach to Interface Theory* (Drucker 2011, 15).

31
Drawing on Benjamin's passage *The Moon*, here, the 'mood of colour' clarifies as day shifts to night and the whiteness of moonlight discolours the universe of Benjamin's childhood bedroom. In the context of Friedlander's analysis, this link between being and discolouration establishes that colour is an important facet of a child's fantasy and of memories of childhood. Friedlander opens his essay by explaining why certain images of childhood (whether photographs or phantasy images) can awaken feelings of homesickness and prompt a profound insight or experience of the "irretrievability" (Benjamin) of the past (Friedlander 2011, 45).

32
Fortunately, densitometric monitoring of black-and-white and colour prints can detect anomalous changes (through regular density readings) and so it is used by museums for the care of photoworks. See Chapter 7 in Wilhelm Henry, *The Permanence and Care of Color Photographs: Traditional and Digital Color Prints, Color Negatives, Slides, and Motion Pictures* (1993).

33
For instance, Thomas Ruff and Rineke Dijkstra, both highly acclaimed photographers, decided (in collaboration with collectors and collections) to reproduce chromogenic colour prints of certain works which they had made in the 1990s. The reproductions were made either as inkjet prints, a very different technique, or again as chromogenic photographs, but with the technological means and papers of today. I argue that a change of material also changes the artwork and ultimately affects its production of meaning. The works that I encountered in these projects were portraits of people made in the nineties with the fashion 'look' corresponding to that particular period. In the photographs, a common red discolouration, and fading and/or vanishing of the blue tints, will be recognizable to anyone who has albums at home from the seventies, eighties or nineties. Monica Marchesi discusses critically the wish of three Dutch photographers, including Rineke Dijkstra, to reproduce their chromogenic works held in the collection of the Stedelijk Museum in her dissertation's coda (Marchesi 2017, 248–260).

Concluding Remarks

Photographs are *not* significant surfaces. This study contests the dissertation's opening sentence. To equate images with surfaces in the context of photography, as Vilém Flusser does in his *Philosophy of Photography*, is simply wrong. This dissertation reveals that, if anything, the surface's material *performs* the image – and this is what renders its significance. The performance participates in the photograph's continual movement – of becoming and passing, or appearing and fading – despite the (for the present) static appearance of photographic objects. Making an appropriate response to the conceptual and conservational challenges of the three case studies, then, means establishing a new definition of the photograph, inspired by new materialism, as an object of *becoming*, rather than of being. This is my dissertation's central contribution to the corpus of photo-theoretical knowledge.

Three hybrid photoworks form the core of my research: *Crowhurst II* (2007) by Tacita Dean; *Dutch Grey* (1983–84); and *Russian Diplomacy* (1974), both by Ger van Elk, all painted analogue photographs from the second half of the twentieth century. These three works were the starting point for my study of this wide and varied field of artworks known as photoworks. My intention was to open a methodological pathway for future researchers: I adopted a multi-angled analysis of photoworks, panning back and forth between material, technical, theoretical studies, and the object. The subject's hybridity raises theoretical questions that can throw new light on existing theories.

My first two chapters offered a deep and detailed exploration of the physical and material characteristics of *Crowhurst II*, and of photographs in general. In discovering how the photographic surface does *not* physically resemble the photographed textures, nor does its texture undergo physical change, I was able to conclude that the prevalent theoretical analogies for the photograph – as trace, as footprint, or as imprint – are not apt. Only the composition of the gelatin surface layer changes after exposure and development, and this is why I introduced a new conception of the photograph as *charge*. Without changing texture, the photograph is charged (physically and visually) with the image of the photographed through the workings of light.

Material textures (of the carrier mediums' surfaces) and visual textures (grains or dye clouds) literally mould the textures of the photographic image. They come with meaningful biographical information concerning provenance and maintenance – the story of the photograph. These diverse material forms and indexicalities enrich the subject matter of photographs and bring new insights on the unique nature of original prints – whether or not there is a novel application of the kind that we see in *Crowhurst II*. Intended and unintended marks may be perceived to damage the photographic surface, but they also broaden the content of the photograph as (functional or affectionate) interactions add layers of meanings. These marks of interaction act as physical *indices* that refer to their causes and thereby direct the viewer's attention to the (social) biography of the photograph and the photowork.

Having approached *Crowhurst II* through tactile perception in the second chapter, I came to the conclusion that it is a *haptic photowork,* stimulating an embodied and thereby affected perception within the viewer. This effect stems from the photowork's unprotected open surface, a haptic display which defies common conservational framing practices and acknowledges the presence of both bodies: that of the photowork and that of the viewer. From here, I explored wider tactile engagements with photographs through moments of creation (in the darkroom), handling, consumption, and affect – all "haptic temporalities" that the photograph shares with different beholders in different environments throughout its existence. The more I looked into these encounters, the more the photographic process appeared as a primarily haptic endeavour, despite the prominence of its visual agency.

As I sought new ways to relate and to conceptualize the invisible that is conjured by the photographic surface, I arrived at a characterization of the photographic surface as a form of *horizon-interface*. A horizon dominates *Dutch Grey,* the case study of my third chapter. In a landscape, horizon is what separates the visible and invisible. It is subject to the position of the person who perceives it and conversely, the person's view is determined by the horizon. I concluded that we cannot characterize the photowork's subsurface as merely invisible, but as a matter of our own blindness. We find redress for this blindness by taking different viewing angles and by deepening our material apprehension of a photograph as multi-layered object.

A photographic image, as it is perceived, is produced by an accumulation of miniscule image particles that are stacked on one another to different levels within various gelatin layers. The fact that this stacking concerns the entire thickness and consistency of the emulsion layers gave rise to my characterization of the photograph's inside as a material *thickness of field* which creates the image of any analogue photograph. My attention to and analysis of this dimensionality (at a microscopic scale as much as on the scale of the whole object) led to a three-dimensional reimagining of another photo-theoretical concept, the *blind field*. Historically characterized as the off-frame – the invisible scene just outside the picture frame – I introduced a new notion of the blind field as part of the photograph's in-frame. This notion encompasses those elements that are not visible to us when we look at a photograph, but are nonetheless present in its depicted depth and its material thickness.

Photography's eidetic impression of a moment frozen in time annihilates our awareness of the object itself as something that is not still. Although the history of photographic inventions can be described as a history of fixing (in the sense of arresting) images, this study, and especially my investigation of the colouration of the final case study, *Russian Diplomacy*, indicates that this aspiration to fixity is never guaranteed. Chemical and circumstantial interplay within and between many factors can bring about change. The photographic surface as *reflecting* as well as *acting* force (re)acts to internal and external processes (and chemical bonds) over the long-term development of the photograph. This can hardly be inhibited, if perhaps decelerated. Hence, one of the key observations: that the surface *performs* the image rather than *becomes* that which it depicts.

The intrinsically processual nature of the photographic surface finds a parallel in processes of meaning creation. The shifting constellations of the photograph's make-up, rooted in the passage of time and in environmental circumstances, affect relations and conser-

vational convictions, and cause them to shift accordingly. A responsive process also comes into play: when cultural and institutional perceptions of what photographic materiality is or ought to be change, this can have physical consequences (via decision-making and treatment) affecting the conditions of individual photographs.

This dissertation is dedicated to a small subset of photoworks – painted analogue photographs made between 1974 and 2007 and in two cases mounted and framed – however, many of my observations apply to other photowork forms too. The Science4Arts research team encountered some of these forms during the search for our central project case studies. Participating Dutch museums listed potential photoworks for us to study. Only a fraction of the photoworks in these collections had the surface applications which the research team was investigating (such as paint, paper, pen(cil), varnish, or stickers). Other photoworks were characterised by unique printing methods (such as Polaroid prints or textiles), or by their mounting, framing, or backing material (think of collages, or photographs glued on textiles, cardboard, aluminium, wood), and there were also face-mounted contemporary works.

Throughout this dissertation, I have argued for the processual nature of photographs, and for the photographic biography as something that is written in and of the work's distinct visual and material textures, its haptic affective value, and its instability – or more positively, its mutability. This understanding is applied here to a differentiated (material) understanding of a complex photowork, but it is equally relevant to a 'simple' framed chromogenic colour photograph (such as Rineke Dijkstra's prints from the 1990s, held now at the Stedelijk Museum, Amsterdam). Therefore my analysis of the case studies also contributes to our ideas about, and understanding of, photographs in general. Ultimately, I believe that an appropriately differentiated engagement with photoworks and photographs will only come about when there is a meaningful shift in our ontological thinking. This concerns all players: the broad public, curators and conservators, academics, and artists. It may be that my ambition is somewhat idealistic. Nonetheless, it only becomes more poignant as we draw closer to a future in which photoworks look set to become (semi-)historic objects.

My distinct point of departure was the analogue photograph. However, future researchers could do important work by extending this investigation (of photographic materiality in its present state) to the digital realm. Yet other areas of research could come to life in the future, given the referential dynamic between photography and painting, which comes physically and visually into play in all the three case studies, and given the ways in which the different ambitions of the two colliding media mingle indexicality and intentionality, therein changing ontological convictions. The double figure of transparency and the opaque, which literally dominates my case studies, could be another subject of extended interest in the future, as could a further exploration of the ethics of conservation and collection practices and policies, through which photoworks could be studied with a focus on the tension between nature (deterioration processes of materials) versus culture (the museum as medium).

The most resonant insight that I take from my decade of research is my growing respect for the complexity of this familiar object, the analogue photograph, and also for humans – sensitive and sensing beings who register all kinds of sensible, visible, and invisible information that lies beyond our awareness, as we encounter photographs in private and photoworks in exhibition spaces. What rests is my profound humility towards the coming into being, the becoming, and the vanishing of all that concerns life, an unfolding and thereby moving process that I have also found in photographs.

Bibliography

Adams, Ansel. *The Camera*. The New Ansel Adams Photography Series / Book 1. New York: New York Graphic Society, 1980.

Adams, Ansel. *The Negative: Exposure - Development*. Basic Photo 2. New York: Morgan & Lester, 1952.

Adams, Ansel. *The Print*. The Ansel Adams Photography Series 3. 12th ed. Boston: Little, Brown & Company, 2006.

Adamson, Glenn, and Victoria Kelley (eds.). *Surface Tensions: Surface, Finish and the Meaning of Objects*. Manchester: Manchester University Press, 2013.

Alloa, Emmanuel. *Erscheinung und Ereignis: Zur Zeitlichkeit des Bildes*. Paderborn: Wilhelm Fink Verlag, 2013.

Alloa, Emmanuel. "Seeing-in, Seeing-as, Seeing-with: Looking through Images." In *Image and Imaging in Philosophy, Science, and the Arts: Proceedings of the 33rd International Wittgenstein Symposium*, Vol. 1., edited by Richard Heinrich, Elisabeth Nemeth, Wolfram Pichler, and Wagner David, 179–90. Berlin: De Gruyter, 2011. Accessed February 30, 2018. https://doi.org/10.1515/9783110330519.

Amato, Joseph A. *Surfaces: A History*. Berkley: University of California Press, 2013.

Ault, Julie. "The Subject Is Exhibition." In *Wolfgang Tillmans*, edited by Russell Ferguson and Dominic Molon, 119–43. New Haven: Yale University Press, 2006.

Bacon, Alex. "Ishmael Randall-Weeks with Alex Bacon." *The Brooklyn Rail* (February 2013). Accessed March 10, 2017. https://brooklynrail.org/2013/02/art/ishmael-randall-weeks-with-alexnbspbacon.

Baetens, Jan, and Heidi Peeters. "Hybridity: The Reverse of Photographic Medium Specificity?" *History of Photography* 31, no. 1 (Spring 2007): 3–10. Accessed August 10, 2019. https://doi.org/10.1080/03087298.2007.10443497.

Baetens, Jan, Alexander Streitberger, and Hilde van Gelder (eds.). *Time and Photography*. Lieven Gevaert Series Vol. 10. Leuven: Leuven University Press, 2010.

Baker, George. "Photography's Expanded Field." *October* 114 (Autumn 2005): 120–40. Accessed May 30, 2016. https://doi.org/10.1162/016228705774889574.

Bal, Mieke. "Exhibition as Film." In *(Re)visualizing National History: Museums and National Identities in Europe in the New Millennium*, edited by Robin Ostow, 15–43. Toronto: University of Toronto Press, 2008.

Bal, Mieke. *Quoting Caravaggio: Contemporary Art, Preposterous History.* Chicago: University of Chicago Press, 1999.

Bal, Mieke. *Travelling Concepts in the Humanities: A Rough Guide*. Green College Lecture Series. Toronto: University of Toronto Press, 2002.

Baldwin, Gordon, and Martin Jürgens. *Looking at Photographs: A Guide to Technical Terms*. 2nd ed. Los Angeles: Getty Publications, 2009.

Ballhause, Sylvia. "Zerstörte Bilder Oder Bilder Der Zerstörung? Eine Betrachtung des Münchner Triptychons von Louis Jacques Mandé Daguerre." Thesis, Academy of Visual Arts Leipzig, Germany, 2010. Accessed March 25, 2021. https://docplayer.org/7404812-Zerstoerte-bilder-oder-bilder-der-zerstoerung-eine-betrachtung-des-muenchner-triptychons-von-louis-jacques-mande-daguerre.html.

Barad, Karen. "Chapter 3: Interview with Karen Barad." In *New Materialism: Interviews & Cartographies*, edited by Rick Dolphijn and Iris Van der Tuin, 48–70. London: Open Humanities Press, 2012. http://hdl.handle.net/2027/spo.11515701.0001.001.

Barad, Karen. *Meeting the Universe Halfway: Quantum Physics and the Entanglement of Matter and Meaning*. Durham: Duke University Press, 2007.

Barad, Karen. "Posthumanist Performativity: Toward an Understanding of How Matter Comes to Matter." *Signs: Journal of Women in Culture and Society* 28, no.3 (Spring 2003): 801–31. Accessed September 14, 2020. https://doi.org/10.1086/345321.

Barker, Jennifer M. *The Tactile Eye: Touch and the Cinematic Experience*. Berkeley: University of California Press, 2009.

Bärnighausen, Julia, Stefanie Klamm, Franka Schneider, and Petra Wodtke. "Photographs on the Move: Formats, Formations, and Transformations in Four Photo Archives." In *Photo-Objects: On the Materiality of Photographs and Photo Archives*, edited by Julia Bärnighausen, Costanza Caraffa, Stefanie Klamm, Franka Schneider, and Petra Wodtke. Berlin: Max-Planck-Gesellschaft zur Förderung der Wissenschaften, 2019. Accessed May 12, 2017. https://www.mprl-series.mpg.de/studies/12/3/index.html.

Bärnighausen, Julia, Costanza Caraffa, Stefanie Klamm, Franka Schneider, and Petra Wodtke (eds.). *Photo-Objects: On the Materiality of Photographs and Photo Archives*. Berlin: Max-Planck-Gesellschaft zur Förderung der Wissenschaften, 2019. Accessed May 12, 2017. https://www.mprl-series.mpg.de/studies/12/toc.html.

Barrett, Estelle, and Barbara Bolt (eds.). *Carnal Knowledge: Towards a 'New Materialism' Through the Arts*. New York: Bloomsbury Publishing, 2013.

Barthel, Gitta. *Choreografische Praxis: Vermittlung in Tanzkunst und Kultureller Bildung*. TanzScripte. Bielefeld: transcript, 2017.

Barthes, Roland. *Camera Lucida: Reflections on Photography*. Translated by Richard Howard. New York: Farrar, Straus and Giroux, 1981.

Barthes, Roland. *La Chambre Claire: Note Sur La Photographie*. Paris: Seuil, 1980.

Barthes, Roland. "Rhetoric of the Image." In *Image Music Text*, 32–51. 4th ed. New York: Farrar, Straus and Giroux, 1982.

Barthes, Roland. "Rhétorique de l'Image." *Communications* 4, no.1 (1964): 40–51. Accessed August 7, 2018. https://www.persee.fr/doc/comm_0588-8018_1964_num_4_1_1027.

Batchen, Geoffrey. *Each Wild Idea: Writing, Photography, History*. 1st MIT ed. Cambridge, MA: MIT Press, 2002.

Batchen, Geoffrey. *Emanations: The Art of the Cameraless Photograph*. New York: Prestel Publishing, 2016.

Batchen, Geoffrey. *Forget Me Not: Photography & Remembrance*. New York: Princeton Architectural Press, 2004.

Batchen, Geoffrey. *Negative/Positive: A History of Photography*. Oxon: Routledge, 2021.

Bate, David. *Photography: The Key Concepts*. 2nd ed. London: Routledge, 2019.

Baudrillard, Jean. "Photography, Or The Writing of Light." Translated by Francois Debrix, 2000. Original "La Photographie ou l'Ecriture de la Lumière: Littéralité de l'Image," In *L'Echange Impossible*. Paris: Galilee, 175–84. Accessed March 16, 2017. https://emptyurglass.com/wp-content/uploads/2018/01/CTheory.net_.pdf.

Bazin, André. "The Ontology of the Photographic Image." *Film Quarterly* 13, no. 4 (Summer 1958): 4–9.

Belden-Adams, Kris (ed.). *Photography and Failure: One Medium's Entanglement with Flops, Underdogs and Disappointments*. London: Bloomsbury Publishing, 2017.

Benjamin, Walter. "Kleine Geschichte der Fotografie." In *Walter Benjamin: Gesammelte Schriften II.I*, edited by Rolf Tiedermann, and Hermann Schweppenhäuser, 368–85. Frankfurt: Suhrkamp, 1977 [1931].

Benson, Richard. *The Printed Picture*. New York: Museum of Modern Art, 2008.

Birkin, Jane. "Describing the Archive: Preservation of Space, Time and Discontinuity in Photographic Sequences" *Networking Knowledge: Journal of the MeCCSA Postgraduate Network* 9, no. 5 (2016): 1–19.

Bjerregaard, Peter, Anders Emil Rasmussen, and Tim Flohr Sørensen (eds.). *Materialities of Passing: Explorations in Transformation, Transition and Transience*. Oxon/ New York: Routledge, 2016.

Bleyen, Mieke (ed.). *Minor Photography: Connecting Deleuze and Guattari to Photography Theory.* The Lieven Gevaert Series. Leuven: Leuven University Press, 2012.

Bloemheuvel, Marente, and Jan Debbaut (eds.). *Ger van Elk, The Horizon, a Mental Perspective.* Exhibition catalogue. Rotterdam: NAi Publishers, 1999.

Bloemheuvel, Marente, and Zsa-Zsa Eyck (eds.). *Ger van Elk*. Deventer: Thieme Art, 2009.

Blotkamp, Carel. "'k Heb u Lief, Mijn Ne-He-Derland / I Love L.A. Ger van Elk's Song for Two Voices." In *Ger van Elk*, edited by Marente Bloemheuvel, and Zsa-Zsa Eyck, 100–7. Deventer: Thieme Art, 2009.

Boehm, Gottfried (ed.). *Was ist ein Bild?*. 2nd ed. Munich: Fink, 1994.

Boelens, Gwenneth, and Nickel van Duijvenboden. *Gwenneth Boelens: In Two Minds.* Amsterdam: Roma Publications, 2014.

Bogue, Ronald. *Deleuze on Music, Painting, and the Arts*. New York: Taylor & Francis, 2014.

Bolt, Barbara. *Art Beyond Representation: The Performative Power of the Image*. London: I.B.Tauris, 2004.

Bolter, David, and Richard Grusin. *Remediation: Understanding New Media*. Cambridge, MA: MIT Press, 2000.

Borch Editions. "Tacita Dean." Accessed May 31, 2020. https://borcheditions.com/artist/tacita-dean/.

Bourriaud, Nicolas. "Precarious Constructions: Answer to Jacques Rancière on Art and Politics." *Open. Cahier on Art and the Public Domain* 17 (November 1, 2009): 20–36. Accessed June 2, 2018. https://monoskop.org/images/0/0a/Open_17_A_Precarious_Existence.pdf.

Boyens, José. "Ger van Elk Was Here." *The Low Countries,* no. 2 (1994): 215–22. Accessed July 4, 2019. https://the-low-countries.com/article/ger-van-elk-was-here-7.

Brown, Elspeth H. and Thy Phu (eds.). *Feeling Photography*. Durham/ London: Duke University Press, 2014.

Bruno, Giuliana. *Surface: Matters of Aesthetics, Materiality, and Media*. Chicago: University of Chicago Press, 2014.

Burge, Daniel. "IPI Guide to Preservation of Digitally-Printed Photographs." Rochester: Image Permanence Institute, 2014. Accessed January 8, 2018. http://www.dp3project.org/web-fm_send/739.

Calhoon, Kenneth S. "Personal Effects: Rilke, Barthes, and the Matter of Photography." *Modern Language Notes* 113, no.3 (April 1998): 612–34.

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

Caraffa, Costanza. "Photographic Itineraries in Time and Space." In *The Handbook of Photography Studies*, edited by Gil Pasternak, 79–96. New York: Routledge, 2020.

Caraffa, Costanza (ed.). *Photo Archives and the Photographic Memory of Art History*. Berlin/ Munich: Deutscher Kunstverlag, 2011.

Cartwright, William, Georg Gartner, and Antje Lehn (eds.). *Cartography and Art*. Berlin/ Heidelberg: Springer, 2009.

Casey, Edward S. *Representing Place: Landscape Painting and Maps*. Minneapolis: University of Minnesota Press, 2002.

Chappell, Danica. *Double Dark: A Constructed Composition from a Darkroom Haptic*. Master research thesis, Faculty of the Victorian College of the Arts. Melbourne: University of Melbourne, 2012.

Christofovici, Anca. *Touching Surfaces: Photographic Aesthetics, Temporality, Aging*. Amsterdam/ New York: Editions Rodopi, 2009.

Cipriani, Gerald. "The Touch of Meaning: Researching Art between Text and Texture." *Janus Head: Journal of Interdisciplinary Studies in Literature, Continental Philosophy, Phenomenonological Psychology, and the Arts* 15, no. 2 (2016): 159–68.

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

Cohen, Brianne, and Alexander Streitberger (eds.). *The Photofilmic: Entangled Images in Contemporary Art and Visual Culture*. Lieven Gevaert Series Vo. 21. Leuven: Leuven University Press, 2016.

Coleman, Allan D. "Counting the Teeth: Photography for Philosophers." In *The Weight of Photography: Photography History Theory and Criticism, Introductory Readings,* edited by Johan Swinnen and Luc Deneulin, 281–88. Brussels: Academic & Scientific Publishers, 2010.

Coole, Diana H, and Samantha Frost (eds.). *New Materialisms: Ontology, Agency, and Politics*. Durham: Duke University Press, 2010.

Costello, Diarmuid, and Margaret Iversen (eds.). *Photography After Conceptual Art*. Art History Special Issues. London: Wiley-Blackwell, 2011.

Costello, Diarmuid, and Margaret Iversen. "Introduction: Photography between Art History and Philosophy." *Critical Inquiry* 38, no. 4 (Summer 2012): 679–93.

Costello, Diarmuid. "The Question Concerning Photography." *The Journal of Aesthetics and Art Criticism* 70, no. 1, (Winter 2012): 101–13.

Cotter, Suzanne (ed.). *Wolfgang Tillmans: On the Verge of Visibility*. Porto: Serralves Museum, 2016.

Cotton, Charlotte, and Alex Klein (eds.). *Words Without Pictures.* Los Angeles: Lacma; New York: Aperture Foundation, 2009.

Crabbé, Sophie. "Daisuke Yokota" 30 January 2015. Accessed March 10, 2019. https://sofiecrabbe.blogspot.com/2015/01/daisuke-yokota.html.

Crimp, Douglas. "Pictures." *October* 8 (Spring 1979): 75–88.

Cubitt, Sean. *The Practice of Light: A Genealogy of Visual Technologies from Prints to Pixels*. Leonardo Book Series. Cambridge, MA and London: MIT Press, 2014.

Cubitt, Sean, Daniel Palmer, and Nathaniel Tkacz (eds.). *Digital Light*. Fibreculture Books. London: Open Humanities Press, 2015. Accessed February 18, 2019. https://openhumanities-press.org/books/download/Cubitt-Palmer-Tkacz_2015_Digital-Light.pdf.

Cubitt, Sean, Nikos Papastergiadis, and Scott McQuire. "Transient Media." *Public*, no. 37 (January 2008): 1–19. Accessed September 8, 2019. https://public.journals.yorku.ca/index.php/public/article/view/30259.

Cullinan, Nicholas (ed.). *Film: Tacita Dean*. Unilever Series Exhibition Catalogue. London: Tate Publishing, 2011.

Damisch, Hubert. "Five Notes for a Phenomenology of the Photographic Image." *October* 5 (Summer 1978): 70–72.

De Castro, Catherine S., Stoichko Dimitrov, Hugh D. Burrows, Peter Douglas, and Matthew L. Davies. "Photoinduced Charge Transfer: From Photography to Solar Energy." *Science Progress* 100, no. 2 (2017): 212–30.

Dean, Tacita. "Book 2: Selected Writings 1992–2011." In *Tacita Dean: Seven Books Grey*. Wien: Museum Moderner Kunst Stiftung Ludwig; Göttingen: Steidl, 2011a.

Dean, Tacita. *FLOH*. Göttingen: Steidl, 2001.

Dean, Tacita. "Tacita Dean." *Artforum* 54, no. 2 (October 2015): unpaged. Accessed July 10, 2018. https://www.artforum.com/print/201508/tacita-dean-54974.

Dean, Tacita, Theodora Vischer, and Isabel Friedli (eds.). *Tacita Dean: Analogue: Drawings 1991–2006*. Basel: Schaulager; Göttingen: Steidl, 2006.

Dean, Tacita. *Tacita Dean: Landscape Portrait Still Life*. Exhibition catalogue. London: Royal Academy of Arts, the National Portrait Gallery, and the National Gallery, 2018.

Dean, Tacita. "Save Celluloid, for Art's Sake." *The Guardian*, February 22, 2011b. Accessed July 20, 2014. https://www.theguardian.com/artanddesign/2011/feb/22/tacita-dean-16mm-film.

Dean, Tacita. *Tacita Dean: Seven Books Grey*. Wien: Museum Moderner Kunst Stiftung Ludwig; Göttingen: Steidl, 2011a.

Dean, Tacita, Laurence Bossé, Julia Garimorth, Rita Kersting, Jean-Luc Nancy, and Michael Newman (eds.). *Tacita Dean: Seven Books (Selected Writings. 12.10.02–21.12.02, W.G. Sebald, The Russian Ending, Boots, Complete Works and Filmography 1991–2003 and Essays)*. Göttingen: Steidl, 2003.

Deleuze, Gilles. "The Fold." translated by Jonathan Strauss, *Yale French Studies* 80 Baroque Topographies: Literature/History/Philosophy (1991): 227–47.

Derieux, Florence, Krist Gruijthuijsen, and Bettina Steinbrügge (eds.). *Lisa Oppenheim: Works 2003–2013.* Exhibition catalogue. Berlin: Sternberg Press, 2014.

Derrida, Jacques. "Archive Fever: A Freudian Impression." Translated by Eric Prenowitz. *Diacritics* 25, No. 2 (Summer 1995): 9–63.

Derrida, Jacques, "Die Fotografie als Kopie, Archiv und Signatur:

Im Gespräch mit Hubertus von Amelunxen und Michael Wetzel." In *Theorie der Fotografie IV, 1980–1995,* edited by Hubertus von Amelunxen. Munich: Schirmer/Mosel, 2000.
Derrida, Jacques. "The Parergon." *October* 9 (Summer 1979): 3–41.
Didi-Huberman, Georges. "Contact Images." translated by Alisa Hartz, 1997. Accessed November 2, 2022. https://under-construction.wdfiles.com/local--files/imprint-reading/contact_images.pdf.
Didi-Huberman, Georges. *Ähnlichkeit und Berührung: Archäologie, Anachronismus und Modernität des Abdrucks*. Cologne: DuMont, 1999.
Donaldson, Lucy. *Texture in Film*. Palgrave Close Readings in Film and Television. London: Palgrave Macmillan UK, 2014.
Drucker, Johanna. "Humanities Approaches to Interface Theory" *Culture Machine* 12 (2011): 1–20. Accessed October 25, 2020. https://culturemachine.net/wp-content/uploads/2019/01/3-Humanities-434-885-1-PB.pdf.
Dubois, Philippe. "Von Der Wirklichkeitstreue Zum Index." In *Der Fotografische Akt: Versuch über ein Theoretisches Dispositiv*, edited by Herta Wolf, 15–57. Amsterdam/ Dresden: Verlag der Kunst, 1998.
Dubois, Philippe. *L'acte photographique et autres essais*. Paris: Nathan, 1990.
Dudley, Sandra (ed.). *Museum Materialities: Objects, Engagements, Interpretations*. New York/ London: Routledge, 2013.
Durand, Regis. "How to See (Photographically)." In *Fugitive Images: From Photography to Video*, edited by Patrice Petro, 141–51. Bloomington: Indiana University Press, 1995.
DP3 Digital Print Preservation Project. "Storage Recommendations." Accessed January 11, 2022. http://www.dp3project.org/preservation/storage-recommendations.
Eastman Kodak Company. *Kodak's Description of Professional Black and White Films, F-5*. Rochester N.Y: Eastman Kodak Company, 1984.
Edwards, Elizabeth. "Objects of Affect: Photography beyond the Image." *Annual Review of Anthropology* 41, no. 1 (September 2012): 221–34.
Edwards, Elizabeth. "Photographic Uncertainties: Between Evidence and Reassurance." *History and Anthropology* 25, no. 2 (2014): 171–88. Accessed August 23, 2017. https://doi.org/10.1080/02757206.2014.882834
Edwards, Elizabeth. "Photographs and History." In *Museum Materialities: Objects, Engagements, Interpretations*, edited by Sandra H. Dudley, 21–38. London: Routledge, 2010.
Edwards, Elizabeth, and Christopher Morton (eds.). *Photographs, Museums, Collections: Between Art and Information*. London: Bloomsbury Publishing, 2015.
Edwards, Elizabeth, and Janice Hart (eds.). *Photographs Objects Histories: On the Materiality of Images*. London: Routledge, 2004.
Edwards, Elizabeth. "Photography and the Material Performance of the Past." *History and Theory* 48, no. 4 Photography and Historical Interpretation edited by Jennifer Tucker (December 2009): 130–50.
Edwards, Elizabeth. "Thinking Photography beyond the Visual?" In *Photography: Theoretical Snapshots*, edited by Jonathan. J. Long, Andrea Noble, and Edward Welch, 31–48. London: Routledge, 2009.
Edwards, Elizabeth. "Thoughts on the 'Non-Collections' of the Archival Ecosystem." In *Photo-Objects: On the Materiality of Photographs and Photo Archives*. Berlin: Max-Planck-Gesellschaft zur Förderung der Wissenschaften, 2019. Accessed June 17, 2020. https://mprl-series.mpg.de/studies/12/4/.
Edwards, Elizabeth, and Sigrid Lien (eds.). *Uncertain Images: Museums and the Work of Photographs*. New York and London: Routledge, 2016.
Elcott, Noam M. *Artificial Darkness: An Obscure History of Modern Art and Media*. Chicago: University of Chicago Press, 2016.
Elkins, James. *What Photography Is*. New York: Routledge, 2011.
Elkins, James. *Six Stories from the End of Representation: Images in Painting, Photography, Astronomy, Microscopy, Particle Physics, and Quantum Mechanics, 1980–2000*. Writing Science. Stanford: Stanford University Press, 2008.
Elkins, James (ed.). *Photography Theory*. The Art Seminar. New York: Taylor & Francis, 2007.
Elkins, James. "On Some Limits of Materiality in Art History." *Das Magazin des Instituts Für Theorie [Zürich]* 12 (2008): 25–30.
Elkins, James. "What Do We Want Photography to Be? A Response to Michael Fried." *Critical Inquiry* 31, no. 4 (2005): 938–56.
Elo, Mika, and Miika Luoto (eds.). *Senses of Embodiment: Art, Technics, Media*. Art - Knowledge - Theory (3). Bern: Peter Lang, 2014.
Elo, Mika. "The New Technological Environment of Photography and Shifting Conditions of Embodiment." In *Photomediations: A Reader*, edited by Jonathan Shaw, Ross Varney, and Michael Wamposzyc, 268–82. London: Open Humanities Press, 2016.
Elsaesser, Thomas, and Malte Hagener. *Film Theory: An Introduction Through the Senses*. 2nd ed. New York: Routledge, 2015.
Finke, Marcel, and Mark Halawa (eds.). *Materialität und Bildlichkeit*. Berlin: Kulturverlag Kadmos, 2012.
Finke, Marcel. "Materialität und Performativität: Ein bildwissenschaftlicher Versuch über Bild/Körper." In *Verwandte Bilder: Die Fragen der Bildwissenschaft,* edited by Ingeborg Reichle, Steffen Siegel, and Achim Spelten, 57–80. Berlin: Kulturverlag Kadmos, 2007.
Finke, Marcel. *Prekäre Oberflächen*: *Zur Materialität des Bildes und des Körpers am Beispiel der künstlerischen Praxis Francis Bacons*. Kunstwissenschaftliche Studien Vol. 185. Berlin: Deutscher Kunstverlag, 2015.
Finke, Marcel. "Denken (mit) der Kunst oder: Was ist ein theoretisches Objekt?" *Wissenderkuenste.de* 3 (November 2014). Accessed July 5, 2015. https://wissenderkuenste.de/texte/ausgabe-3/denken-mit-der-kunst-oder-was-ist-ein-theoretisches-objekt/pdf/.
Fischer, Hartwig (ed.). *Covering the Real: Art and the Press Picture, from Warhol to Tillmans*. Exhibition catalogue. Cologne: DuMont, 2005.
Fisher, Jennifer. "Tactile Affects." *Tessera*, 32 (June 2002). Accessed August 2, 2017. http://tessera.journals.yorku.ca/index.php/tessera/article/view/25273.
Flusser, Vilém. *Towards a Philosophy of Photography*. 2nd ed. London: Reaktion Books, 2005.
Flusser, Vilém. *Für Eine Philosophie der Fotografie*. 8th ed. Göttingen: European Photography/Edition Flusser, 1997 [1983].
Flusser, Vilém. *Gestures*. Minneapolis: University of Minnesota Press, 2014.
Fogle, Douglas (ed.). *The Last Picture Show: Artists Using Photography, 1960–1982*. Minneapolis MN: Walker Art Center, 2003.
Fortin-Tournès, Anne-Laure. "The photographic grain as punctum in W. G. Sebald's Austerlitz" *Image & Narrative* 15, no.2, (2014): 77–86. http://www.imageandnarrative.be/index.php/imagenarrative/article/view/538.
Fossati, Giovanna. *From Grain to Pixel: The Archival Life of Film in Transition*. Framing Film. Amsterdam: Amsterdam University Press, 2009.
Fried, Michael. *Art and Objecthood: Essays and Reviews*. Art History. Chicago and London: University of Chicago Press, 1998.
Friedlander, Eli. "The Photographic Gesture." *Paragrana* 23, no. 1 (2014): 46–55. Accessed November 23, 2018. https://doi.org/10.1515/para-2014-0005.
Friedlander, Eli. "A Mood of Childhood in Benjamin." In *Philosophy's Moods: The Affective Grounds of Thinking*, edited by Hagi Keenan and Ilit Ferber, 39–50. Berlin/Heidelberg: Springer, 2011.
Funderburk, Kit. *A Guide to the Surface Characteristics: Kodak Fiber Based Black-And-White Papers*. 2nd ed. 2009. Accessed November 9, 2016. http://gawainweaver.com/images/uploads/Guide_to_Surface_Characteristics_FINAL.pdf.
Galloway, Alexander R. *The Interface Effect*. Hoboken: John Wiley & Sons, 2012.
Geimer, Peter. *Bilder Aus Versehen: Eine Geschichte Fotografischer Erscheinungen*. Fundus-Bücher. Hamburg: Philo Fine Arts, 2010.
Geimer, Peter. 2003. "Bild und Bildstörung: Wissen im 'Modus der Audringlichkeit'." In *Text und Wissen: Technologische und Anthropologische Aspekte*. Edited by Renate Lachmann and Stefan Rieger, 91–103. Tübingen: Gunter Narr, 2003.
Geimer, Peter. "Image as Trace: Speculations about an Undead Paradigm." Translated by Kata Gellen *Differences: A Journal of Feminist Cultural Studies* 18, no.1, (2007): 7–28.
Geimer, Peter. *Inadvertent Images: A History of Photographic Apparitions*. Translated by Gerrit Jackson. Chicago: University of Chicago Press, 2018.
Geimer, Peter (ed.). *Ordnungen der Sichtbarkeit: Fotografie in Wissenschaft, Kunst und Technologie*. Suhrkamp Taschenbuch Wissenschaft. Frankfurt: Suhrkamp Verlag, 2002.
Geimer, Peter and Isabelle Graw. Über Malerei: Eine Diskussion. Berlin: Matthes Seitz, 2012.
Geimer, Peter. "Was Ist Kein Bild? Zur 'Störung Der Verweisung.'" In *Ordnungen der Sichtbarkeit: Fotografie in Wissenschaft, Kunst und Technologie*, edited by Peter Geimer, 313–41. Frankfurt: Suhrkamp Verlag, 2002.
Gell, Alfred. *Art and Agency: An Anthropological Theory*. Oxford/ New York: Clarendon Press, 1998.
Geniusas, Saulius. *The Origins of the Horizon in Husserl's Phenomenology*. Contributions to Phenomenology. Dordrecht: Springer, 2012.
Gibson, James. *The Ecological Approach to Visual Perception*. New York and London: Psychology Press Taylor & Francis Group, 2015 [1979].
Godfrey, Mark. "Photography Found and Lost: Photography On Tacita Dean's *Floh*." *October* 114 (Autumn 2005): 90–119.
Goldberg, Vicki (ed.). *Photography in Print: Writings from 1816 to the Present*. Albuquerque: University of New Mexico Press, 1981.
Graham, Paul. "Paul Graham Photography Archive." Accessed September 23, 2020. https://www.paulgrahamarchive.com/.
Greenwald, Chris. "Photography as Art in Heidegger's Philosophy." *Episteme* 3 (May 1992): 13–22. Accessed December 12, 2018. https://digitalcommons.denison.edu/episteme/vol3/iss1/3.
Grusin, Richard. "Premediation." *Criticism* 46, no.1 (Winter 2004): 17–39.
Hall, Todd H. *Emotional Diplomacy: Official Emotion on the International Stage*. Ithaka: Cornell University Press, 2015.
Heckert, Virginia (ed.). *Light, Paper, Process: Reinventing Photography*. Exhibition catalogue. Los Angeles: J. Paul Getty Museum, 2015.
Heidegger, Martin. *Der Ursprung des Kunstwerkes: Mit Der "Einführung" von Hans-Georg Gadamer und Der Ersten Fassung Des Textes (1935)*. Klostermann RoteReihe. Frankfurt am Main: Klostermann, 2012 [1935].
Heidegger, Martin. "The Origin of the Work of Art." In *Heidegger: Off the Beaten Track*, edited and translated by Julian Young and Kenneth Haynes, 1–48. Cambridge: Cambridge University Press, 2002.
Hendriks, Klaus, and Rüdiger Krall. "Fingerprints of Photographs." *Topics in Photographic Preservation* 5 (1993). Washington: Photographic Materials Group (PMG) of the American Institute for Conservation of Historic & Artistic Works (AIC), 8–13. Accessed July 30, 2015. https://resources.culturalheritage.org/pmgtopics/1993-volume-five/05_02_Hendriks.pdf.
Hendriks, Klaus, Brian Lesser, Jon Stewart, and Doug Nishimura. "Properties and Stability of Gelatin Layers in Photographic Materials." n.p., n.d. Accessed January 20, 2017. https://cool.culturalheritage.org/albumen/library/c20/hendriks1.html.
Henry, Wilhelm. *The Permanence and Care of Color Photographs: Traditional and Digital Color Prints, Color Negatives, Slides, and Motion Pictures.* Grinnell: Preservation Publishing Company, 1993. Accessed May 22, 2020. http://www.wilhelm-research.com/pdf/HW_Book_01_of_20_HiRes_v1c.pdf.
Hentschel, Klaus. *Mapping the Spectrum: Techniques of Visual Representation in Research and Teaching*. Oxford: Oxford University Press, 2002.
Hevia, James L. "The Photography Complex." In *Photographies East*, edited by Patricia Spyer, James L. Hevia, and James T. Siegel, 79–119. Chicago: University of Chicago Press, 2009.
Hindson, Toby. "Historic Churchyard Yews." Cathedral Communications, 2015. Accessed March 23, 2016. https://www.buildingconservation.com/articles/churchyard-yews/churchyard-yews.htm.
Hirsch, Robert. *Photographic Possibilities: The Expressive Use of Equipment, Ideas, Materials, and Processes*. Oxford: Focal Press/Elsevier, 2009.
Hoelzl, Ingrid, and Rémi Marie. *Softimage: Towards a New Theory of the Digital Image*. Bristol: Intellect Ltd, 2015.
Hölling, Hanna. *Paik's Virtual Archive: Time, Change, and Materiality in Media Art*. Berkeley: University of California Press, 2017.
Hölling, Hanna. *Re: Paik. On Time, Changeability and Identity in the Conservation of Nam June Paik's Multimedia Installations.* Doctoral Thesis. Amsterdam: University of Amsterdam, 2013.
Hooper, Barbara. "Matter Acts. De-Forming Space." In *Take Place: Photography and Place from Multiple Perspectives*, edited by Helen Westgeest, 189–213. Amsterdam: Valiz, 2009.
Hopkins, Robert. "Touching pictures." *British Journal of Aesthetics* 40, no. 1 (2000): 149–67.
Hummelen, IJsbrand, Dionne Sillé, and Marjan Zijlmans (eds.). *Modern Art - Who Cares?: An Interdisciplinary Research Project and an International Symposium on the Conservation of Modern and Contemporary Art*. London: Archetype, 2006.
Hummelen, IJsbrand, and Tatja Scholte. "Capturing the Ephemeral and Unfinished: Archiving and Documentation as Conservation Strategies of Transient (as Transfinite) Contemporary Art." *Technè* 24 (2006): 5–11.
Husserl, Edmund. *Phantasy, Image Consciousness, and Memory (1898–1925)*, translated by John B. Brough. Dordrecht: Springer, 2005.
Husserl, Edmund. *Phantasie und Bildbewusstsein*, edited by Eduard Marbach. Hamburg: Felix Meiner Verlag: 2006.
Image Permanence Institute. "Publications." Accessed January 17, 2023. https://www.imagepermanenceinstitute.org/education/publications.html
Image Permanence Institute. "A Consumer Guide to Modern Photo Papers." Rochester: Image Permanence Institute, 2009. Accessed August 15, 2021. https://lenasalina.files.wordpress.com/2016/05/modern-photo-paper.pdf.
Ingold, Tim. "Materials against Materiality." *Archaeological Dialogues* 14, no.1 (June 2007): 1–16.
Ingold, Tim. *The Perception of the Environment: Essays on Livelihood, Dwelling and Skill*. London/ New York: Routledge, 2000.
Ingold, Tim. *Being Alive: Essays on Movement, Knowledge and Description*. *Social Anthropology*. London/ New York: Routledge, 2011.
Iversen, Margaret. *Photography, Trace, and Trauma*. Chicago/ London: University of Chicago Press, 2017.
Iversen, Margaret. "On Zoe Leonard and Tacita Dean." *Critical Inquiry* 38 Agency and Automatism: Photography as Art Since the Sixties, no. 4 (Summer 2012): 796–818.
James, Christopher. *The Book of Alternative Photographic Processes*. Boston: Cengage Learning, 2015.
Jeong, Seung-hoon. *Cinematic Interfaces: Film Theory After New Media*. London/ New York: Routledge, 2013.
Kelsey, Robin. *Photography and the Art of Chance*. Cambridge MA: Harvard University Press, 2015.
Kennedy, Nora W, and Peter J Mustardo. "Changing Perspectives on Color Photography." *ICOM CC 15th Triennial Conference New Delhi, 22–26 September 2008,* edited by Jane Bridgland, 696–701. New Delhi: Allied Publishers Pvt Ltd., 2008.
Klerck Gange, Eva. *Tacita Dean: Reflecting Posterity*. Oslo: Nasjonalmuseet for Kunst, Arkitektur og Design, 2006.
Kopytoff, Igor. "The Cultural Biography of Things:

Commoditization as Process." In *The Social Life of Things*, edited by Arjun Appadurai, 64–92. Cambridge: Cambridge University Press, 1986.
Krämer, Sybille. "Gibt es eine Performanz des Bildlichen? Reflexionen über ‚Blickakte'." 2009. Accessed December 27, 2021. https://userpage.fu-berlin.de/~sybkram/media/downloads/Performanz_des_Bildlichen.pdf.
Krämer, Sybille. *Medium, Messenger, Transmission: An Approach to Media Philosophy*. Amsterdam: Amsterdam University Press, 2015.
Krauss, Rosalind. "Notes on the Index: Seventies Art in America. Part 2." *October* 4 (Autumn 1977): 58–67.
Krauss, Rosalind. "Notes on the Index: Seventies Art in America. Part 1." *October* 3 (Spring 1977): 68–81.
Krauss, Rosalind. "Sculpture in the Expanded Field." *October* 8, edited by Donald Preziosi (Spring 1979): 30–44.
Krauss, Rosalind. "Grids." *October* 9 (Summer 1979): 50–64.
Kriebel, Sabine, and Andrés Mario Zervigón (eds.). *Photography and Doubt*. London: Routledge, 2016.
Krtilova, Katerina. "Vilém Flussers Bild-Theorie: Zur Philosophie des Technischen Bildes Ausgehend von der Fotografie." In *Flusser Studies* 10 (November 2010). Accessed April 30, 2018. https://www.flusserstudies.net/sites/www.flusserstudies.net/files/media/attachments/krtilova-bildtheorie.pdf.
Kröller-Müller Museum. "Search the Collection: *Dutch Grey* 1983–84." Accessed April 11, 2020. https://krollermuller.nl/en/ger-van-elk-dutch-grey.
Laermans, Rudi. *Moving Together: Theorizing and Making Contemporary Dance*. Antennae Series. Amsterdam: Valiz, 2015.
Lageira, Jacinto. "Retrospective Portrait." In *Ger van Elk*, edited by Marente Bloemheuvel and Zsa-Zsa Eyck, 212–27. Deventer: Thieme Art, 2009.
Lange-Berndt Petra (ed.). *Materiality*. Cambridge MA: MIT Press, 2015.
Lautenschlaeger, Graziele. *Sensing and Making Sense: Photosensitivity and Light-to-sound Translations in Media Art*. Media Studies. Bielefeld: transcript, 2020.
Le Point d'Ironie. "Tacita Dean No. 36." Accessed September 19, 2017. http://www.pointdironie.com/in/36/dean_en.php.
Lev-Yadun, Simcha. "Bark." In *Encyclopedia of Life Sciences: Handbook of Plant Science*, Vol. 2, edited by Keith Roberts, unpaged. Chichester: John Wiley & Sons, Ltd., 2011. Accessed April 11, 2013. https://doi.org/10.1002/9780470015902.a0002078.pub2
Lin, Fabia Ling-Yuan. *Doubling the Duality: A Theoretical and Practical Investigation into Materiality and Embodiment of Meaning in the Integration of Live Action and Animation*. Newcastle upon Tyne: Cambridge Scholars Publisher, 2014.
Long, Jonathan, Andrea Noble, and Edward Welch (eds.). *Photography: Theoretical Snapshots*. London/ New York: Routledge, 2009.
Lopes, Dominic. "Art Media and the Sense Modalities: Tactile Pictures." *The Philosophical Quarterly* 47, no.189 (October 1997): 425–40.
Lopes, Dominic "The Puzzle of Mimesis." In *Sight and Sensibility: Evaluating Pictures*. Online ed. Oxford: Oxford Academic, 2005. Accessed June 7, 2016. https://doi.org/10.1093/0199277346.003.0002.
Majetschak, Stefan. "Opazität und Ikonischer Sinn: Versuch ein Gedankenmotiv Heideggers für die Bildtheorie Fruchtbar Zu Machen." In *Bildwissenschaft Zwischen Reflexion und Anwendung*, edited by Klaus Sachs-Hombach, 177–94. Cologne: Halem, 2005.
Malt, Johanna. "The Image in Its Absence." In *Meta- and Inter-Images in Contemporary Visual Art and Culture*, edited by Carla Taban, 99–114. Leuven: Leuven University Press, 2013.
Manford, Steven. *Behind the Photo: the Stamps of Man Ray.* Paris: Collection Clémentine, 3rd revised edition, 2009.
Manovich, Lev. "The Paradoxes of Digital Photography." 1995. Accessed October 8, 2018. http://manovich.net/content/04-projects/004-paradoxes-of-digital-photography/02_article_1994.pdf.
Marçal, Hélia Pereira. "Embracing Transience and Subjectivity in the Conservation of Complex Contemporary Artworks: Contributions from Ethnographic and Psychological Paradigms." Doctoral Thesis, Lisbon: University of Lisbon, 2012.
Marchesi, Monica. "Forever Young: The Reproduction of Photographic Artworks as a Conservation Strategy." Doctoral Thesis, Leiden: Leiden University, 2017.
Marin, Louis. *On Representation*. Meridian Series. Stanford: Stanford University Press, 2001.
Marks, Laura U. *The Skin of the Film: Intercultural Cinema, Embodiment, and the Senses*. Durham/ London: Duke University Press, 2000.
Marks, Laura U. *Touch: Sensuous Theory and Multisensory Media*. Minneapolis: University of Minnesota Press, 2002.
Maroja, Camilla, Caroline Menezes, and Fabrizio Augusto Poltronieri (eds.). *The Permanence of the Transient: Precariousness in Art*. Newcastle upon Tyne: Cambridge Scholars Publisher, 2014.
Marx, Kristine. "The Materiality of Impermanence." *PAJ: A Journal of Performance and Art* 30, no.1 (2008): 64–70.
McCabe, Constance. "Noble Metals for the Early Modern Era: Platinum and Palladium Prints." In *Object:Photo. Modern Photographs: The Thomas Walther Collection 1909–1949. An Online Project of The Museum of Modern Art.* 2014. Accessed August 7, 2017. http://www.moma.org/interactives/objectphoto/assets/essays/%5CnMcCabe.pdf.
McCabe, Constance (ed.). *Coatings on Photographs: Materials, Techniques, and Conservation*. Washington, DC: American Institute of Conservation, 2006.
McTighe, Monica. *Framed Spaces: Photography and Memory in Contemporary Installation Art*. Interfaces: Studies in Visual Culture. Lebanon NH: Dartmouth College Press, 2012.
Meier, Stefan. "Die Simulation von Fotografie: Konzeptuelle Überlegungen Zum Zusammenhang von Materialität und Digitaler Bildlichkeit." In *Materialität und Bildlichkeit*, edited by Marcel Finke and Mark Halawa, 126–42. Berlin: Kadmos Verlag, 2012.
Merleau-Ponty, Maurice. *Phenomenology of Perception*. Oxon/ New York: Routledge, 2012 [1945].
Merleau-Ponty, Maurice. "Eye and Mind." In *The Merleau-Ponty Aesthetics Reader: Philosophy and Painting*, edited by Galen A. Johnson and Michael B. Smith, 121–49. Evanston: Northwestern University Press, 1993.
Merleau-Ponty, Maurice. *The Visible and the Invisible*. Evanston: Northwestern University Press, 1968.
Messier, Paul. "Image Isn't Everything: Revealing Affinities across Collections through the Language of Photographic Print." In *Object:Photo: Modern Photographs: The Thomas Walter Collection 1909–1949*, 332–39. New York: Museum of Modern Art, 2014.
Metz, Christian. "Photography and Fetish." *October* 34 (Autumn 1985): 81–90.
Michaels, Walter Benn. "Photographs and Fossils." In *Photography Theory,* edited by James Elkins, 431–50. New York: Taylor & Francis, 2007.
Miller, Daniel (ed.). *Material Cultures: Why Some Things Matter*. Chicago: University of Chicago Press, 1998.
Miller, Daniel (ed.). *Materiality*. E-Duke Books Scholarly Collection. Durham: Duke University Press, 2005.
Mitchell, W.J.T. "Representation." In *Critical Terms for Literary Study,* 2nd ed., edited by Frank Lentricchia and Thomas McLaughlin, 11–22. Chicago: University of Chicago Press, 1995.
Molon, Dominic, and Russell Ferguson (eds.). *Wolfgang Tillmans.* Los Angeles: Hammer Museum; Chicago: Museum of Contemporary Art; New Haven: Yale University Press, 2006.
Mullarkey, John, and Charlotte de Mille (eds.). *Bergson and the Art of Immanence: Painting, Photography, Film*. Edinburgh: Edinburgh University Press, 2013.
Museum of Modern Art. "Object:Photo: Modern Photographs: The Thomas Walther Collection 1909–1949." Accessed October 30, 2020. https://www.moma.org/interactives/objectphoto/#home.
Molon, Dominic and Russell Ferguson (eds.). *Wolfgang Tillmans*. New Haven/ London: Yale University Press, 2006.
Monteiro, Stephen (ed.). *The Screen Media Reader: Culture, Theory, Practice*. London: Bloomsbury Publishing, 2017.
Monteiro, Stephen. "Fit to Frame: Image and Edge in Contemporary Interfaces." *Screen* 55, no. 3 (September 2014): 360–78.
Moser, Gabrielle. "Lenscraft: Jessica Eaton Asks Us to Think About What We See." *Canadian Art* 29, no. 4 (Winter 2013): unpaged. Accessed May 10, 2019. https://canadianart.ca/features/jessica-eaton/.
Newhall, Beaumont. *The History of Photography: From 1839 to the Present*. New York: Museum of Modern Art, 1982.
Newhall, Nancy. *The Photographs of Edward Weston*. New York: Museum of Modern Art, 1946.
Newman, Michael. "Medium and Event in the Work of Tacita Dean." In *Tacita Dean*, edited by Tacita Dean and Clarrie Wallis, 24–27. London: Tate Gallery Publishing, 2001.
Norman, Donald. *The Design of Everyday Things.* Revised and expanded ed. Philadelphia: Basic Books, 2013
Norris, Debra Hess, and Jennifer Jae Gutierrez. *Issues in the Conservation of Photographs*. Readings in Conservation. Los Angeles: Getty Publications, 2010.
Nye, David E. 2003. "Visualizing Eternity: Photographic Construction of the Grand Canyon." In *Picturing Place: Photography and the Geographical Imagination*, edited by Joan Schwartz and James Ryan, 74–95.
Obrist, Hans Ulrich, and Tacita Dean. *Tacita Dean: The Conversation Series Vol. 28*. Cologne: Verlag der Buchhandlung Walther König, 2013.
Obrist, Hans Ulrich, and Wolfgang Tillmans. *Wolfgang Tillmans: The Conversation Series Vol. 6*. Cologne: Verlag der Buchhandlung Walther König, 2008.
Olin, Margaret. *Touching Photographs*. Chicago: University of Chicago Press, 2012.
Olin, Margaret. "Touching Photographs: Roland Barthes's 'Mistaken' Identification." In *Representations* 80, no.1 (Autumn 2002): 99–118.
Parisi, David P. "Touch Machines: An Archeology of Haptic Interfacing." Doctoral Thesis. New York: New York University, 2008.
Pasek, Anne. "The Pencil of Error: Glitch Aesthetics and Post-Liquid Intelligence." *Photography and Culture* 10, no. 1 (March 2017): 37–52.
Paterson, Mark. *Seeing with the Hands: Blindness, Vision and Touch After Descartes*. Edinburgh: Edinburgh University Press, 2016.
Paterson, Mark. *The Senses of Touch: Haptics, Affects and Technologies*. London: Bloomsbury Publishing, 2007.
Paul, Christiane. "Mediations of Light: Screens as Information Surfaces." In *Digital Light*, edited by Sean Cubitt, Daniel Palmer, and Nathaniel Tkacz, 179–92. London: Open Humanities Press, 2015.
Paulsen, Kris. *Here/There: Telepresence, Touch, and Art at the Interface*. Leonardo. Cambridge MA: MIT Press, 2017.
Pénichon, Sylvie. *Twentieth Century Colour Photographs: The Complete Guide to Processes, Identification & Preservation*. London: Thames & Hudson, 2013.
Pénichon, Sylvie, and Martin Jürgens. "Plastic Lamination and Face Mounting of Contemporary Photographs." In *Coatings on Photographs: Materials, Techniques, and Conservation*, edited by Constance McCabe, 218–33. Washington: AIC; The Photographic Materials Group, 2005.
Peterson, Jennifer Lynn. "The Life Cycle of an Analog Medium: Tacita Dean's Film." In *New Silent Cinema*, edited by Paul Flaig and Katherine Groo, 286–314. New York: Routledge, 2015.
Petit, Laurence, and Pascale Tollance. "Photographic Text(ure): The Grain and the Dot." *Image & Narrative* 15, no. 2 (2014): 1–6. Accessed October 24, 2019. http://www.imageandnarrative.be/index.php/imagenarrative/article/view/571.
Philips, Christopher. "The Judgment Seat of Photography." *October* 22 (Autumn 1982): 27–63.
Pichler, Wolfram. "Horizon and Line of Fate (with Tacita Dean and Leo Steinberg)." In *Tacita Dean: Seven Books Grey: Essays on the Work of Tacita Dean*, 5–17. Vienna: Museum Moderner Kunst Stiftung Ludwig; Göttingen: Steidl, 2011.
Pichler, Wolfram. "Zur Kunstgeschichte des Bildfeldes." In *Der Grund: Das Feld des Sichtbaren*, edited by Gottfried Boehm and Matteo Burioni, 441–472. Leiden: Brill | Fink, 2019.
Pirenne, Raphaël, and Alexander Streitberger (eds.). *Heterogeneous Objects: Intermedia and Photography After Modernism*. Lieven Gevaert Series Vol. 15. Leuven: Leuven University Press, 2014.
Potts, Alex. "Tactility: The Interrogation of Medium in Art of the 1960s." *Art History* 27 (April 2004): 282–304.
Prosser, Jay. *Light in the Dark Room: Photography and Loss*. Photography / Aesthetics. Minneapolis: University of Minnesota Press, 2005.
Raabe Reiter, Andreas. "Tacita Dean: Film as Painting." *Spike Art Magazine* 29 (Autumn 2011). Accessed April 15, 2022. https://www.spikeartmagazine.com/?q=articles/tacita-dean-film-painting.
Rancière, Jacques. "Notes on the Photographic Image." *Radical Philosophy* 156 (July/ August 2009): 8–15.
Rastenberger, Anna-Kaisa and Iris Sikking (eds.). *Why Exhibit?: Positions on Exhibiting Photographies.* Amsterdam: Fw:Books, Helsinki: The Academy of Fine Arts, University of the Arts, 2018.
Rath, Markus, Jörg Trempler, and Iris Wenderholm (eds.). *Das Haptische Bild: Körperhafte Bilderfahrung in Der Neuzeit*. Actus et Imago Vol. 7. Berlin: De Gruyter, 2013.
Rautzenberg, Markus, and Andreas Wolfsteiner (eds.). *Hide and Seek: Das Spiel von Transparenz und Opazität*. Munich: Wilhelm Fink, 2010.
Reijers, Bas. "How to Preserve Photographic Artworks for the Future: Chemical and Physical Interactions And Implications for Conservation Strategies." Doctoral Thesis. Utrecht: University of Utrecht, 2017.
Reinhold, Nancy, Hanako Murata, Richard Stenman, Taina Meller, and Nora W Kennedy. "Marking Photographs: The Impact of Ink Stamping Practices." *Topics in Photographic Preservation* 12, no.2 (2007): 3–14. Accessed September 24, 2016. http://resources.culturalheritage.org/pmgtopics/2007-volume-twelve/12_02_Reinhold.html.
Riepenhoff, Meghann. "Littoral Drift." Accessed October 20, 2022. http://meghannriepenhoff.com/project/littoral-drift/.
Rose, Gillian. *Doing Family Photography: The Domestic, the Public and the Politics of Sentiment*. Re-Materialising Cultural Geography. Farnham: Ashgate, 2010.
Rübel, Dietmar, Monika Wagner, and Vera Wolff (eds.). *Materialästhetik: Quellentexte zu Kunst, Design und Architektur.* Berlin: Dietrich Reimer Verlag, 2005.
Rubenstein, Daniel, Johnny Golding, and Andy Fisher (eds.). *On the Verge of Photography: Imaging Beyond Representation*. Birmingham: ARTicle Press, 2013.
Sassoon, Joanna. "Photographic Materiality in the Age of Digital Reproduction." In *Photographs Objects Histories: On the Materiality of Images*, edited by Elizabeth Edwards and Janice Hart, 196–213. London: Routledge, 2004.
Schimmel Paul, and Maria Morris Hambourg (eds.). *Sigmar Polke: Photoworks: When Pictures Vanish*. Los Angeles: Museum of Contemporary Art, 1995.
Schwartz, Joan, and James Ryan (eds.). *Picturing Place: Photography and the Geographical Imagination*. International Library of Human Geography. New York/ London: Routledge, 2003.
Scott, Clive. *Spoken Image: Photography and Language*. London: Reaktion Books, 1999.
SHOWstudio. "Wolfgang Tillmans: In Camera: SHOWstudio Live Interview". Filmed on April 10, 2017. Accessed May 6, 2018. https://youtu.be/MiQKFyvHouQ.
Shusterman, Richard. *Surface and Depth: Dialectics of Criticism and Culture*. Ithaca: Cornell University Press, 2002.

Smith, Shawn Michelle. “Photography between Desire and Grief: Roland Barthes and F. Holland Day.” In *Feeling Photography*, edited by Elsbeth H Brown and Thy Phu, 27–46. Durham: Duke University Press, 2014.
Smith, Caylin. “‘The Last Ray of the Dying Sun’: Tacita Dean’s Commitment to Analogue Media as Demonstrated through FLOH and FILM.” *NECSUS: European Journal of Media Studies* 1, no.2 Tangibility (Autumn 2012): 269–98. Accessed June 6, 2013. https://doi.org/10.25969/mediarep/15059.
Smith, Terry. *Impossible Presence: Surface and Screen in the Photogenic Era*. Chicago: University of Chicago Press, 2001.
Snyder, Joel. “Picturing Vision.” *Critical Inquiry* 6, no. 3 (Spring 1980): 499–526.
Sobchack, Vivian. “The Scene of the Screen: Envisioning Photographic, Cinematic, and Electronic ‘Presence’.” In *Post-Cinema: Theorizing 21st-Century Film*, edited by Shane Denson and Julia Leyda, 88–128. Falmer: REFRAME Books, 2016. https://reframe.sussex.ac.uk/post-cinema/2-1-sobchack/.
Sontag, Susan. *On Photography.* New York: RosettaBooks, 2005 [1973].
Springorum, Friedrich. *Der Gegenstand der Photographie: Eine Philosophische Studie*. Munich: Ernst Reinhardt Verlag, 1930.
Squiers, Carol (ed.). *What Is a Photograph?* New York: International Center for Photography; Munich: Prestel; New York: DelMonico Books, 2013.
Stanford Encyclopedia of Philosophy. “Hans-Georg Gadamer” first published March 3, 2003; substantive revision August 22, 2022. Accessed October 8, 2022. https://plato.stanford.edu/entries/gadamer/.
Statzer, Mary (ed.). *The Photographic Object 1970*. A Simpson Book in the Humanities. Berkeley: University of California Press, 2016.
Stedelijk Museum Amsterdam. *Op het tweede gezicht 1979–1980: begeleiding bij werken uit de collectie van het Stedelijk Museum, Amsterdam*. Exhibition catalogue. Amsterdam: Stedelijk Museum Amsterdam, 1979.
Stedelijk Museum Amsterdam. “Storage: Behind the Scenes.” Accessed January 23, 2023. https://www.stedelijk.nl/en/dig-deeper/collection-care-conservation/collection-care/storage.
Stiegler, Bernd. “Katastrophen und ihre Bilder.” In *Die Unordnung Der Dinge: Eine Wissens- und Mediengeschichte Des Unfalls*, edited by Christian Kassung, 221–48. Bielefeld: transcript, 2009.
Stiegler, Bernd. *Theoriegeschichte der Photographie*. Bild und Text. Paderborn: Wilhelm Fink Verlag, 2006.
Stigter, Sanneke. “Living Artist, Living Artwork? The Problem of Faded Colour Photographs in the Work of Ger van Elk.” *Studies in Conservation* 49, no. 2 (2004): 105–8.
Stigter, Sanneke. “To Replace or Not to Replace? Photographic Material in Site-Specific Conceptual Art.” In *ICOM-CC 14th Triennial Meeting The Hague: Preprints*, edited by Isabelle Sourbès-Verger, 365–70. London: James & James/Earthscan, 2005.
Stigter, Sanneke. “Through the Conservator’s Lens: from Analogue Photowork to Digital Printout: How is Authenticity Served?.” In *Authenticity in Transition: Changing Practices in Contemporary Art Making and Conservation*, edited by Erma Hermens and Frances Robertson, 169–78. London: Archetype Publications, 2016.
Stigter, Sanneke. “Verkleurde kleurenfoto’s: Restauratieproblematiek in het werk van Ger van Elk.” *kM: vakinformatie voor beeldende kunstenaars en restauratoren* 50 (2004): 54–6.
Stulik, Dusan, and Art Kaplan. “The Atlas of Analytical Signatures of Photographic Processes. Albumen.” Los Angeles: The Getty Conservation Institute, 2013a. Accessed July 22, 2021. https://www.getty.edu/conservation/publications_resources/pdf_publications/pdf/atlas_albumen.pdf.
Stulik, Dusan, and Art Kaplan. “The Atlas of Analytical Signatures of Photographic Processes.” Los Angeles: The Getty Conservation Institute, 2013. Accessed July 22, 2021. https://www.getty.edu/conservation/publications_resources/pdf_publications/atlas.html.
Stulik, Dusan, and Art Kaplan. “The Atlas of Analytical Signatures of Photographic Processes. Collotype.” Los Angeles: The Getty Conservation Institute, 2013b. Accessed July 22, 2021. https://www.getty.edu/conservation/publications_resources/pdf_publications/pdf/atlas_collotype.pdf.
Stulik, Dusan, and Art Kaplan. “The Atlas of Analytical Signatures of Photographic Processes. Silver Gelatin.” Los Angeles: The Getty Conservation Institute, 2013c. Accessed July 22, 2021. https://www.getty.edu/conservation/publications_resources/pdf_publications/pdf/atlas_silver_gelatin.pdf.
Sturken, Marita, and Lisa Cartwright. *Practices of Looking: An Introduction to Visual Culture*. 1st American edition. New York: Oxford University Press, 2005.
Švankmajer, Jan. *Touching and Imagining: An Introduction to Tactile Art*. Translated by Stanley Dalby. International Library of Modern and Contemporary Art. London: I. B. Tauris, 2014.
Talbert, Michael. “Cibachrome (the Silver Dye Bleach Process).” Accessed January 25, 2020. https://www.photomemorabilia.co.uk/Ilford/Cibachrome.html.
Tillmans, Wolfgang. “Wolfgang Tillmans: Interview.” Fondation Beyeler, Basel, Switzerland, July 26, 2017. Accessed 22 October, 2020. https://youtu.be/f9RrmzUXnhA.
Toadvine, Ted and Leonard Lawlor (eds.). *The Merleau-Ponty Reader*. Evanston: Northwestern University Press, 2007.
Trachtenberg, Alan. “Likeness as identity: Reflections on the Daguerrean Mystique.” In *The Portrait in Photography*, edited by Graham Clarke, 173–92. London/ Seattle: Reaktion Books, 1992.
Trodd, Tamara. “Lack of Fit: Tacita Dean, Modernism and the Sculptural Film.” *Art History* 31, no. 3 (June 2008): 368–86.
Tuan, Yi Fu. *Space and Place: The Perspective of Experience*. London: Edward Arnold, 1977.
Westgeest, Helen, Truus Van Bueren, Agnes Groot, Arjan de Koomen (eds.). *Kunsttechnieken in Historisch Perspectief*. Turnhout: Brepols, 2011.
Van Camp, Kristel. “Damage Atlas for Photographic Materials.” *CeROArt* EGG 1 Horizons, (November 2010). Accessed February 28, 2014. https://journals.openedition.org/ceroart/1770.
Van der Lint, Roos. “Ger van Elk Draait Alles Om.” *Kunstbeeld* 36, no. 10 (2012): 24–31. Accessed December 15, 2022. http://roosvanderlint.nl/wp-content/uploads/2013/01/KB10_2012_interview-Ger-van-Elk.pdf.
Van de Wetering, Ernst. “The Surface of Objects and Museum Style.” In *Museum Objects: Experiencing the Properties of Things*, edited by Susan Dudley, 103–8. Oxon/ New York: Routledge, 2012.
Van Duijvenboden, Nickel, Gwenneth Boelens, Kevin Cook, and David McKay. *Gwenneth Boelens: In Two Minds*. Amsterdam: Roma Publications, 2014.
Van Gelder, Hilde, and Helen Westgeest. *Photography Theory in Historical Perspective*. Hoboken: John Wiley & Sons, 2011.
Van Gelder, Hilde, and Helen Westgeest. “Photography and Painting in Multi-Mediating Pictures.” *Visual Studies* 24, no.2 (2009): 122–31.
Van Lier, Henri. *Philosophy of Photography*. Lieven Gevaert Series Vol. 6. Leuven: Leuven University Press, 2007 [1983].
Van Winkel, Camiel. *The Regime of Visibility.* Rotterdam: NAi Publishers, 2005.
Vasseleu, Cathryn. *Textures of Light: Vision and Touch in Irigaray, Levinas and Merleau-Ponty*. Warwick Studies in European Philosophy. London: Routledge, 2002.
Vernallis, Kayley. “The Loss of Meaning in Faded Color Photographs.” *Journal of the American Institute for Conservation* 38, no.3 (Autumn/ Winter 1999): 459–76.
Visser, Hripsimé, and Rik Suermondt. *Fotografie in het Stedelijk: De Geschiedenis van een Collectie*. Rotterdam: NAi Publishers, 2009.
Visser, Hripsimé, and Flip Bol. “Image, Medium, Instrument, Document: Developments since the 1960s.” In *Dutch Eyes: A Critical History of Photography in the Netherlands*, edited by Flip Bool, Mattie Boom, Frits Gierstberg, Ingeborg Th. Leijerzapf, Adi Martis, Anneke van Veen, and Hripsimé Visser, 471–520. Ostfildern: Hatje Cantz, 2007.
Visser Jeroen. “Ger van Elk, Kunstenaar.” Directed and filmed by Jeroen Visser, 1986. Accessed December 27, 2020. https://vimeo.com/104600912.
Vitale, Tim. “Film Grain, Resolution and Fundamental Film Particles.” April 2007. Accessed October 4, 2021. https://vashivisuals.com/wp-content/uploads/2017/07/2007-04-vitale-filmgrain_resolution.pdf.
Vogel, Hermann Wilhelm. *The Chemistry of Light and Photography in Their Application to Art, Science, and Industry*. Cambridge Library Collection - Technology. Cambridge: Cambridge University Press, 2011 [1875].
Von Berswordt-Wallrabe, Silke, Beate Reifenscheid, and Diana Wind (eds.). *Broken Landscapes: Ger Dekkers, Jan Dibbets, Ger van Elk, Jaap van Den Ende*. Bochum: Situation Kunst (für Max Imdahl), Kunstsammlungen der Ruhr-Universität Bochum; Koblenz: Ludwig Museum Koblenz; Schiedam: Stedelijk Museum, 2014.
Von Waldthausen, Clara. “Condition Mapping Report: *Crowhurst II* by Tacita Dean.” 2013.
Von Waldthausen, Clara. “Condition Mapping Report: *Dutch Grey* by Ger van Elk.” 2013.
Von Waldthausen, Clara. “Condition Mapping Report: *Russian Diplomacy* by Ger van Elk.” 2013.
Wagner, Monika. *Das Material Der Kunst: Eine Andere Geschichte Der Moderne*. Munich: Beck, 2001.
Weaver, Gawain, and Zach Long. “Handout for Chromogenic Color Characterization: A Study of Kodak Color Prints, 1942–2008.” January 2010. Presented at the Photographic Materials Group Winter Meeting Tucson, AZ, 2009. Accessed December 5, 2015. https://gawainweaver.com/images/uploads/Weaver_and_Long_Chromogenic_prepub.pdf.
Weiss, Gail. “Imagining the Horizon.” In *New Critical Theory: Essays on Liberation*. G - Reference, Information and Interdisciplinary Subjects Series, edited by William Wilkerson and Jeffrey Paris, 249–63. Lanham: Rowman & Littlefield Publishers, 2001.
Westgeest, Helen (ed.). *Take Place: Photography and Place from Multiple Perspectives*. Antennae Series. Amsterdam: Valiz, 2009.
Weston, Edward. “Seeing Photographically.” *The Complete Photographer* 9, no. 49 (2003 [1943]): 104–8.
Wiesing, Lambert. *Artifizielle Präsenz: Studien zur Philosophie des Bildes*. First. Frankfurt: Suhrkamp Verlag, 2005.
Wilhelm, Henry, and Carol Brower. *The Permanence and Care of Color Photographs: Traditional and Digital Color Prints, Color Negatives, Slides, and Motion Pictures*. Grinnell: Preservation Publishing Company, 1993.
Willumson, Glenn. “Making Meaning: Displaced Materiality in the Library and Art Museum.” In *Photographs Objects Histories: On the Materiality of Images*, edited by Elizabeth Edwards and Janice Hart, 62–80. New York: Routledge, 2004.
Zakia, Richard D, and John Suler. *Perception and Imaging: Photography as a Way of Seeing*. New York: Routledge, 2017.
Zika, Fay. “Tactile Relief: Reconsidering Medium and Modality Specificity.” *British Journal of Aesthetics* 45, no.4 (October 2005): 426–37.

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Samenvatting

Het FOTOGRAFISCH OPPERVLAK
Een MATERIAAL-FILOSOFISCHE STUDIE

Zo op het eerste gezicht manifesteert fotografie zich in al haar veelzijdigheid aan het oppervlak, zij het op papier, op filmrol, op doek, op beeldscherm, op touchscreen, enzovoorts. Kort gezegd, fotobeelden zijn alleen zichtbaar op de drager die hen medieert. Niet voor niets is uit Vilém Flussers *Für eine Philosophie der Fotografie* (1983) de uitspraak "Bilder sind bedeutende Flächen," oftewel, afbeeldingen zijn betekenisvolle oppervlaktes, tot het fototheoretische canon verheven. De specifieke focus op het fotografische oppervlak in deze dissertatie betreft analoge fotowerken die deels zijn overschilderd. Het oppervlak als tussenvlak tussen fotografie en schilderkunst is hier per definitie een *interface* tussen verschillende momenten van creatie en perceptie, tussen representerende en verwijzende betekenislagen, tussen figuratieve en abstracte fotokunst.

Mijn analyse van het fotografische oppervlak als interface concentreert zich hoofdzakelijk op hybride, met name overschilderde, fotowerken, maar is grotendeels toepasbaar op transformatieprocessen van analoge foto's in het algemeen. In dit specifieke kader is het oppervlak een grensvlak tussen interne en externe chemische substanties, tussen bijvoorbeeld belichte zilverdeeltjes en latere vochtinwerking door overschildering of conservatie. Daarnaast acteert het oppervlak als verbinding en scheidslijn tussen de wisselende momenten, periodes en ruimtes waarin het fotowerk zijn bestaansrecht heeft, van creatie en expositie tot restauratie.

Deze materiaal-filosofische studie van het fotografische oppervlak probeert vanuit bovengenoemde materiële relationaliteit van fotografische processen tot een theorie van de foto als veranderlijk object te komen. Analoge foto's maken een permanente chemische ontwikkeling door, ze zijn niet in een staat van zijn, maar altijd in wording. Ook beeltenissen en nabewerkingen op het oppervlak zijn onderhevig aan post-creatieve wordingsprocessen. Uit deze gevoelige ontvankelijkheid voor interne en externe chemische transformaties blijkt dat het fotografische oppervlak niet slechts een minimale functie als mediërende beelddrager heeft, maar dat het oppervlak doorlopend het beeld actief mede vormgeeft – *the surface performs the image*.

In het eerste hoofdstuk staat de textuur van fotografische oppervlaktes centraal. Materiële texturen, zoals gelatine en het soort fotopapier, en visuele texturen, zoals de door de mate van lichtgevoeligheid bepaalde korreligheid, creëren samen de textuur van een fotografische afbeelding. Hierbij is van belang op te merken dat de materiële texturele eigenschappen van fotografische oppervlaktes nooit een mimetisch evenbeeld van de afbeeldingen zijn of kunnen produceren, noch tijdens hun ontstaan noch gedurende hun levensduur. Wel staan ze in direct verband met het gefotografeerde onderwerp. De moleculair-texturele samenstelling van de hoeveelheid aan beelddeeltjes in de gelatinelagen geeft *analoog* de lichtreflecties die van het gefotografeerde object uitgingen weer.

Een ander belangrijk aspect van de texturaliteit van het fotografisch oppervlak is haar indexicaliteit, de mate waarin een foto verwijst naar de tijd en context van creatie en productie. Welk negatief is gebruikt, op welk papier is de foto afgedrukt? De texturen van een fotografische oppervlak vertellen wanneer en hoe het basismateriaal onder andere door technische uitvindingen, productiemethoden, genrevoorwaarden en schoonheidsidealen is gevormd.

Hoe vanzelfsprekend deze bevindingen ook mogen lijken, nog steeds overheersen in gangbare fototheorieën analogieën van 'de foto' als fysieke af*druk*. In navolging van de letterlijke betekenis van fotograferen als een vorm van schrijven, graveren of impregneren met licht wordt de foto begripsmatig meer dan frequent als 'spoor,' 'voetafdruk' of zelfs 'inscriptie' aangeduid. Deze metaforen en concepten verwijzen naar hun potentieel veranderingen aan te brengen in de textuur van een oppervlak. Dit is niet alleen misleidend, dit is ronduit incorrect. Zonder dat het fotografisch oppervlak fysiek verandert, worden analoge foto's bij hun totstandkoming, in de interactie tussen gereflecteerde lichtenergie en lichtgevoelig materiaal, visueel en materieel met de afbeelding 'geladen' dan wel 'opgeladen'. Na verloop van tijd verandert deze lading onder invloed van gebruik en behoud (conservering). Om niet alleen het creatieve, maar ook het chemisch-visuele ontwikkelingsproces van een foto tijdens zijn bestaan recht te doen, introduceer ik 'de foto als lading' – *the photograph as charge*.

Het tactiele aspect van analoge fotografie krijgt binnen de fototheorie beperkt aandacht. In hoofdstuk twee verklaar ik hoe enkele moleculaire en menselijke interacties samenhangen in relatie tot het fotografische oppervlak. Voorbeelden van deze interacties zijn het licht dat het lichtgevoelige fotografisch oppervlak raakt, of de handen van de persoon die het in de donkere kamer ontwikkelt, maar natuurlijk ook de chemische oplossingen waarin het latente beeld wordt ondergedompeld en zichtbaar gemaakt. Aan de hand van Tacita Dean's *Crowhurst II* (2007), de casestudy van de eerste twee hoofdstukken, beargumenteer ik vanuit fenomenologisch perspectief dat de analoge fotografie behalve een visueel, ook een intrinsiek tactiel medium is.

De gigantische, eeuwenoude taxusboom afgebeeld op *Crowhurst II* heeft op een meer dan elf vierkante meter groot fotografisch oppervlak een adembenemende aanwezigheid. Maar niet alleen het formaat maakt het mogelijk dat dit niet ingelijste, 'naakte' fotowerk naast een visuele, ook een tactiele zintuiglijk ervaring teweegbrengt. De boom uit East-Sussex is afgedrukt op vier stroken van bijna een meter breed zilvergelatine papier dat gedeeltelijk is overschilderd met witte gouacheverf. De afwisseling van het zacht golvende, glanzende fotopapier met de matte, broze structuur van de witte gouacheverf geven zowel het fotowerk op zich als de afgebeelde taxus een onverwachte sculpturale, dus fysiek haptische kwaliteit.

Menselijk sensorisch vermogen en bewustzijn worden door fysieke foto's niet alleen visueel, maar ook haptisch, emotioneel en affectief geprikkeld. Door beschouwing én aanraking 'laden' mens en analoge foto elkaar. Dit wederzijds 'opladen' gebeurt altijd binnen een specifieke context waarin gedragscodes ten opzichte van foto's zijn

bepaald: ze moeten of mogen worden aangeraakt als creërende of koesterende geste of absoluut niet vanwege conserverende maatregelen. De manier van tentoonstellen is dus van wezenlijk belang. Deze kan bijdragen aan een haptische ervaring van analoge fotografie of het juist teniet doen.

Tacita Dean's fotowerk is bij uitstek een haptisch fotowerk – *a haptic photowork*, dat als object kan worden gewaardeerd en getheoretiseerd; en waarbij kan worden geconcludeerd dat de haptische ervaring eerder de visuele ervaring beïnvloedt dan andersom. Het is dus in eerste instantie de haptiek die de analyse en betekenisgeving van het kale beeld, de taxusboom, bepaalt. Vanuit theoretisch oogpunt moeten visuele en tactiele analyse tenminste hand in hand gaan.

De wereld is niet plat en het fotografische oppervlak net zo min. Het is dieper dan men denkt. Naast meer aandacht voor de multi-sensorische waarneming binnen de fototheorie, bepleit ik in het derde hoofdstuk het nut van multi-perspectivische analysemethodes van analoge foto's en fotowerken. Deze bieden meer onderzoeksmogelijkheden om de verschillende 'ruimtes' van het fotografisch oppervlak te bestuderen dan dat gangbare theorieën voorhanden hebben.

Met ruimtes doel ik op de zichtbare en onzichtbare delen van een analoge foto, die als een meerlagige sandwich tussen de uiterste recto en verso, de voor- en achterkant, van een foto zijn 'geperst'. Op het eerste gezicht lijkt het beeld *in* of *op* het oppervlak inderdaad niet meer dan een oppervlakkige kwestie, maar hoe wij een beeld zien, is slechts het product van onze beperkte waarneming. In werkelijkheid ligt een fotobeeld in het sediment van op elkaar gestapelde beelddeeltjes ingebed in gelatinelagen. Voor het begrip dat elk beeld op een analoge foto ontstaat in de dikte van het oppervlak, gebruik ik een neologisme, namelijk *thickness of field,* om tegelijk de dikte en scherptediepte van de foto, die door de posities van de beelddeeltjes in de gelatinelagen wordt bepaald, te benadrukken.

Om methodisch de dikte van een foto multi-perspectivischer te kunnen benaderen, zet ik het fotografisch oppervlak conceptueel in als een soort landschap, waarbij de zichtbare buitenste lagen van de foto worden gevormd door de onzichtbare, gelaagde compositie eronder. Deze analogie met het landschap komt mede voort uit het onderwerp en de techniek van mijn tweede case study, *Dutch Grey* (1983–84) van Ger van Elk. Dit fotowerk kan worden beschouwd als een allegorie van het platte Hollandse landschap, opgeroepen door de vele abstracte, gedrupte kleurlagen lakverf op een ondergrond van vier zwart-wit foto's van een akkerlandschap dat grotendeels onder de verflagen schuilgaat.

Afhankelijk van het perspectief dat wordt ingenomen ten opzichte van *Dutch Grey*, verschuiven eveneens materieel-theoretische en beeldanalytische invalshoeken. Wat op het eerste gezicht onzichtbaar is, blijkt zichtbaar op het tweede. Wat theoretisch eerst niet denkbaar is, is mogelijk bij elke verandering van perspectief. Deze verschuivingen zinspelen op het verleggen van iemands horizon, een spel waaraan Ger van Elk met zijn fotowerk kijkers aan onderhevig maakt. Niet alleen kunstenaar of kijker bepaalt een perspectief, een werk op zich maakt steeds weer een andere, onverwachte blik mogelijk. Behalve ter analyse van *Dutch Grey* onderstreept Merleau-Ponty's fenomenologische begrip van 'horizon' mijn argument dat het fotografisch oppervlak als een horizon fungeert. Ten eerste omdat de binnenlagen van de foto niet per se onzichtbaar zijn, maar ten tweede omdat het zichtbare beeldoppervlak ons er toe zou moeten aanzetten om een bredere onderzoekshouding ten opzichte van het fotografische sediment in relatie tot het fotobeeld in te nemen.

Het doel van deze dissertatie is om via het fotografische oppervlak en de materiële relationaliteit van chemische-fotografische processen tot een theorie van de analoge foto als veranderlijk object te komen. In het vierde en laatste hoofdstuk werk ik de veranderlijke aard van de analoge foto verder uit en breng ik de voorafgaande analyses bij elkaar om mijn begrip van het fotografisch oppervlak nog verder te specificeren als *interface van het fotografische transformatieproces*.

De analoge foto is tijdens zijn ontstaan en levensduur afhankelijk van chemische processen en menselijke handelingen. In een korter of langer durend vergankelijkheidsproces, oftewel transformatieproces, verandert de chemische samenstelling van een foto of fotowerk.

Dit heeft gevolgen voor hoe wij sensorisch handelen, welk perspectief wij innemen, voor hoe wij betekenis geven aan een chemisch beïnvloed, bijvoorbeeld verkleurd, fotobeeld, voor hoe een foto wordt tentoongesteld, geconserveerd en of gerestaureerd. Kort gezegd zou bijvoorbeeld de situatie waarin Ger van Elks verkleurde *Russian Diplomacy* (1978), de case study in dit laatste hoofdstuk, verkeert, zich eerder laten omschrijven als een (zelf-)destructieproces, waarin een 'aan het object inherente vergankelijkheid' zich manifesteert.

Het fotografisch oppervlak als interface van het fotografisch transformatieproces beweegt letterlijk mee gedurende de hele levensspanne van een analoge foto of analoog fotowerk en niet alleen wat creatie, productie en behoud aangaat. Per definitie is het fotografische oppervlak een actief tussenvlak, een actieve interface, waarop en waarin interne en externe chemie plaatsvindt; en waar sociale, artistieke, historische en theoretische lijnen zich kruisen en een wederzijdse relatie aangaan met de materiële gelaagdheid van een analoge foto.

Uit fotoconservatorisch onderzoek blijkt dat het fotografische oppervlak elke foto en elk fotowerk uniek maakt, zelfs als er meerdere afdrukken van eenzelfde negatief in de omloop zijn. Zijn en worden, uniciteit en reproduceerbaarheid, lijken in de context van fotografie onverenigbare concepten, maar het transformatieproces en de sociaal-materiële biografie van het fotografisch oppervlak bewijzen in hun continue staat van wording het tegendeel.

Een stabiele, statische ontologische opvatting van 'de foto' is niet alleen begrensd, maar evident onvoldoende. Mijn analyse van het fotografische oppervlak als een actieve interface geldt daarom als dringende aanbeveling om, voorbij de minimale functie van mediërende beelddrager, specifiek de veranderlijke aard van iedere foto en fotowerk serieus te nemen en te waarderen, met name binnen de fototheorie en in de museumpraktijk.

Biography

CAROLINE VON COURTEN (b.1983, DE) is an essayist at heart and a curator/editor by profession. In 2006 she completed her undergraduate studies in Language and Culture Studies, majoring in Visual Culture, at Utrecht University (with an exchange semester at Monash University, Melbourne, Australia). In 2008 she completed the Photographic Studies master's programme at Leiden University (the Netherlands), graduating with a thesis on blurriness in contemporary photography.

After that she inhabited (assistant) curatorial positions at the Stedelijk Museum Amsterdam and the Nederlands Fotomuseum Rotterdam. While working at the Fotomuseum, she was commissioned to co-curate and organize *QUICKSCAN NL – new photography from the Netherlands,* an exhibition at the Dutch Culture Center in Shanghai, during the 2010 Worldexpo. In the same year she produced and shaped the first edition of the Dutch Doc Award: the Netherlands's first award for documentary photography by order of FOTODOK – Space for Documentary Photography in Utrecht and the Fund BKVB. Between 2010 and 2012 she was Managing Editor of Foam International Photography Magazine, and also responsible for the conceptual content of Foam's *What's Next?* project on the future of photography. This involved ground-breaking special publications, an exhibition, and an international symposium of experts at Foam photography museum in Amsterdam in spring 2011.

Mid 2012, she was appointed to become one of the three researchers on the NWO-funded interdisciplinary Science4Arts research project *Photographs & Preservation – How to save photographic artworks for the future?* As a research assistant, she taught undergraduate students in contemporary photography at Leiden University while conducting her PhD-research on the photographic surface under supervision of Prof. Dr. Kitty Zijlmans and Dr. Helen Westgeest (2012 – 2023) at the Leiden University Centre for the Arts in Society (LUCAS). She attended summer schools at eikones – The National Centre of Competence in Research (NCCR), on Iconic Criticism (2013), and at the Philipps-University Marburg (2015). From 2016 until 2019 she was Associate PhD-student at The Photographic Dispositif graduate program at the Hochschule für Bildende Künste Braunschweig, funded by the German Research Foundation (DFG).

In 2018 she acted as interim managing editor for three issues of Foam Magazine and wrote the conceptual proposal for an exhibition that would reflect and share issues brought up by the Science4Arts research with the museum's public. This exhibition was realized by the photography department of the Stedelijk Museum Amsterdam under the title *FOREVER YOUNG? Impermanence in Photography.*

Currently, she is co-directing Der Greif – an award-winning global organization for contemporary photography based in Munich and is lecturer for photography theory and visual culture at Lucerne School of Art and Design.

As an expert, she has contributed in-depth articles on the materiality of photography to international photography magazines (UNSEEN magazine#2, Foam #49 Back to the Future, C/O Berlin newspaper), and written essays for artist publications (on Nobuyoshi Araki, Jessica Backhaus, Michael Wolf, and Ola Lanko) and magazines (The Photobook Review by Aperture and Foam Magazine).

Throughout her career, she has moderated artist interviews and panel discussions for various European photo institutions. She has regularly acted as external adviser and judge in the field of contemporary photography (Foam Talent, C/O Berlin Talent, Unseen Outset Exhibition Fund, Plat(t)form Winterthur, Steenbergen Stipendium, and CNAC Portfolio award Luxemburg).

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