

Nicole Miller

**SELECTED
WORKS**

2016 - 2023

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Note: This document is best viewed in two-page view. It begins with single page summaries of each project so that if you have an interest in making a physical copy, you can print pages 1-8 if you'd like to save ink/paper. The projects include some pages with a black background which are not very printer-friendly.

State of the Union: Married to an Idea

2016-2017

State of the Union is a research collaboration with artist Kathryn Scott to explore the conceptual linkage between American capitalist culture, marriage rituals, and environmental destruction. Selected works shown here are part of my contribution to the collaboration. The project was carried out in Montana, and a longer period of time was spent in Butte, visiting the infamous Berkeley Pit. The Berkeley Pit is a former open-pit copper mine, a bizarre tourist attraction, and one of the largest Superfund sites in the United States. It has been noted as "one of the only places in the world where you can pay to see toxic waste".



<https://www.nicolemmiller.com/work/state-of-the-union/>

The Atmosphere of Climate Change

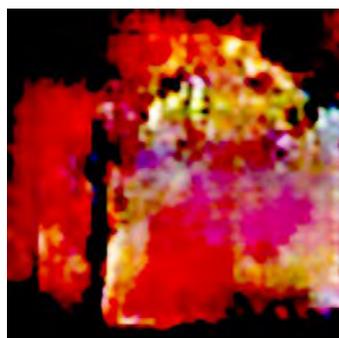
2019-2020

The Atmosphere of Climate Change is an artistic research project overlapping with visual anthropology using AI, media images, imagination, and film to explore the atmosphere constructed around the topic of climate change. The project involved interviews with participants asking them to visualize climate change as a tangible object with a color, form, and texture and to describe their interactions with the object. They were also asked to recount their personal experiences of climate change as well as their encounters with climate change media images.

The outcome is a series of 13 experimental ethnographic short films coupling archival footage with interview audio. The films are divided into segments - - Experience and Imagination.

To complement the project a neural network was trained on an input set of media images of climate change in order to generate new climate change images.

1,700 new "climate change images" were generated. The resulting images, shown in a sample here, demonstrate the atmospheric aesthetic similarities in media constructions of climate change. The research paper, *The Atmosphere of Climate Change: An Anthropological Study Using Visualization, Imagination, Film, and Artificial Intelligence as Conceptual Tools to Explore the Construction of Atmosphere*, is, to my knowledge, the first research exploration in creating AI generated images for arts and humanities studies on the topic of climate change.



Video Links:

[The Heat](#)

[The Fire](#)

[The Circle](#)

Text Link:

[Research Paper](#)

<https://www.nicolemmiller.com/work/climate-change/>

On the Precipice of Something Great



2022-2023

I became interested in photographs of the Grand Canyon after I visited in 2019. I'd been several times before, but this time I felt something about the experience was incredibly sad. Standing in the group of tourists who had anticipated their visit, on the edge of the Grand Canyon. Although I took a few photographs with my phone, I found myself wondering why I would take the photos and what they mean. I also wondered if it was a mistake to go somewhere just to see a quick view, rather than to stay and understand a place. From the directed viewing platform it would be nearly impossible to take a photograph that didn't look visually similar to the millions of other photographs. If I wanted to remember what it looked like, I could easily Google search the Grand Canyon and find many images indistinguishable from the one I would have taken. Or maybe there are differences that are more subtle in these photographs, that communicate an underlying connection to a particular temporal point. These questions prompted me to look through archives and amass a collection of Grand Canyon images and home movies.

The resulting collection says more about the history and viewing frame of photography and human relationships to nature than it says about the Grand Canyon. The images are from the American national archive collections, from the U.S. War Department (now called the Department of Defense), from famous photographers like Ansel Adams, from amateur home movies, as well as a few of my own photographs. In the past, this natural wonder was encountered during extreme expeditions into unknown territories, and it was even more exciting and awe-inspiring to be alone and to be one of the first people to see or photograph the Grand Canyon. But in the age of fast transportation and digital image capturing where everything is increasingly accessible, what does it mean to take a photograph of the Grand Canyon? Is it a symbolic gesture, a piece of a collection, or a mechanism used to ensure a mental image is captured? Does an increasing number of photographs existing mean that the original photographs become less significant? The project visually explores the cultivation of the photographic gaze.

The collection of photographs is best viewed online, although some collaged samples are included here.

Project webpage:

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Natural History Collecting - Places I've Touched

2022-ongoing

Natural History Collecting - Places I've Touched is an ongoing project in experimental photography. Utilizing a handheld portable scanner, which resembles an airport security wand, I document places in Småland, Sweden. This requires pressing and rolling the scanner against natural elements to create photographs that have a mixture of dreamlike elements and sharp realistic detail. The approach references the increasing amount of technology that encourages sensing, scanning, and data collecting every aspect of natural environments, highlighting an element of absurdity to this trend in the distortion of the information. The resulting images are more poetic than practical. Interestingly, the act of scanning an environment through this method necessitates physical presence, the usage of touch in image-making, and a level of physical intimacy which traditional photography does not afford. Paradoxically the process creates space to make a stronger connection to nature through the interactions required for collecting images.



Nicaragua and the Invisible Canal

2016-2017

In 2016 I received a research grant for an environmental photography project documenting the Nicaragua Canal. The Nicaragua Canal is a little known infrastructural project that was started to develop a canal, very similar to the Panama Canal, through the entirety of Nicaragua, from the East to West coast. The project, with an unknown environmental impact, was set to displace a large number of indigenous people who had a constitutional right to their land on the Atlantic side of Nicaragua. My intention was to interview them and document the initial start of the canal project and the environmental interactions of the people living there. When I arrived in Nicaragua, the next day the U.S. State Department issued a warning about travel to Nicaragua. When I was forbidden to research the canal project or document anything of relevance, the project became oriented towards critically examining the documentary possibilities for photography when views are intentionally obscured.

The end product was not as I anticipated. Rather than consisting of an insightful spread of revealing documentary photographs, I used one image that conceptually fit the situation of the project as a discussion point in a seminar I gave. Additional photographs of Nicaragua, but not related to the canal project, were catalysts for discussion about photographic representations of environments. The research project became an investigation of what photography is in the situations when a photograph cannot be taken - it is an exercise in thinking around photographs and starting conversations around photographs.



Collecting the Environment

2021-2022

Environmental History Thesis Project Abstract

Miller, N. 2022. Collecting the Environment: A Cultural and Aesthetic Historical Analysis of Mushroom Collecting in Sweden from the 19th century to the Present. Uppsala, Department of Archaeology and Ancient History.

The aim of this project is to investigate a cultural history of mushroom collecting in Sweden from the 19th century to the present with a focus on connections between aesthetics and the environment. Collecting is defined broadly as gathering, storing, and accumulating. This definition encompasses mycologists, mushroom enthusiasts, botanists, and natural historians documenting and preserving as many species as possible. But it also includes collecting in the sense of leisurely mushroom collectors taking a part of the environment home with them to eat, store, or learn from. A history of mushroom collecting in Sweden is framed that does not only focus on edible mushrooms or scientific value, but emphasizes their linkages to place, memory, conservation, sociality, and embodied knowledge. Mushroom aesthetics are a starting point for exploring wider human connections to the environment and human perceptions of nature.

Collecting is presented as a process which is argued to be a means for constant dialogue with the environment. The cyclical collecting process is broken into stages that are discussed in designated chapters: Hunting, Identification and Assessment, and Storage and Sharing. Aesthetic aspects of mushroom collecting in Sweden are examined within these stages applying visual and discourse analyses to archival images, questionnaires, historic cookbook recipes, and mushroom identification books. Importance is also assigned to fully immersed aesthetic experiences and specific sensory stimuli that facilitate interconnection with non-human actors. Immersed aesthetic experiences are argued to be significant in their ability to democratize aesthetic appreciation of nature, in contrast to historical associations of aesthetics with taste and high culture. Fluctuating historical judgments are mapped about mushrooms, highlighting the framing of nature as a productive asset. Mushroom exhibitions are shown to be a point of collective meaning making, where aspects of natural time according to mushrooms challenge anthropocentric notions of temporality. This thesis through its focus on aesthetics in mushroom collecting reveals spaces of uncertainty and dynamic fluctuation in human-nature relationships, as well as a sense of value for being physically present and part of environments.

Full paper available [HERE](#)

**State of the
Union:
Married to an Idea**

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<https://www.nicolemmiller.com/work/state-of-the-union/>

Can you swim in the Berkeley Pit?

The water in Berkeley Pit is highly toxic to your health. You can not swim in it or drink from it. While no humans have ever tried to swim in the pit, examination of deceased birds confirms they died of high levels of arsenic and copper. These chemicals and metals burned their insides and produced festering sores.



The Invitation



The Aisle



The Altar



The Venue



The Reception



The Bouquet Toss



The Honeymoon



The Dream



The Married State



In Sickness and in Health



'Til Death Do Us Part

The Atmosphere of Climate Change

The Atmosphere of Climate Change

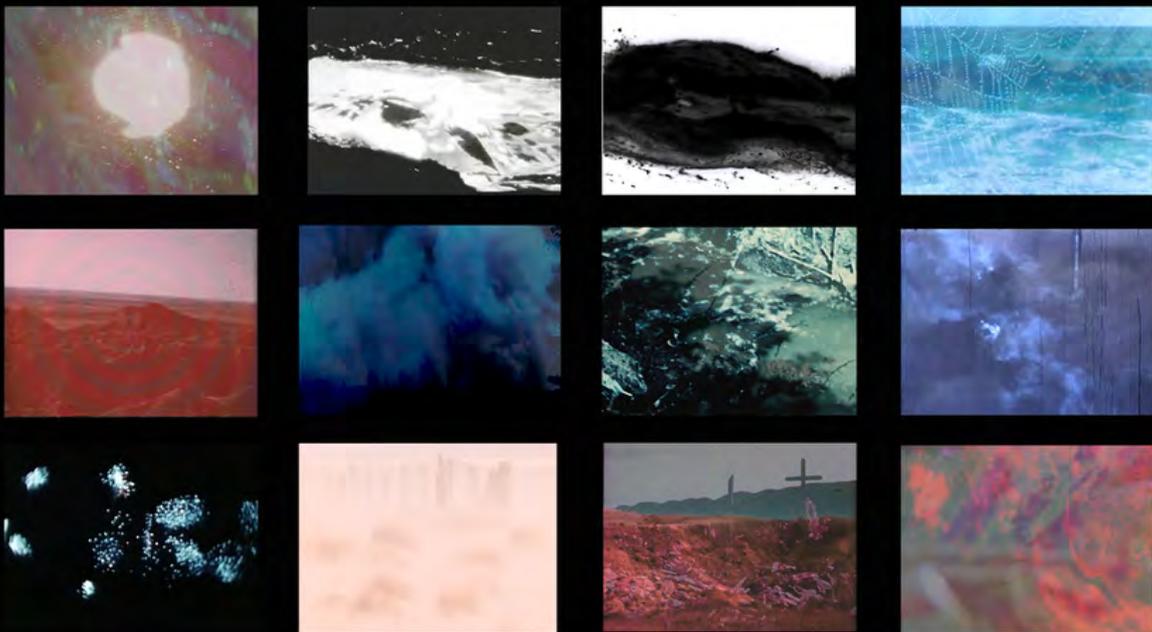
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The full research paper can be read [here](#)

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Collection of stills from the films



The Heat

1 minute 47 seconds
film.

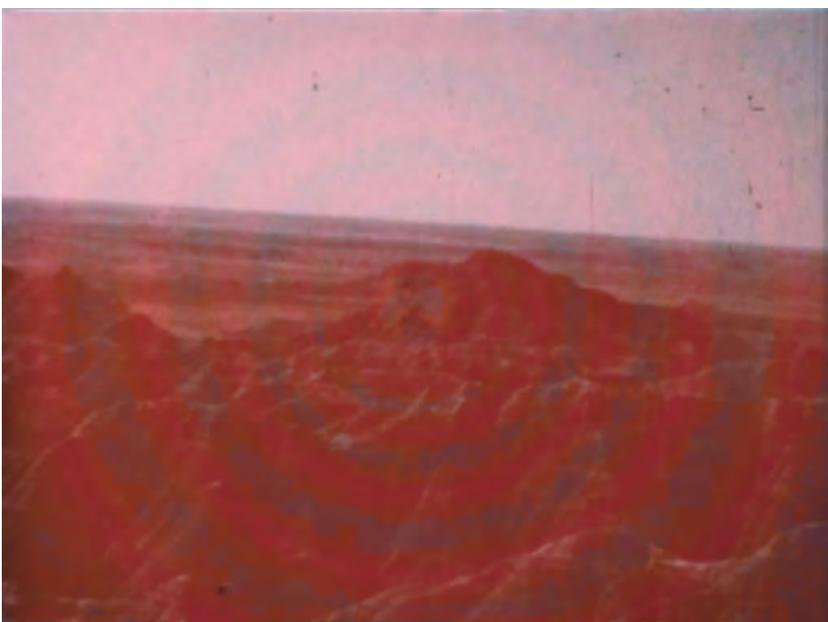
<https://vimeo.com/340497830>



The Fire

4 minutes 17 seconds
film.

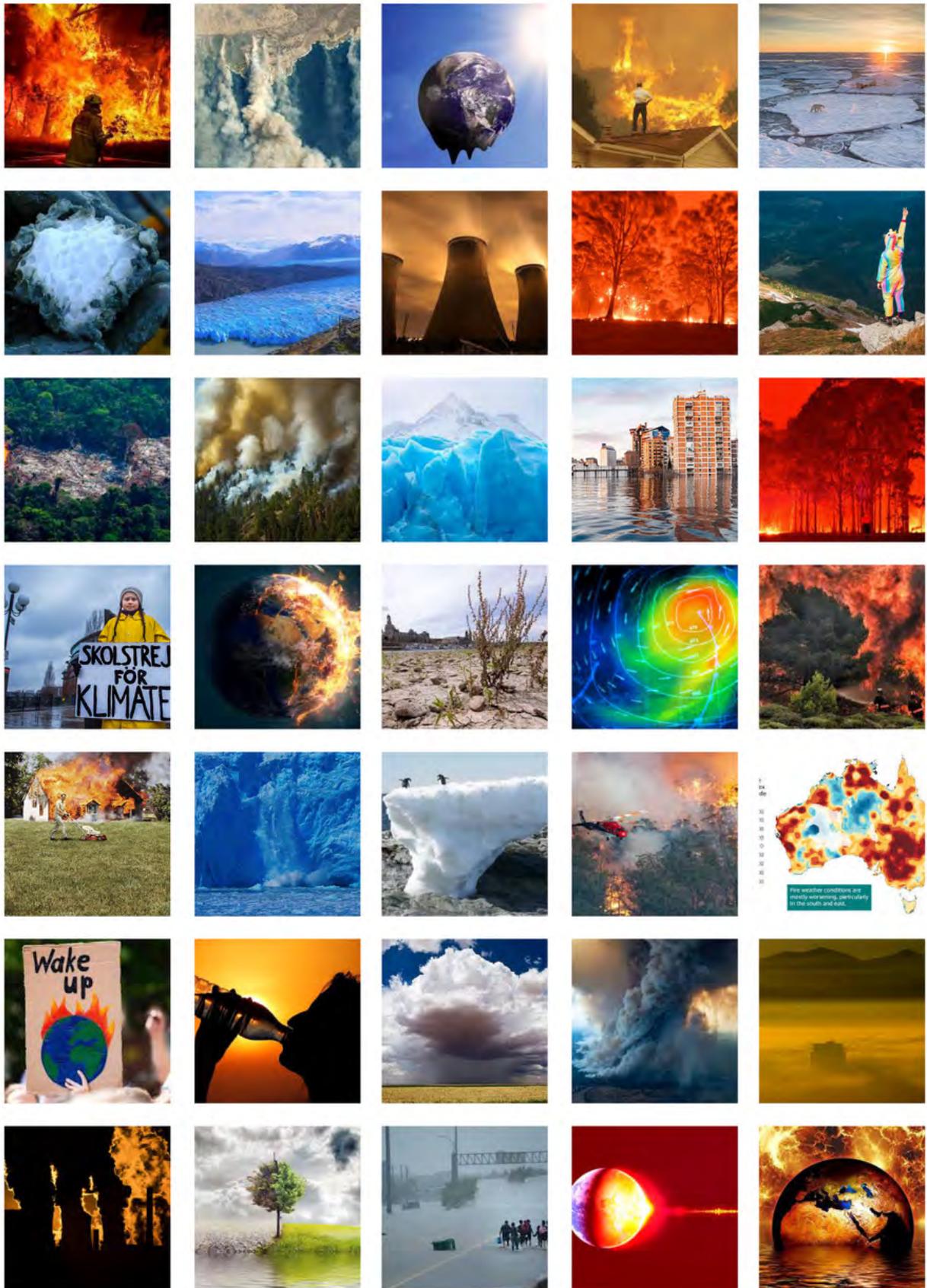
<https://vimeo.com/user48230398/thefire>



The Circle

3 minutes 13 seconds
film.

<https://vimeo.com/user48230398/thecircle>



Sample of input images of climate change

Neural Networks and the Study of Atmosphere in Media Images (excerpt from The Atmosphere of Climate Change research paper)

Me: Is there a media image you recall that reminds you of climate change?

Participant: I don't have one media image - just a big cloud of stuff that isn't easily separated.

This response reflects the atmospheric content I wanted to extract from media images, assuming that viewing many images creates an overall atmosphere around the topic. In order to study the inseparable cloud of atmosphere around images, I implemented the use of a neural network. Because atmosphere is a difficult to pinpoint concept due to its invisibility and often indescribable qualities linked to emotion, there is some difficulty in investigating it. When reducing atmosphere to aesthetic properties such as color, contrast, shape, and composition, some elements contributing to atmosphere can be identified in a quantifiable manner. These properties are similar to those used in art history for interpretations of works of art.

In conjunction with individual interviews about imagination, I have gathered a collection of 2,000 photographs of climate change using Google search for the term "climate change". There is some difficulty for a human to analyze a data set this large for commonalities. In addition to quantitative limitations of human analysis, the human elements found in the images become an obstacle for discerning the subtle and more aesthetically-based atmospheric qualities of the images. For instance, many of the images contain the earth, but interpreting the images based on color and shape becomes more complicated when human cognitive programming recognizes both the symbolic meaning and signified objects in the images. Atmospheric analysis is diverted by human filters which condition humans to be visually literate. Working against these filters is a task that makes achieving a solely aesthetic interpretation more difficult.

To address this problem, I collaborated with a research assistant at the Royal Danish Academy of Fine Arts in Copenhagen who works with machine learning. I collaborated with him to use machine learning as a tool to aid my analysis. My goal was to have a neural network "think through atmosphere." In early discussions about the technical details, he informed me that what I hoped to do would not result in clear images of climate change. The methods I was interested in are typically used for projects such as the generation of new human faces or pictures of cats. Because cats and humans have a particular external form, a neural network can be trained to recognize and replicate them based on common visual similarities in the image. With climate change the result would not be

the same because the object is so visually elusive and diverse in its representations. We decided that it would be interesting to use a neural network to study an extensive network of climate change images and then generate images reflective of the atmosphere of all of the images collectively. Artificial Intelligence and the training of neural networks is based on imitating the processes of the human brain to solve problems. The novelty of my application of machine learning is in the use of it to reduce human filters to allow a formal analysis of the aesthetic qualities present in the collection of images and to illustrate the overall atmospheric qualities of a network of images.

The technical procedure used is as follows, which is markedly similar to a human's intake of images. We implemented a Generative Adversarial Network (GAN) framework, and a neural network was trained to study 2,000 climate change images as the input data. Training consisted of two networks working together where one, "the discriminative network", functions as a teacher, and the other "the generative network", functions as a student. The student attempts to create a "climate change photo" beginning with noise, and the teacher judges if it is real or fake based on similarities to the input set, giving feedback to the student on why it is not correct. The student becomes better and better at accurately generating something that can pass as a "climate change photo" by repeatedly attempting to recreate pixels of a "climate change image" showing patterns of aesthetic elements such as color, shape, contrast, and composition. I like to think of this as the student imagining climate change. As training progresses, the more each generation of images gains precision and appears as a smoother, decisively made image with a higher correlation to the input set.

The outcome of the process is similar to human intake of media images, where in the end a single image of climate change may not be memorable. Instead a blur of aesthetic qualities or intuitive feelings of the images one has seen may be more prominent in the brain. The neural network creates more precise images in the same way a thought slowly becomes more explicit in a human's mind or the flow of a film becomes more complex after starting from black. The outcome of the neural network's training is a generation of 1,700 images which depict the atmospheric qualities of climate change through recognition of the repetitive aesthetic elements in the input set; the generated images serve as a medium for visualizing the atmosphere of climate change. The resulting atmosphere is similar to participants' imaginings. However, it is most interesting because it is representative of an underlying, prevailing mood in the network of images that are widely circulated in the media. It is evident through the apparent connection in similarities to the images and the "imagined climate change objects," which will be discussed later, human imagination of a mostly invisible concept like climate change is heavily influenced by the input of abundant images and mentally processed in relation to their atmospheric properties; the imagination of a concept is correlated to its input images. This application of a GAN framework is novel in that it gives insight into the construction process of creating an atmosphere. It gives visibility to how media influence has contributed to a cultural construction of the atmosphere of climate change that lives in the imagination of media consumers.

Imagine climate change as a tangible object

Imagine climate change as a tangible object with a color, shape, and texture and describe its appearance.

What is the size of the object?

In what environment is it most natural to find this object?

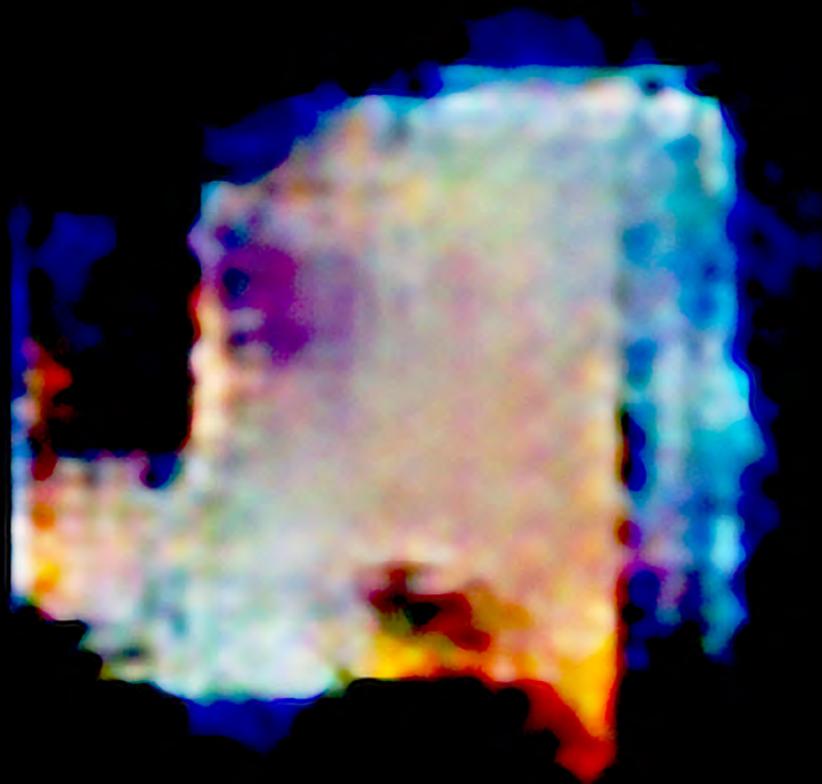
How does the object interact with humans?

How does interaction with the object feel in your body/what are the emotional reactions?

Is there a method humans can use to get rid of this object if they want to?



“I was picturing it in an observation room. In a white laboratory area where there are windows to look through and view it. And scientists come in with protective gear to observe it and measure it. And in my mind it’s floating in the center of this room. Whether by its own merit or by something that’s suspending it, it’s in the room, and then it was probably about the size of a basketball....The scientists interacting with it don’t know [how to get rid of it] and they are wary of it. And they just know taking it out of that room would harm other people. So they don’t know how to dispose of it. They don’t know what would happen if they just destroy the container - if it would destroy it all or what.”



"It feels like some sort of dystopian nightmare. Like a science fiction film. Or a Japanese manga..."

"It's a bit 'A Space Odyssey'-ish with the humming representing evil. It's very clinical and ruthless."

"It functions like a solar eclipse - you only get to see it sometimes, but once it goes away you're like oh, it's just another solar eclipse. Then you feel like it's okay... but it's not."



“I went to New Zealand with my sister, and we went to see the glaciers. And I was expecting to see something very pristine and big big blocks of ice because that’s kind of the aerial view that you get of them. But when you go to the end of the glacier and it’s melting into the sediment it looks almost volcanic and there is a lot of dark sediment and it’s very dark. And that particularly was a very startling image because it almost kind of looked like a martian landscape, one of destruction. And it wasn’t necessarily. Because the acceleration of the glacier could be caused by climate change or the landscape there might have been normal. But I remember it being a shock against what I thought it would be. It was something very dark where I was expecting something lighter.”



Invisibility and Visibility. Subtle Changes.

(excerpt from The Atmosphere of Climate Change research paper)

Imagination, atmosphere, and climate change can all be argued to be mostly invisible. Climate change in particular presents a problem in that the immediacy of action needed is in conflict with its level of visibility in many highly industrialized countries that are best positioned to reduce CO2 emissions and affect change. When climate change is easily visible the results are often catastrophic: hurricanes, floods, droughts, desertification, and wildfires are extreme natural disasters which serve as indices of climate change. In many parts of the world, including Europe and Scandinavia, these events are uncommon, which means the visibility of the phenomenon is low when looking for direct evidence. In Scandinavia, awareness of climate change comes first from scientific evidence proving the climate is changing. Then this awareness is brought to the public through media discourse and community and governmental action. After exposure to science and media narratives, events like seeing dried grass or experiencing an unusually hot summer become indices of climate change. As such, indices of varying levels of severity and drama can be seen globally. In many European locations these indices are more subtle, rendering climate change as mostly invisible. Literacy in perceiving the subtle indications of climate change could be trained. In the end, climate change can be understood as mostly invisible because it is not a concrete, tangible object, it is not clearly present most of the time in most locations, and it shifts in form and manifestation.

There are several ways in which climate change became visible for participants I interviewed. Two prominent themes are shifts in subtle environmental awareness and the absence of environmental events that were a regular part of childhood.

“I definitely felt last summer that the white color, the more sun, was something you could experience. It was nice with the sun in Denmark, but it also felt not completely right. I felt guilty of enjoying the sun. That it was really nice but you couldn’t really put aside that it might not be for the best. It might not be for enjoyment.”

This excerpt demonstrates the subtle change in environments linked to climate change awareness. The participant notes that the sun “felt not completely right” and the change in whiteness from the sun was something that could be subtly noticed, but the minimal shift in this difference is indicated by the acknowledgment that it didn’t feel right. The change in this example was so small that it merely caused a feeling that could be classified as unsettling, leaving the participant with guilt. This is demonstrative of how low the threshold for visibility versus invisibility is; a minor change in visibility occurs but the difference is almost unnoticeable except through experiential awareness. Other

participants noted how things differed in their childhoods. In the following excerpts, the elements both participants remember are currently absent. Paradoxically in the absence of snow and bugs climate change becomes visible through emphasis on the negative space where those things once were.

“Thinking about snow - when I was a kid I remember a lot more snow and I think there hasn’t been snow in the same way for the last ten years. The snowy winters are only a weird memory.”

“Another thing is more a conversation, but my mom, when I was at home, we were out picking up garbage in the woods and then she was like ‘there are no bugs’ and I was like oh yeah. When I was a kid you got loads of bugs on your windscreen and you’d have to clear them off. I thought back to that being a thing when I was a kid.”

The negative space that is filled by a lack of snow and a lack of bugs is also space that otherwise is un-notable. But, it is significant in contrast to the past as an index of change and the passage of time. For example, images of a forest without bugs out of context are unremarkable however, when they are compared to memory, there are subtle differences between experiences over time which make the impact of climate change visible. In this regard, a question to explore in the future is if still photography is limited in what it can convey because it cannot easily show the movement of time.

“I can’t help but think of Greta Thunberg. A picture of her is what I see when I think of climate change. Or like a forest fire - a catastrophe more or less. They don’t show people at the beach enjoying weather because it could be an image to use in some sense”.

Additionally when asked to recall a media image of climate change, many participants remarked that images of people enjoying nature were not commonly used, but were equally as able to communicate the idea. Instead, the negative images of large-scale catastrophe were more memorable in the minds of participants. Experientially, however, the reminder of a past enjoyment, and a future loss can also be markers of visibility of climate change. This observation also raises awareness around the influence of the commonly catastrophic media images used. The atmosphere of those images, from their higher level of visibility, is one of destruction, rather than conveying subtle shifts in time or a deep felt loss of everyday experiences. Subtlety and everyday loss are mostly invisible without connections in time.

Researching climate change in a less critically affected location, it is evident that understanding of climate change is related to subtle changes in the environment. This is reflected in the noted absence of phenomena like snow or bugs, or the subtle understanding of the world feeling different (ie. brighter, hotter, or drier). Because of the subtlety that classified many of the experiences of climate change in Scandinavia, my research has shown the need to study absence as a form of visibility. Focusing on absence and gradual change departs from typical visual tropes of media images which often depict sudden, extreme change. The importance of absence in understanding imaginings and atmosphere around climate change brings to attention the importance of memory. This raises the questions: *How can humans respond to absence if they are not aware of what was present before? How can absence in relation to climate change be effectively communicated to an audience?*



**On the Precipice
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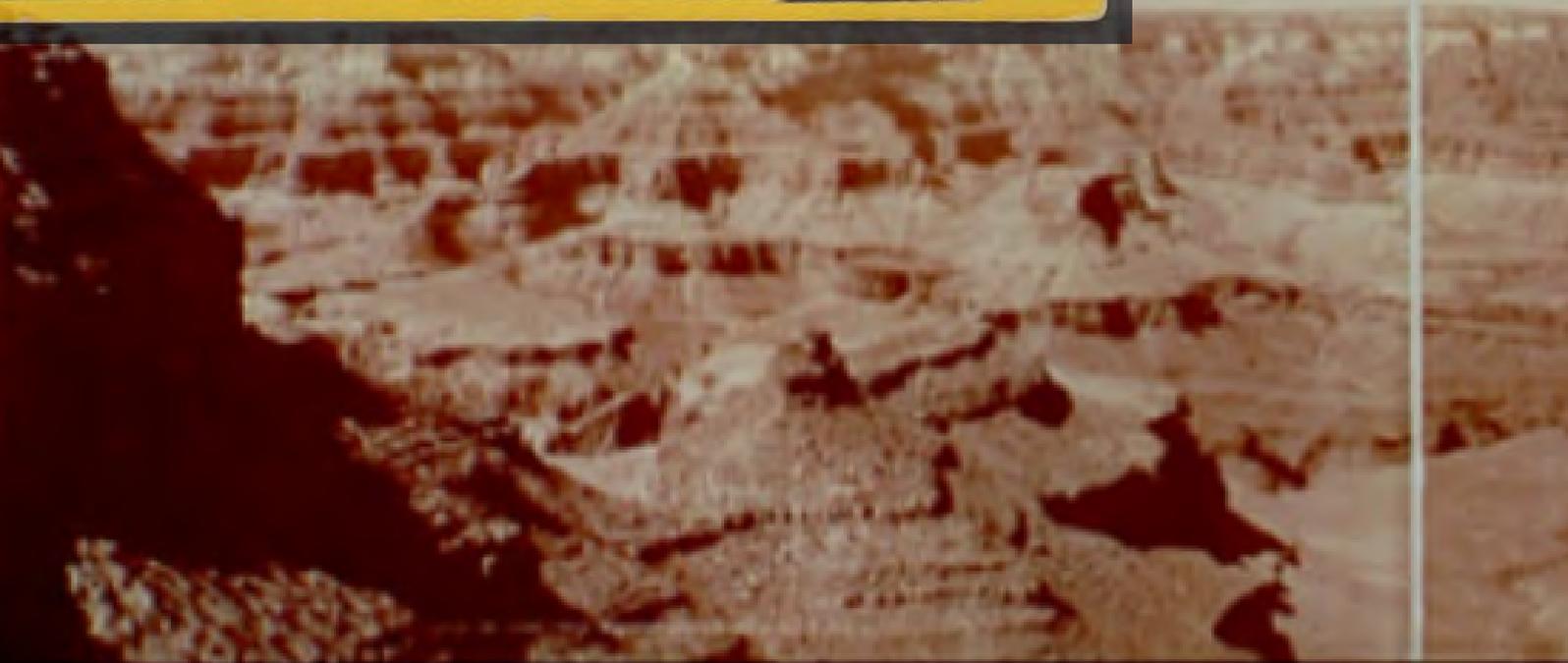
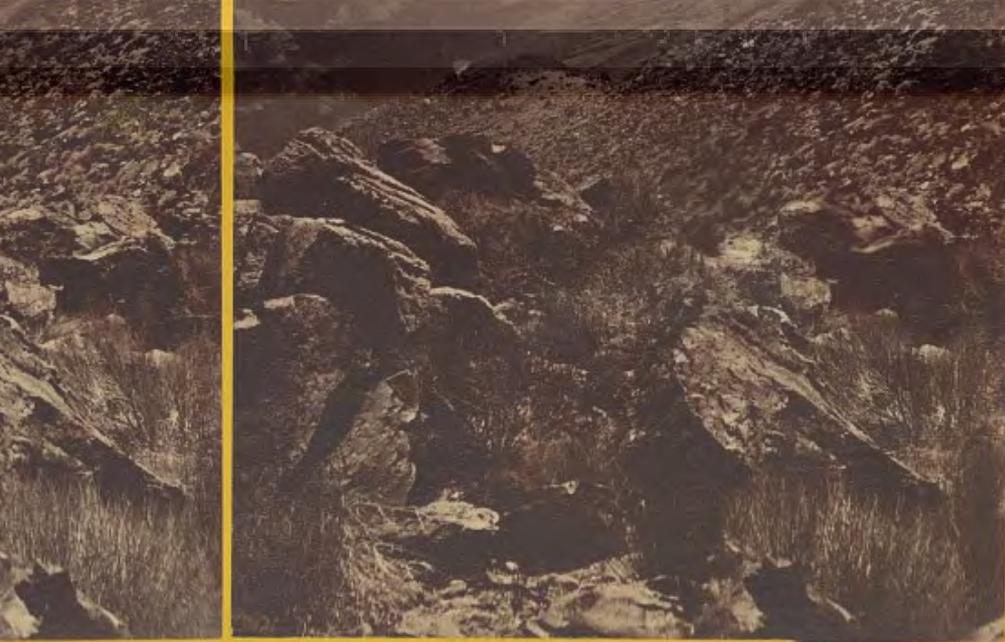
Grand Canyon, Arizona - 9 (6-29-32) int. 30m.

Original neg. rec'd Sept. 1944 from
March Field, California.



INDEXED

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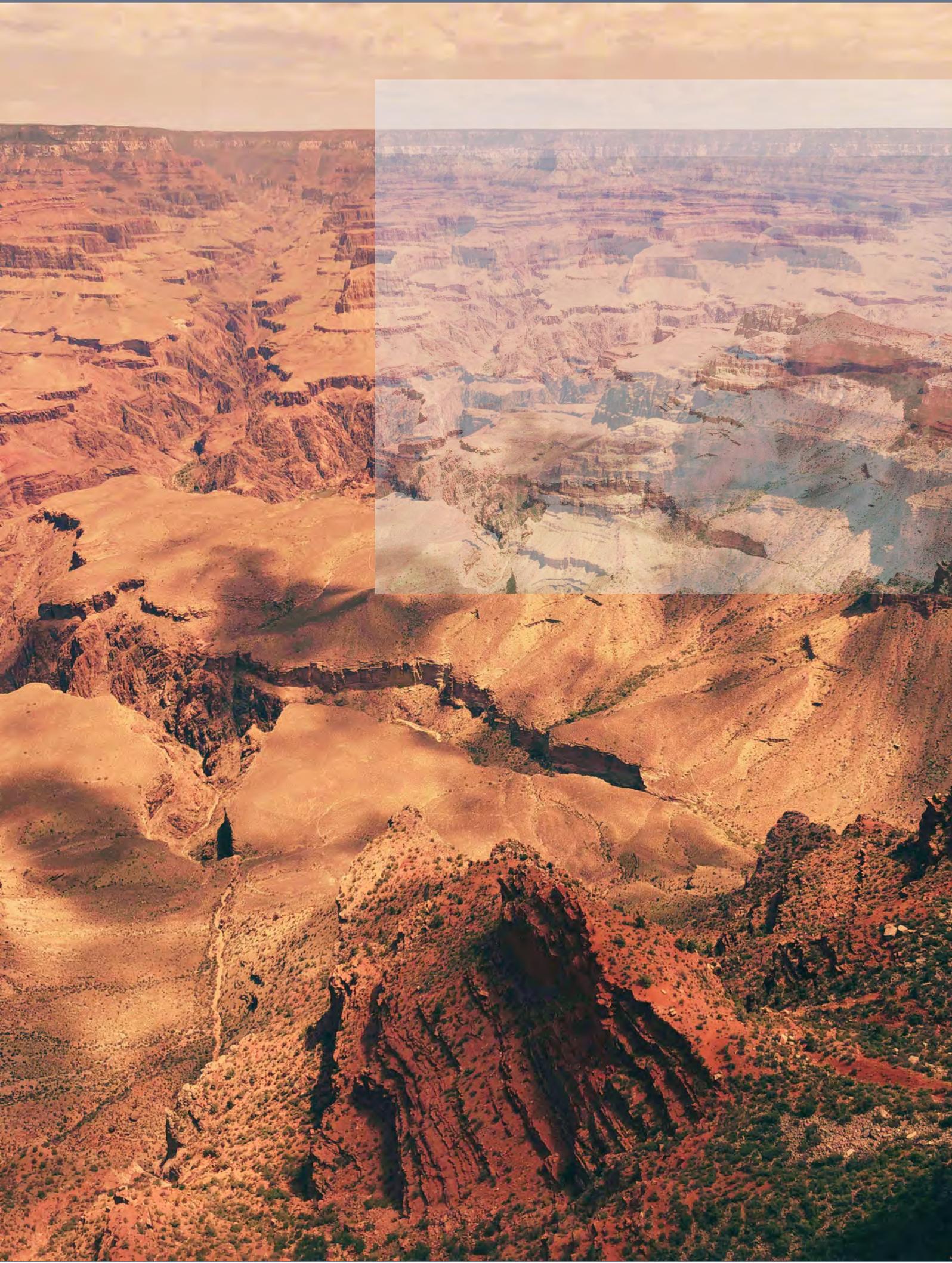
*Keystone View Company,
Manufacturers and Publishers.*

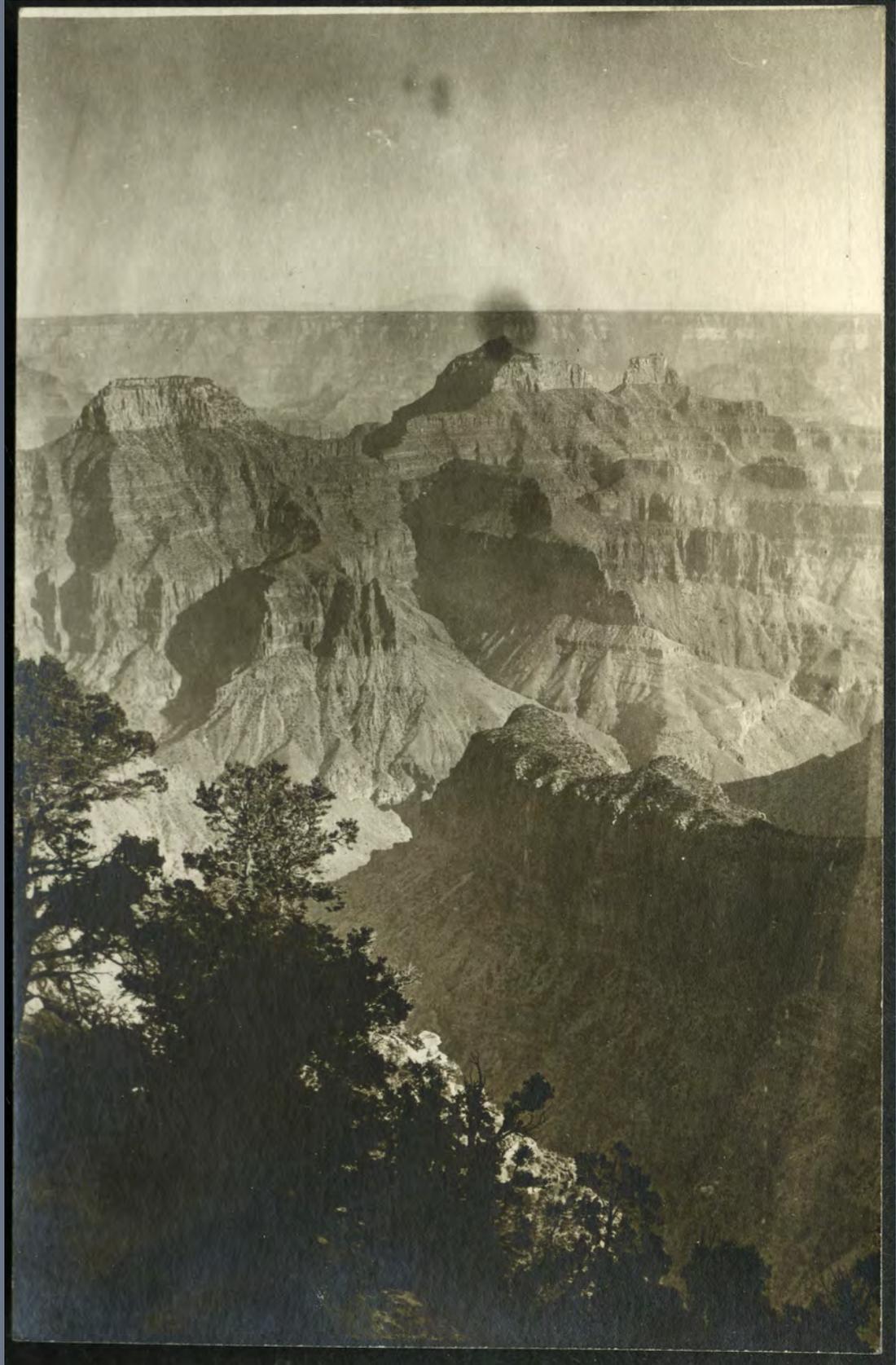


Keystone 1808, by O. S. Stanley.

13518—Venturing a little too near the Yawning Chasm, Grand Canyon, Arizona, U. S. A.







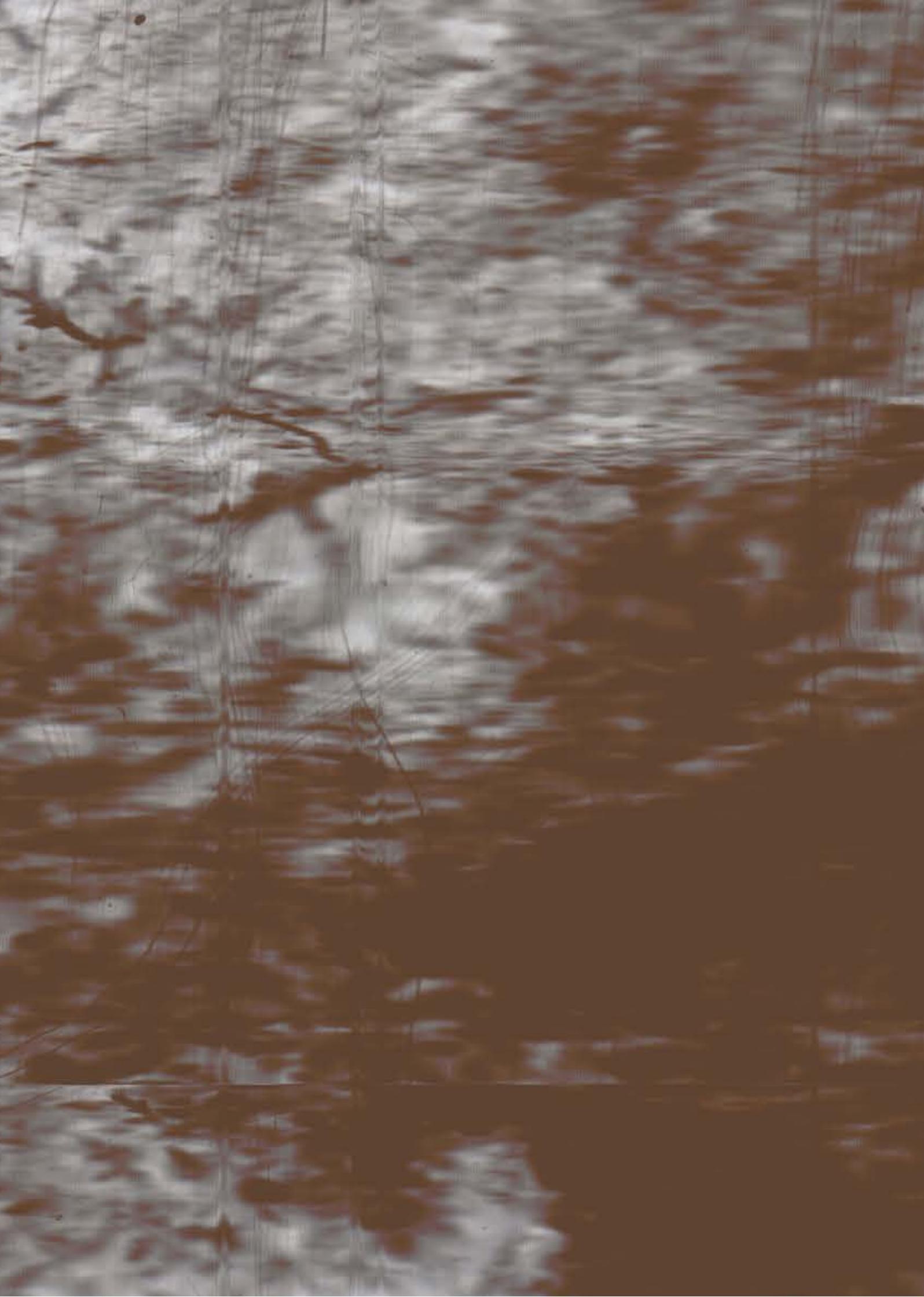
**Natural History
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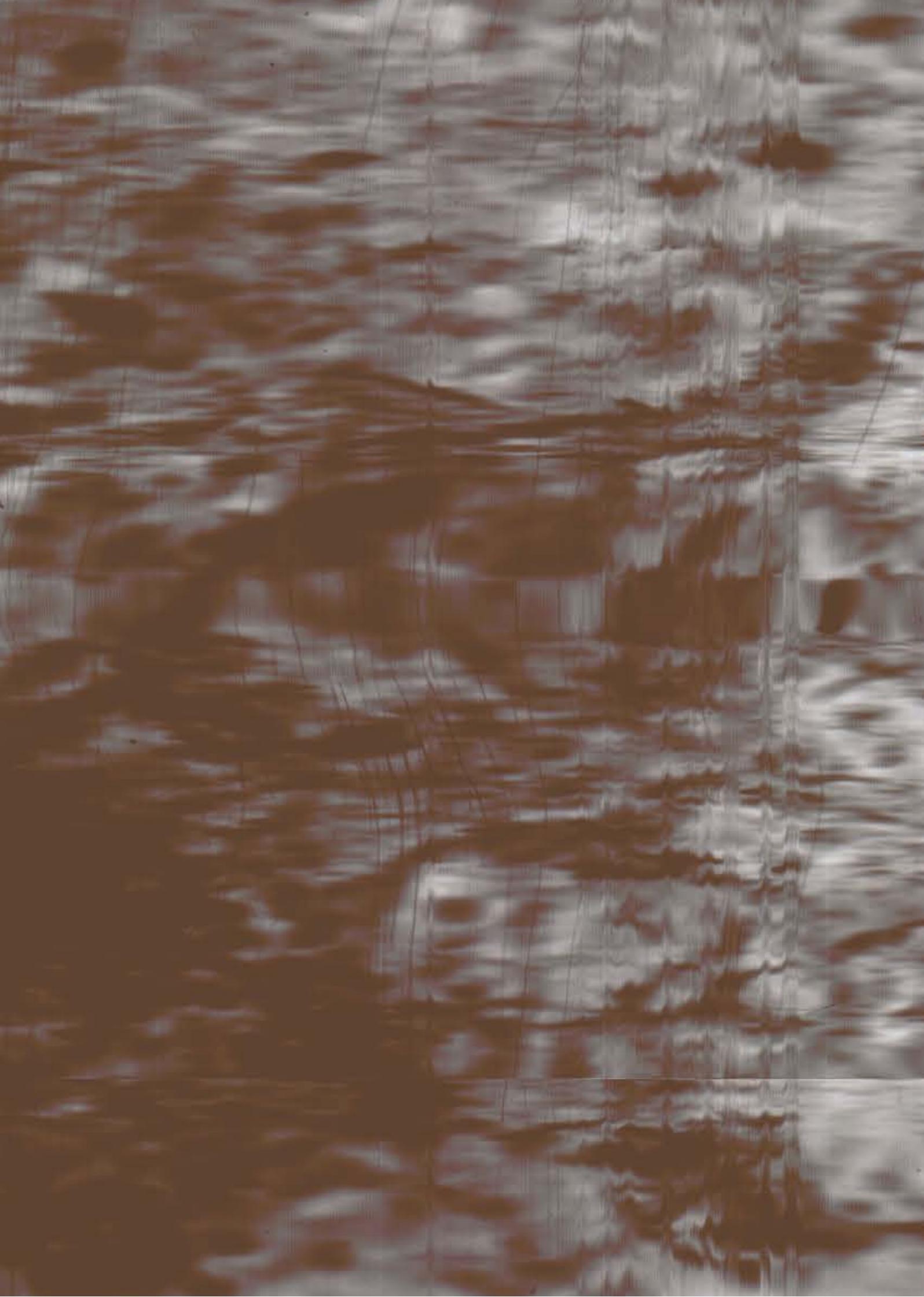
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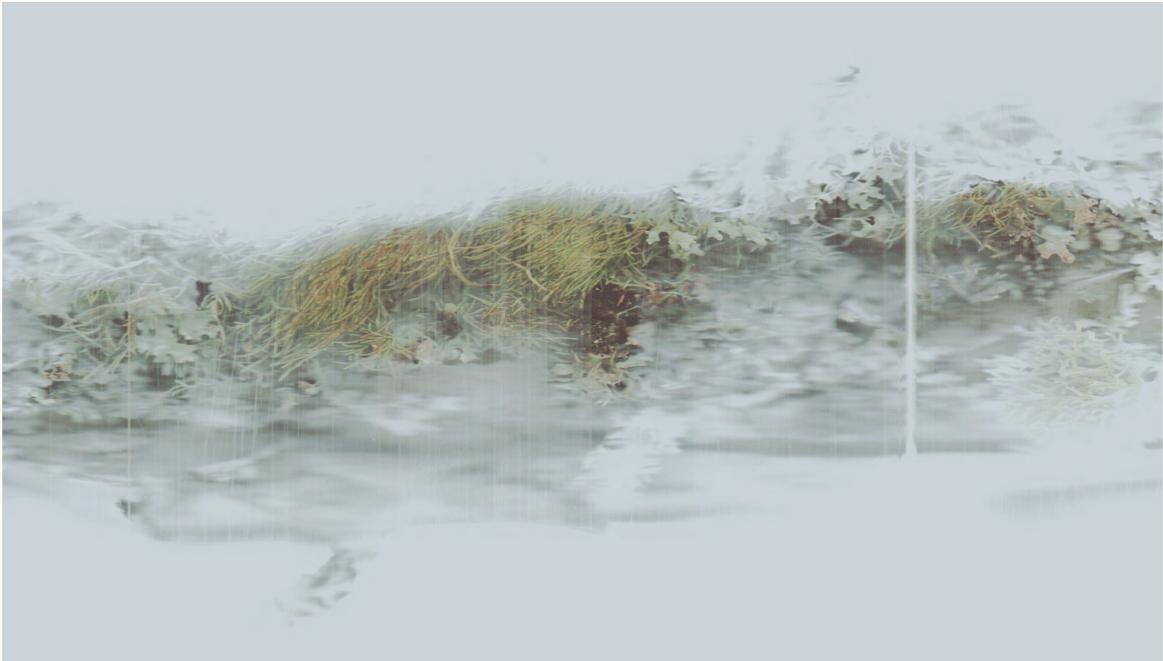
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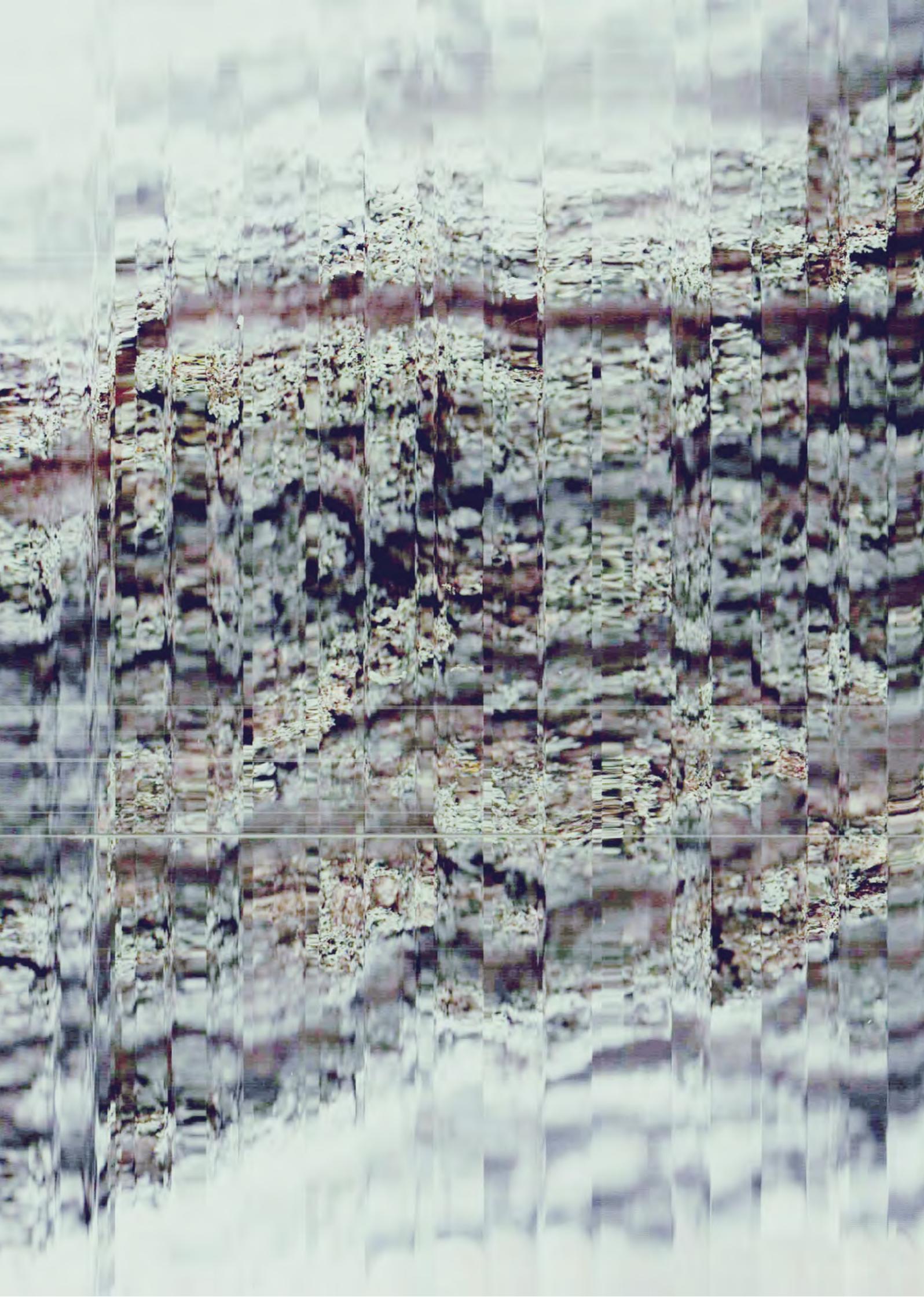


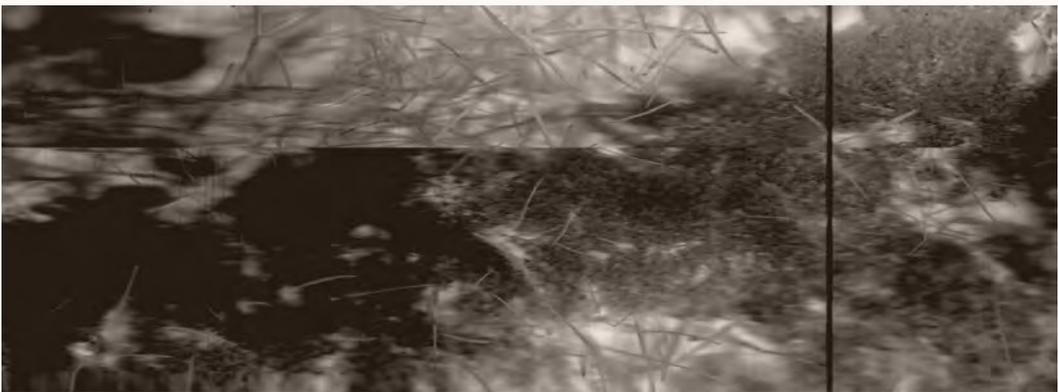


















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2016-2017

In 2016 I received a research grant for an environmental photography project documenting the Nicaragua Canal. The Nicaragua Canal is a little known infrastructural project that was started to develop a canal, very similar to the Panama Canal, through the entirety of Nicaragua, from the East to West coast. The project, with an unknown environmental impact, was set to displace a large number of indigenous people who had a constitutional right to their land on the Atlantic side of Nicaragua. My intention was to interview them and document the initial start of the canal project and the environmental interactions of the people living there. When I arrived in Nicaragua, the next day the U.S. State Department issued a warning about travel to Nicaragua. When I was forbidden to research the canal project or document anything of relevance, the project became oriented towards critically examining the documentary possibilities for photography when views are intentionally obscured.

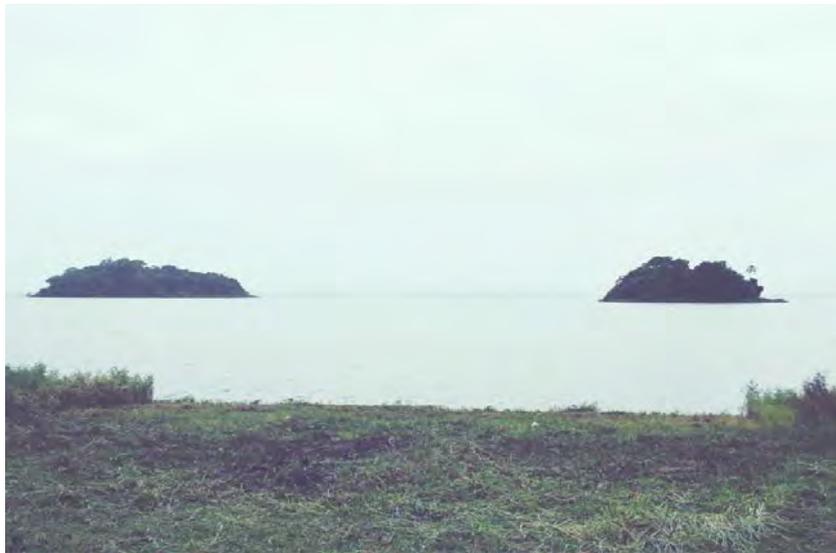
The end product was not as I anticipated. Rather than consisting of an insightful spread of revealing documentary photographs, I used one image that conceptually fit the situation of the project as a discussion point in a seminar I gave. Additional photographs of Nicaragua, but not related to the canal project, were catalysts for discussion about photographic representations of environments. The research project became an investigation of what photography is in the situations when a photograph cannot be taken - it is an exercise in thinking around photographs and starting conversations around photographs.

The Department of State alerts U.S. citizens about increased government scrutiny of foreigners' activities, new requirements for volunteer groups, and the potential for demonstrations during the upcoming election season in Nicaragua. This Travel Alert expires on November 30, 2016.

Nicaragua is conducting Presidential and National Assembly elections on November 6, 2016. During the period leading up to and immediately following elections, U.S. citizens in Nicaragua should be aware of heightened sensitivity by Nicaraguan officials to certain subjects or activities, including:

**elections,
the proposed inter-oceanic canal,
volunteer or charitable visits,
topics deemed sensitive by or critical of the government.**

Nicaraguan authorities have denied entry to, detained, questioned, or expelled foreigners, including U.S. government officials, academics, NGO workers, and journalists, for discussions, written reports or articles, photographs, and/or videos related to these topics. Authorities may monitor and question private U.S. citizens concerning their activities, including contact with Nicaraguan citizens. This situation may persist in the post-election period.



Collecting the Environment

Collecting the Environment

2021-2022

Project Abstract

Miller, N. 2022. Collecting the Environment: A Cultural and Aesthetic Historical Analysis of Mushroom Collecting in Sweden from the 19th century to the Present. Uppsala, Department of Archaeology and Ancient History.

The aim of this project is to investigate a cultural history of mushroom collecting in Sweden from the 19th century to the present with a focus on connections between aesthetics and the environment. Collecting is defined broadly as gathering, storing, and accumulating. This definition encompasses mycologists, mushroom enthusiasts, botanists, and natural historians documenting and preserving as many species as possible. But it also includes collecting in the sense of leisurely mushroom collectors taking a part of the environment home with them to eat, store, or learn from. A history of mushroom collecting in Sweden is framed that does not only focus on edible mushrooms or scientific value, but emphasizes their linkages to place, memory, conservation, sociality, and embodied knowledge. Mushroom aesthetics are a starting point for exploring wider human connections to the environment and human perceptions of nature.

Collecting is presented as a process which is argued to be a means for constant dialogue with the environment. The cyclical collecting process is broken into stages that are discussed in designated chapters: Hunting, Identification and Assessment, and Storage and Sharing. Aesthetic aspects of mushroom collecting in Sweden are examined within these stages applying visual and discourse analyses to archival images, questionnaires, historic cookbook recipes, and mushroom identification books. Importance is also assigned to fully immersed aesthetic experiences and specific sensory stimuli that facilitate interconnection with non-human actors. Immersed aesthetic experiences are argued to be significant in their ability to democratize aesthetic appreciation of nature, in contrast to historical associations of aesthetics with taste and high culture. Fluctuating historical judgments are mapped about mushrooms, highlighting the framing of nature as a productive asset. Mushroom exhibitions are shown to be a point of collective meaning making, where aspects of natural time according to mushrooms challenge anthropocentric notions of temporality. This thesis through its focus on aesthetics in mushroom collecting reveals spaces of uncertainty and dynamic fluctuation in human-nature relationships, as well as a sense of value for being physically present and part of environments.

Full paper available [HERE](#)

Chapter 4 The Preparations of the Pre-Hunt (Excerpt from Collecting the Environment)

The imagination plays a role recurring through the entire process of collecting, and filling the imagination with content in the form of a mental image informs the collecting process. To use Pearce's (1995) phrase, the "mental scaffolding" created around mushrooms creates a mental image that allows them to be sought in the physical world. Not only are mushroom identification books useful in identifying shifts of perception and representation, the image of the mushroom, as an object unto itself, plays a part in a process of collecting through its role in circulating information and influencing mental images of mushrooms; mushroom identification books were one of the more dominant ways that mental images were shaped to encourage noticing mushrooms. W.J.T. Mitchell (1985, p.10), in his book *Image, Text, Ideology*, has charted different types of images, such as the graphic, verbal, perceptual, and mental. The graphic image describes the pictorial representation one might find in a mushrooms book, the mental image the collector forms when attempting to visualize and remember the mushroom, and the perceptual image involves the experiential sensory power of the mushroom to visually act onto the collector. In the system of many types of images, the image of the mushroom may originate from many different points, including as a verbal image (through storytelling and descriptive discussion of mushrooms) or through its pictorial introduction in a mushroom identification book. Ultimately the mental image is what sticks in the mind of the collector after the book is closed, the physical mushroom is gone, and there are no longer visible stimuli. The mental image of mushrooms carries in it embedded cultural stories and cultural memory that require imagination to access and to apply to the physical world, and compared to images recorded and presented, mental images are in a constant state of flux and revision. A theme through the collecting process is the trajectories of different types of images (perceptual, mental, verbal, graphic) affecting an experience of the world and coinciding mental model. Although I have presented the collecting process as circular, one wonders where does a circle end and where does it begin? I would like to answer this question by suggesting it begins outside of itself, with an impetus, a notion, triggering the motion of the cycle, and the creation of a circle in the first place. The image, in all its forms, is the momentum that drives the collecting process as a common thread subtly weaving in and out.

The Image of the Mushroom

The interaction between the mental image and the physical presence (the 'perceptual image' in Mitchell's terms) of the mushroom is an interesting point to focus on in cultural memory. I personally had a strange experience with the relationship between the mental image and the perceptual image one of my first times looking for mushrooms in the forest. After casually looking through many mushroom identification books to get a feeling for the content before the start of this project, I inadvertently acquired a persistent mental image of a Karl Johan (*Boletus edulis*) mushroom, due to their prominence, sometimes on the cover, in many mushroom books. Without really knowing what the mushroom was, I was surprised when walking in the forest to discover a mushroom that looked like the perfect specimen of a Karl Johan, matching the books in every way. I had never seen one in person in the forest and hadn't anticipated picking any mushrooms due to my lack of knowledge, but the certainty that this mushroom in person was in fact the one from the books persuaded me to collect one to look at once I was home. The experience of encountering a physical mushroom while present in the actual forest made collecting and observing nature a concrete experience that became situated in a physical location. The images that carried me to that experience were by contrast lacking in substance due to their abstractness.

My experience of mushroom collecting, which grounded all of the previous abstract images I had consumed beforehand, was seemingly not unique but typical of the collecting process. One of my questionnaire participants, Magnus Källberg, voiced a similar situation in mushroom collecting when asked to describe his best experience picking mushrooms and touched upon the strange feeling when one recognizes that an abstract idea is actually grounded in a substance-filled physical presence.

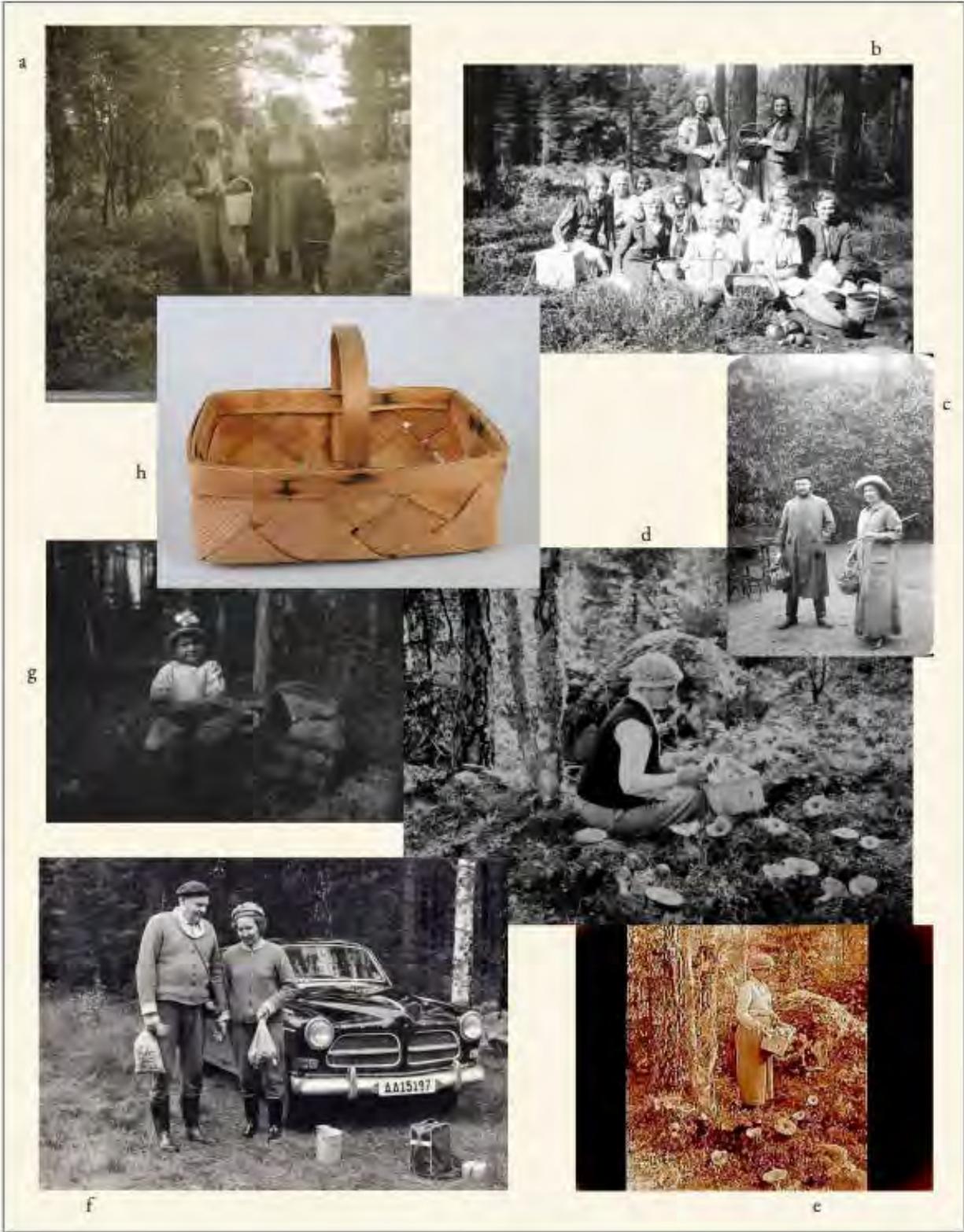
Maybe the most memorable [experiences] are when I see a mushroom that I have never seen before but in some way I know that it is possible for me to learn its name or I have already seen it in a book and know that it IS that mushroom. I think it is some 'flow experience'.

The images of mushrooms mentally carry humans to imagine them and ultimately to search for them. Interestingly, one of the most iconic, well-known mushrooms perhaps not just in Sweden but in the world is the fly agaric (*Amanita muscaria*). It has developed significance to the point that it is also conceived as synonymous with the word mushroom and its icon is used frequently to represent mushrooms as a category. It is distinct with its bright red hat and white

spots. Without providing an image it is likely the reader of this paper can picture it. I speculate that the distinct visual features of the fly agaric have allowed it the special property in history of being able to easily be transmitted through its oral description, its verbal image. When photographs of mushrooms, especially color photographs, were not affordable and printing in books was also a luxury, the fly agaric in its iconic status was able to be communicated long before more accessible image sharing mediums were developed. As such, the prominence of the mushroom and its multitude of cultural uses and meanings developed over a long span of time and a long cultural memory. Svanberg and Lindh (2019) have noted that a longevity of cultural use has been seen in mushrooms that notably have a distinct shape. It can be speculated that mushrooms such as the chanterelle, which offer a rather distinct visual appearance from most other mushrooms, perhaps gained their widespread use and popularity due to the ease of carrying valuable information for collecting them through their verbal image. I propose, for understanding oral transmissions of information, attention to the 'verbal image' of mushrooms is particularly important. In addition, the mental image is constantly shifting as the scaffolding around the idea changes. The mental image of mushrooms is revised and changed in responses to all steps of the collecting process to come out in the end altered by the flow of experiences. People throughout history are thrust into the world with a mental image of what they might find. And they can be surprised by the physical reality of their explorations and their dynamic natures.

The Hunt Photo Collage

Figure 7



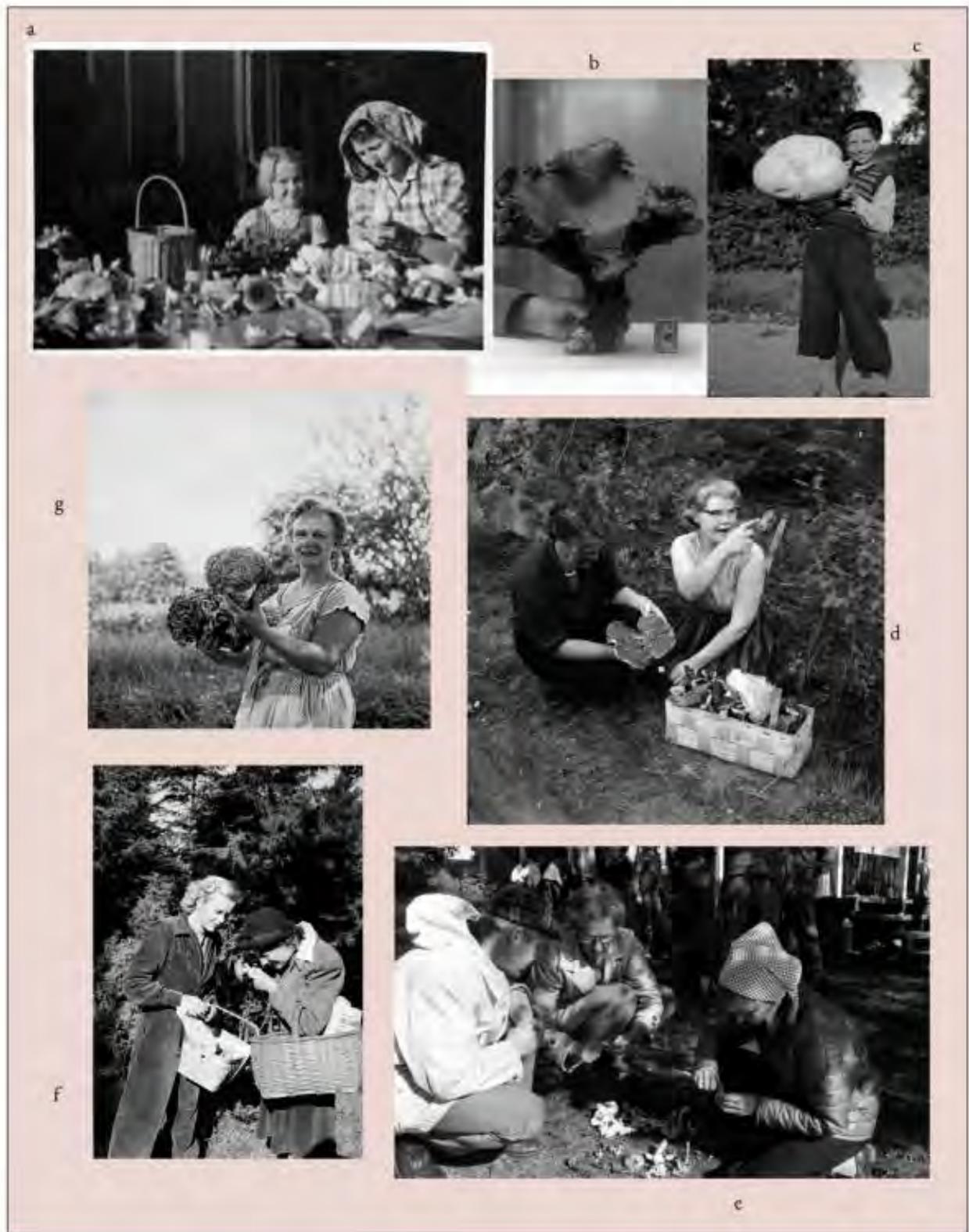
Archival Photo Collage

Figure 8



Identification and Assessment Photo Collage

Figure 27

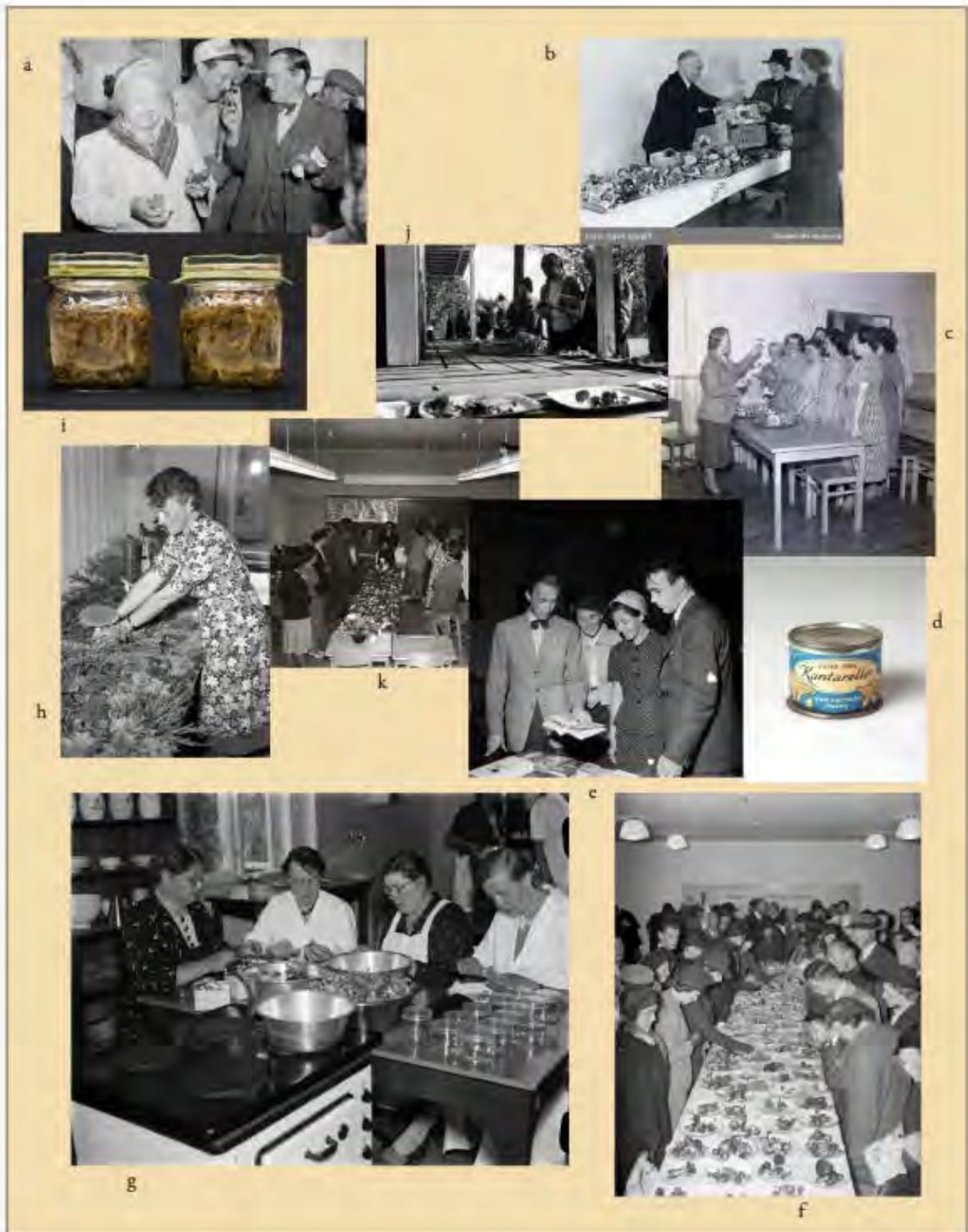


Storing and Sharing Photo Collage

Figure 36



Figure 37



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