

Intermédialités

Histoire et théorie des arts, des lettres et des techniques

Intermediality

History and Theory of the Arts, Literature and Technologies

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Number 17, Spring 2011

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URI: <https://id.erudit.org/iderudit/1005751ar>

DOI: <https://doi.org/10.7202/1005751ar>

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Publisher(s)

Revue intermédialités (Presses de l'Université de Montréal)

ISSN

1705-8546 (print)

1920-3136 (digital)

[Explore this journal](#)

Cite this article

McManus, K. (2011). Objective Landscapes: The Mediated Evidence of Repeat Photography. *Intermédialités / Intermediality*, (17), 105–118.
<https://doi.org/10.7202/1005751ar>

Article abstract

Repeat photography, which involves re-photographing a location from the same vantage point, has become a common method to document the changes occurring in the landscape. Artists, ecologists, geologists and anthropologists alike have employed this practice. What unites these disciplines across great ideological and cultural distances is their understanding of photography as a truthful witness to the passage of time. This position places great value on the mechanical observation of the camera and the objectivity of the photographer. The article focuses on one example of this practice: the *Rocky Mountain Repeat Photography Project*, an academic research project, illustrates the complexities inherent in claiming photography, or the photographer, as a neutral observer free of ideological and cultural concerns.

Objective Landscapes: The Mediated Evidence of Repeat Photography

KARLA McMANUS

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Melting glaciers, disappearing prairie, habitat displacement, forest growth, the development of homes and highways: all of these signs of transformation on the landscape reflect time's passage. The practice of repeat photography—re-photographing the same place from the exact position (ideally with the same type of equipment) at the same time of year and under the same climatic conditions—has become a central method of visually representing the passage of time and its effect on the landscape. Of late, this practice has been embraced as a way to demonstrate the impact of ecological change on the planet, both for the purpose of documenting and quantifying changes in the landscape, but also as a way to communicate these changes to a general audience. This article will investigate the implications of relying on photography as *evidence* by confronting the interpretation of photographs as repeatable—their meaning fixed—whether they were taken over 85 years or only one hour ago. This problematic understanding raises questions around the status of photography as a culturally inscribed medium that functions as both document and art form. With the goal of understanding the broader ways that these images are made to function as evidentiary data across various disciplines, I will attempt to illustrate the complexity of this practice by focusing on the University of Alberta's *Rocky Mountain Repeat Photography Project*,¹ a multi-disciplinary research project supervised by the environmental scientist Dr. Eric Higgs. My approach will highlight the interdisciplinary status of photography, while bringing the analysis of my own discipline of art history to bear upon the medium, the practice, and the images themselves.

1. The *Rocky Mountain Repeat Photography Project* was renamed *The Mountain Legacy Project* in 2006 to reflect the larger scope of the project but, as the Bridgland Jasper photographs I am discussing were made before the name change, I continue to refer to the project as RMRP.

In their 1996 article, which surveyed the scientific use of repeat photography in 175 texts, the rangeland scientists Richard H. Hart and William A. Laycock displayed a general methodological position on repeat photography characteristic of the scientific community at large. They wrote:

“One picture is worth a thousand words,” says an often-quoted proverb. A pair or sequence of photographs, taken over time, can be even more valuable than a single photograph for documenting change in range or forest vegetation. In many cases, old photographs are the only documentation for past range or forest conditions; no numerical data exist. Also, non-specialists who are not accustomed to evaluating numerical data can see and understand changes over time as shown in photographs.²

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This simplistic understanding, which places the value of photography in its ability to act as scientific witness and evidence, is deeply problematic. How can a photograph be, as described by Hart and Laycock, both a kind of scientific objective recorder and a broad-based visual tool that easily communicates to “non-specialists” the data that only a trained scientist is capable of analyzing? The juxtaposition of the specialist and non-specialist begs the question: who is this so-called non-specialist? Are they a mountain-climber, amateur photographer, climate-change denier? How can they be, as suggested by Hart and Laycock, so innocent in the act of looking, free from their own visual training, historical context, and experience of the landscape? Equally, how do we negotiate the scientist’s own cultural experience of looking, which is suppressed in favour of objective scientific viewing? This conflict, between the presentation of complex data and its readability, between the interpretation of facts and the interpretation of the image, offers insight into the scientific position on repeat photography. It suggests the existence of an ideological purpose to the process, one that presupposes the results before a single photograph is repeated.

SCIENTIFIC WITNESS: VISUAL EVIDENCE

Scientific objectivity and the practice of repeatability, that is, the validation of scientific processes which results from the repeatability of experiments, present the foundation of modern science. The practice of relying on mechanized and repetitious documentation methods to observe natural phenomena stands at the centre of scientific objectivity. Yet, the importance of distancing oneself from one’s object of study and the need to repeat results are fairly recent requirements

2. Richard H. Hart and William A. Laycock, “Repeat Photography on Range and Forest Lands in the Western United States,” in *Journal of Range Management*, vol. 49, n° 1, January 1996, p. 60.

of the scientific method as, arguably, the concept of scientific objectivity dates back no further than the mid-19th century.³ In their 2007 history of objectivity, Lorraine Daston and Peter Galison describe how scientific objectivity came to form a new subset of epistemology—one that offered the newly professionalizing scientific community a useful ideal upon which to base its discipline.⁴ This attempt to distance the observer as much as possible from the object of study was greatly enhanced by the development of photography, a mechanized process that produces a supporting document. Daston and Galison refer to this as *mechanical objectivity*, defined as “the insistent drive to repress the wilful intervention of the artist-author, and to put in its stead a set of procedures that would, as it were, move nature to the page [...]”⁵ To wit, the relationship between scientific witnessing and photography has become naturalized through the mediating presence of a machine, where the camera acts as a neutral intermediary, objective in comparison to the testimony of a person. The scientific photographer, therefore, has the added advantage of providing both a kind of authority through his or her first-person testimony as neutral observer and a visual record in the form of a photograph which, presented as a kind of authentic view, supports the scientific testimony in a circuitous bit of logical reasoning.

Of course, not all repeat photographers take for granted the scientific validity of repeat photography. Much rigorous methodology has been employed to demonstrate the reliability of this practice, to guarantee the erasure of subjectivity as much as humanly possible. In his 2005 article, “Historical Landscape: Repeat Photography as a Tool for Land Use Change Research,” the geographer Christian A. Kull analyses the benefits of repeat photography. He does so by describing his own methodology as a repeat photographer, as well as by comparing the practice to other photographic alternatives, particularly airplane and satellite remote sensing practices. While the article raises some of the practical constraints of repeat photography, such as “misregistration and interpretation issues,”⁶ as well as it highlights the challenges of the historical research necessary to compile data, Kull concludes that it presents a beneficial practice alongside other methods of investigation.⁷ Most importantly, Kull writes, “the method allows researchers to

3. Lorraine Daston and Peter Galison, *Objectivity*, New York, Zone Books, 2007, p. 29-31.

4. *Ibid.*

5. *Ibid.*, p. 27.

6. Christian Kull, “Historical Landscape: Repeat Photography as a Tool for Land Use Change Research,” *Norsk Geografisk Tidsskrift*, vol. 59, n° 4, December 2005, p. 265.

7. Smith, 2007, p. 266.

identify key trends for further investigation, to corroborate results from other techniques, to seek data as far back as the late 1800s, and to illustrate changes in ways that are easily accessible to all audiences.”⁸ While Kull raises many difficulties that come with the practice of repeat photography, what is never challenged in the article is the reliability of the original photographs. Rather, they are accepted as visual evidence hindered only by the quality of the images and the quality of the empirical analysis employed to assess them.

From another disciplinary perspective, Trudi Smith, in her 2007 article “Repeat Photography as a Method in Visual Anthropology,” argues that repeat photography is more than just the documentation of geographical and geological change in the landscape. She writes:

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Repeat photography can produce ethnographic knowledge; it is an embodied experience that allows the researcher to ask questions that can only be posed by identifying, as closely as possible, the original site, looking through the camera lens, and retaking a photograph. It is a multilayered and complex way to make the past present and to present the past, which, through this intricate relationship, allows us to investigate historical and contemporary social realities.⁹

As a form of phenomenological inquiry, Smith’s position is more experiential than evidential. She embraces the subjective vision of the photographer, situating her repeat photography practice in relation to the archival turn in art making.¹⁰ Yet, Smith’s understanding of the repeat photographic process is nevertheless underpinned by her own acceptance of the truthfulness of photography. In this case, rather than basing herself on scientific truth and objectivity, Smith argues for a kind of truthfulness inherent to experience: by placing herself in the same place as another, Smith believes the repeat photographer can, “[link] to the past through connecting his or her body to an imagined body.”¹¹ While the purpose and intentions of Smith’s practice are significantly different from those of the

8. *Ibid.*

9. Trudi Smith, “Repeat Photography as a Method in Visual Anthropology,” *Visual Anthropology*, vol. 20, n° 2, 2007, p. 185.

10. *Ibid.*, p. 186. Smith situates “the archival impulse,” as defined by Hal Foster, as an anthropological practice that allows the artist to explore both the material object and its cultural meaning. For more on the archive in art, see Hal Foster, “An Archival Impulse,” *October*, vol. 110, 2004, p. 3-22. This impulse can be understood as part of a larger move towards self-reflexivity in art making and the discipline of art history, influenced by an awareness of underlying structures of power. See Julie Bacon, “Archive, Archive, Archive!” *Circa*, n° 119, 2007, p. 50-59.

11. *Ibid.*, p. 121.

more scientific disciplines, there is a strong link through which a cultural understanding of photography as truth comes to be formed.

As a practice, repeat photography offers a basic understanding of photography as *truthful*. This clearly clashes with the understanding of photography's meaning as culturally constructed by the viewer and the context of viewing, a perspective strongly embraced in the humanities. The problem of photography's evidentiary nature, the "myth of photographic truth," as Allan Sekula has called it,¹² has repeatedly been acknowledged by photo historians and cultural theorists alike. While the intention of this article is less to outline the various positions and arguments surrounding photographic veracity than to challenge its dominance within the practice of repeat photography, I want to acknowledge this direct relationship—between the object photographed and the image produced—as central to the repeat photography process. In *Camera Lucida*, one of the most important texts in photography theory, Roland Barthes acknowledges that, unlike in painting, photography's referent "is not the optionally real thing to which an image or sign refers but the necessarily real thing which has been placed before the lens, without which there would be no photograph."¹³ For Barthes, this is the essence of photography, its "noeme," and what he refers to as the "that-has-been" of the image: the frozen moment in time.¹⁴ Barthes distinguishes between the subject of the photograph and the resulting object by emphasizing that it is the experience of looking at the photograph which brings to life a moment from the past; the moment when someone in the past saw what we today see and took a photograph. Yet, the repeat photography process complicates this single moment in time, emphasizing the importance of the transformation of the "what-has-been" over the referent itself. Davide Deriu, in relying on Barthes to discuss the practice of taking multiple photographs, writes that:

[T]he sequential arrangement of photographs validates the process of ruination by showing evidence of what has vanished from sight. [...] If every photograph is the "certificate of presence" of a reality "that-has-been," then the evidential force of sequential images intimates a "certificate of absence" for a reality "that-had-been."¹⁵

12. Allan Sekula, "On the Invention of Photographic Meaning," in *Photography in Print: Writings from 1816 to the Present*, Vicki Goldberg (ed.), Albuquerque, University of New Mexico Press, 1988, p. 454.

13. Roland Barthes, *Camera Lucida: Reflections on Photography*, trans. Richard Howard, New York, Hill and Wang, 1980, p. 76.

14. *Ibid.*, p. 77–78.

15. Davide Deriu, "Picturing Ruinscapes: The Aerial Photograph as Image of Historical Trauma," in *The Image and the Witness: Trauma, Memory and Visual Culture*,

For Deriu, repeat photographs, as a witness and testimony to transformation, create a greater distance from the original moment of time; through their multiple repetitions they represent the passage of time and validate its transformation, furthering their evidentiary status in the eyes of the viewer and scientist alike. This ontological blurring—the naturalization of the photograph as true to its referent—is at the heart of the truth myth in all photography.

The photographic *process* offers some clarity to this paradox of meaning. By emphasizing the process of repeat photography, and the cultural and aesthetic framing that goes into the making of the images, repeat photography can function as an illuminating addendum to the cultural understanding of landscape. This requires the acceptance of photography's subjective nature and, equally, an acknowledgment of the photographer's point of view. In *Second View: The Rephotographic Survey Project*, a project undertaken between the summers of 1977 and 1979, the photographer Mark Klett writes: "[B]y finding where these photographs were made we were often surprised by the highly individual decisions made by early photographers."¹⁶ In her accompanying essay, collaborator JoAnn Verburg explains that while the purpose of the early images of the American West was, on paper, to document the territory for those who could not visit themselves, early photographers "[...] were following their own artistic visions. They photographed views considered beautiful by the aesthetic standards of the day."¹⁷ As a result, Verburg suggests that the repeat photographers, limited to the same vantage points as the earlier images, ended up with photographs less informed by their personal vision than by the vision of the first photographers. Verburg writes: "[W]e [...] who began with no ambition to make a realistic survey of the West, got one. Unlike our predecessors, we did not take what we thought would be appealing shots. Instead, we did a survey of a survey."¹⁸ The repeat photographic images of *Second View* became another layer of mediation placed upon an already highly mediated vision of the landscape. Yet, in the case of *Second View*, spearheaded by the interest of Mark Klett, an art photographer, JoAnn Verburg, a photographer and museum professional, and Ellen

Frances Guerin and Roger Hallas (eds.), London and New York, Wallflower Press, 2007, p. 200.

16. Mark Klett, "Rephotographing 19th Century Landscapes," in *Second View: The Rephotographic Survey Project*, Mark Klett, Ellen Manchester and JoAnn Verburg (eds.), Albuquerque, University of New Mexico Press, 1984, p. 17.

17. JoAnn Verburg, "Between Exposures," in Klett, Manchester and Verburg, 1984, p. 9.

18. *Ibid.*

Manchester, a photographic historian, the subjectivity of the medium and the double-mediation of the repeat photographic process were acknowledged and accepted as part of the resulting work, giving the viewer an important piece of information to understand the complicated status of photographic evidence.

ROCKY MOUNTAIN REPEAT PHOTOGRAPHY PROJECT

As with the photographs used by the *Rephotographic Survey Project*, early landscape photographs functioned to both document unknown territories for geographical purposes and to promote expansionism and to consolidate the boundaries of ownership. The use of photography as a way to document and support cartographical and geographical representation has been central to the medium since photography's very beginning, contributing to what Joan Schwartz and James R. Ryan describe as the "geographical imagination."¹⁹ This form of witnessing was both pragmatic—a way to bring far away places near—and infused with a sense of adventure and discovery on the part of the photographer, who was the first to reach a site or pinnacle and to capture it, both for posterity and for the collectors back home. Equally, there was often a darker side to this form of witnessing, a kind of documentation of possession that enabled officials of the colonial project to certify their authority over the landscape just as earlier explorers had planted their country's flags to mark ownership.²⁰

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As part of the larger national surveying project of Canada, which began in the 19th century and continued well into the 20th, the photographer and surveyor Morrison Parsons Bridgland began a career with the Dominion Lands Survey (DLS) in 1902, working as a photogeographer and cartographer until 1931.²¹ Bridgland's years working for the DLS in the Canadian Rockies placed him as part of a larger survey team documenting and mapping the region for the purpose of settlement, cataloguing the natural resources of the region, and developing national parks and tourism. At the time of his employment, the Dominion Land

19. For a detailed discussion of the history of this term, see Joan Schwartz and James Ryan (eds.), *Picturing Place: Photography and the Geographical Imagination*, London, I.B. Tauris, 2003, p. 5.

20. For a discussion of the relationship between landscape and imperialism, see W.J.T. Mitchell (ed.), *Landscape and Power* [1994], Chicago, University of Chicago Press, 2002. For a discussion of photography and nationalism, see Alan Trachtenberg, *Reading American Photographs: Images as History, Mathew Brady to Walker Evans*, New York, Hill and Wang, 1989.

21. I.S. MacLaren, *Mapper of Mountains: M.P. Bridgland in the Canadian Rockies 1902-1930*, Edmonton, University of Alberta Press, 2005, 196.

Survey was headed by Dr. Édouard-Gaston Deville, Surveyor General of Canada between 1885 and 1924. It was Dr. Deville who placed the camera at the centre of surveying techniques employed by the DLS and even designed much of the equipment used by the survey team, developing the techniques necessary for the taking of accurate measurements.²² Bridgland's skills were not only in photographing, but also in translating his surveying techniques into photogrammetry, the method in which photographs are used to measure distances between objects, through the collection of data and the reading of the images, a process completed in the winter months when climbing was impossible.²³

For both work and pleasure, Bridgland was an avid and skilled mountaineer and was one of the founding members of the Alpine Club of Canada. The treachery and difficulty of the climbs he completed while working for the Dominion Land Survey cannot be overstated, yet the images he produced reflect none of the challenges he would have faced. Nor do they read as dry "scientific documents" made solely for the purpose of surveying. Rather, they reflect a strong aesthetic vision, informed by the techniques available during the time in which they were made and, quite likely, the stylistic influences of early 20th century landscape photography, which emphasized the romance of wilderness and the sublimity of nature. Bridgland's years of surveying led to the accumulation of thousands of photographic plates and the first extensive maps of the region made for public and official use.²⁴ Yet, were one to encounter these images in an art gallery or museum, I argue it would not be possible to guess that their original purpose was scientific rather than artistic. The interpretation and reception of geographic landscape photography is an important debate in the history of photography. While it is not my intention to fully address this issue here,²⁵ it is important to restate that the viewer of these images, whether professional or non-professional,

22. Don W. Thomson, "Deville and the Survey Camera in Canada," *Canadian Geographical Journal*, vol. 72, n° 1, January 1966, p. 53.

23. MacLaren, 2005, p. 141-142.

24. *Ibid.*, p. 170.

25. The tension between the original intention of survey images and their later interpretation has been debated by numerous photo historians, most significantly by Rosalind Krauss in her seminal article, "Photography's Discursive Spaces: Landscape/View," *Art Journal*, vol. 42, n° 4, Winter 1982, p. 311-319. Krauss takes a strongly contextual position, arguing that the survey images of Timothy O'Sullivan must be understood as embedded in their geographical purpose. In response, Joel Snyder has offered a more nuanced interpretation, stating that the pictorial quality of the images must be accounted for. See Joel Snyder, "Territorial Photography," in W.J.T. Mitchell, 2002, p. 175-201. Robin Earle Kelsey

to use Hart and Laycock's terminology, is as much influenced by his or her own visual training, historical context, and experience of the landscape as by the original "scientific" purpose of the images. As a result, to presuppose the viewer's response to these images as objective is to wrongly presume an innocent eye.

In 1996, the Bridgland photographic archives,²⁶ and particularly Bridgland's documentation of the region of Jasper Park (1915) later renamed Jasper National Park, attracted the interest of a group of academics from various disciplines who came together to form the *Rocky Mountain Repeat Photography Project* (henceforth known as RMRP), later renamed the *Mountain Legacy Project*.²⁷ The 735 Bridgland Jasper photographs taken from 92 different peaks in the area of the park over the course of only four months became the basis of the Bridgland repeat photography project, organized by the University of Alberta. The repeat images, taken in the summers of 1997 and 1998 by Jeanine Rhemtulla (then a graduate student in the Department of Renewable Resources at the University of Alberta and now Assistant Professor of Environmental Studies at McGill University) and Dr. Eric Higgs (then Associate Professor in the Department of Anthropology at the University of Alberta, currently Director of the School of Environmental Studies at the University of Victoria), have been used in various research projects including vegetation analysis, understanding the uses of the land by humans, land management for the National Park today and historic management by former aboriginal occupiers of the land and, not least, for the revision of maps to compare contemporary topography to that of 1915 in an attempt to quantify the changes that have taken place in the mountains.²⁸ All of these projects, whether they engaged in a social analysis of land use or in a scientific analysis of the data produced, relied on the concept of photography as evidentiary and *repeatable*, as scientific observation which can be analysed and quantified without more than cursory acknowledgement of the photographs' mediated nature.

has recently addressed this debate in his book *Archive style: Photographs & Illustrations for U.S. Surveys, 1850-1890*, Berkeley, University of California Press, 2007.

26. Complete copies of the Bridgland Jasper Park photographs are held at the Jasper-Yellowhead Museum and Archive and Jasper National Park. Printed in 1915, these archives consist of 18 bound folios of 5 x 7 inch prints. The glass plate negatives are stored with Library and Archives Canada.

27. MacLaren, 2005, p. 214.

28. Eric Higgs, "Research," *The Rocky Mountain Repeat Photography Project*. On-line at www.bridgland.sunsite.ualberta.ca/jasper/research.html (last accessed December 29, 2010).



Fig. 1: M.P. Bridgland, *Composite of Eremite Glacier and Peak, from station 13 - Thunderbolt Peak*, Jasper National Park, Rocky Mountains (1915). Courtesy of Dr. Eric Higgs, Creative Commons Licence.

114 As archivist Jill Delaney writes in her essay, “An Inconvenient Truth? Scientific Photography and Archival Ambivalence,” until recently, historical photographic collections such as Bridgland’s Jasper images have not been considered to hold much research value by archivists.²⁹ Were it not for the efforts of the *RMRP* team, these images may never have come to light, in part because of the institutional bias that existed in archives where “scientific content has generally taken a back seat, or is dismissed as having little archival value.”³⁰ While I argue that the *RMRP* project tends to focus too much on the scientific value of the images, the project offers insight into the incredible photographic richness of Canadian history. The importance of these images is not only found in their relationship to scientific research, but in their cultural and aesthetic information, which contributes to the viewer’s understanding in less direct ways. Unfortunately, the members of the *RMRP* team make no reference to the aesthetics of the photographs; instead, they posit images as purely data driven and accessible only to those qualified to read them. This omission does not acknowledge the complexity of the photographic archive or of the single image.

The *RMRP* project is typical of this process as it privileges photography as a form of temporal freezing and casts the images produced as scientific evidence that scientists believe communicates directly to the viewer. As an example of the *RMRP* project’s response to Bridgland’s photographs, I propose to look at a pair of images which are reproduced on the *RMRP* website. In addition, these images have also been published in the book *Mapper of Mountains: M.P. Bridgland in the Canadian Rockies 1902-1930*, a historical overview of Bridgland’s work and

29. Jill Delaney, “An Inconvenient Truth? Scientific Photography and Archival Ambivalence,” *Archivaria*, vol. 65, 2008, p. 93.

30. *Ibid.*, p. 91.



Fig. 2: J. Rhemtulla and E. Higgs, *Composite of Eremite Glacier and Peak, from station 13 - Thunderbolt Peak*, Jasper National Park, Rocky Mountains (1998-1999). Courtesy of Dr. Eric Higgs, Creative Commons Licence.

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legacy. The choice of a single pair of images to represent repeat photography as a whole has proven difficult: on one hand, showing the greatest transformation between the images would allow the viewer to read the photographs most clearly; on the other, without proper analysis and explanation, this difference can appear difficult to perceive or explain. Figure 1 shows a series of four photographs shot by Bridgland in 1915 and placed together to form a panoramic sequence. In the first and second frame, the Eremite Glacier occupies the entire bottom half of the image. By comparing Bridgland's images to the 1999 photos taken by Rhemtulla and Higgs (Fig. 2), it is easy to make out a difference in the glacier's size; however, what is equally apparent, even to the untrained eye, is a vast *qualitative* difference between the two sets of photographs. From the amount of detail captured in shooting, to the quality and technique of printing, Bridgland's images are far superior technically and they contain much more information. This "information," for example, the texture of the glacier and mountains, which lends greater depth to the image, is shaped as much by the photographer's skill as it is by the scientific data captured.

Between the first set of images by Bridgland and the second by the RMRP team, we notice a significant difference in tonality and detail, most likely brought about by the difference in photographic skill, but also by the quality of light, the time the photograph was taken and possibly by the difference in equipment used. Equally, viewers of repeat photography bring with them variable skills of analysis, understanding and interpretation. For some, the aesthetic drama of the photographs, highlighted by the sweeping movement of the eye across the mountain range and the speckling of the cloud cover on the valley floor, and the sublime experience of looking at the image of a mountain range and glacier from such

an extreme vantage point, would overwhelm any scientific value. For others, the historical significance of the images as archival objects would be more important, leading the viewer to imagine the struggles of early settlers to the region and the physical hardship of the climb. While, in theory, repeat photography encompasses the multiplicity of interpretations and responses, allowing for a broad cultural engagement with landscape, in practice, repeat photography is aimed at creating scientific evidence, supporting the notion of photographic truth and the before and after of the image. This understanding of photography as objective witness raises an important question regarding the temporality of photography. If photography can freeze time, and thereby produce an object that provides proof and archives a moment, how do we resolve the different interpretations of these images by various viewers, or the different intentions of the photographers themselves?

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In his history of M.P. Bridgland, I.S. MacLaren describes frame two in this sequence and states that “the retreat of [the Eremite] Glacier during the intervening 85 years seems particularly remarkable. Yet, not all pairs of photographs indicate such stark change.”³¹ The fourth frame in this sequence, in contrast, shows the valley floor with a lake in the background surrounded by mountains. The darkness that covers the valley and rises up along the side of the mountains is the growth of new forests, thicker and fuller than in Bridgland’s time, but not significantly different to the untrained eye. MacLaren describes this overgrowth as the direct result of contemporary forestry policies, which suppress the natural cycle of forest fires in national parks. I argue that while the retreating glacier and the forest growth do indicate changes in the landscape, to the untrained viewer, these changes are indicative of the fact that without the knowledge and information provided by scientific experts who witnessed and documented these changes and their subsequent interpretation, this visual information shows little more than the passage of time.

Clearly, a major factor that influences the acceptance of these images as scientific evidence rather than, say, pleasure images by a skilled amateur, is the authority of the photographer and their original intended usage. As a scientific rather than an artistic photographer, Bridgland created photographs for the purpose of collecting data and translating that data into maps and charts. Bridgland’s function as a photographer was to create images as accurate as possible, allowing him to then convert their data into other reliable forms of scientific information. This purpose imbues the images with objective authority, and increases the

31. MacLaren, 2005, p. 246.

photographer's reliability. As the media scholar Joan Leach writes, the credibility of scientific testimony relies on a rhetorical structure that places the scientist and the instrument as "foils," the subjective versus the objective.³² Leach writes:

Most professional scientists rely on the testimony of their colleagues for their belief about fundamental scientific questions. In short, a very precious few scientists have "seen for themselves" or "directly witnessed" the experiments, the proofs, or even the raw data that supports scientific claims. Scientific testimony, then, is usually a double-mediation.³³

As such, the testimony of the person observing is given greater validity through his or her professional status as scientist, imbued with all the authority of that position and the trust accorded him or her based on pedagogical training, empirical experience, preceding credibility and, most importantly, on the claim that they have witnessed the phenomenon for themselves. Bridgland's images are scientific and evidential in part because of the reliability of the photographer himself: the *RMRP* team accepts his authority as mediator and treats the images as reliable data. Equally, through their training, Rhemtulla and Higgs bring to the process a scientific perspective, an *objectivity*, which works in favour of the scientific claims of their resulting images. As such, the process of mediation continues as the scientist's authority imbues the images with greater reliability, having not only documented raw data, but also witnessed the scientific evidence first hand. But one question remains: how do we reconcile the double mediation of the landscape as brought about by the role of the *RMRP* photographers, whose purpose is to create images of scientific evidence based on the work of another photographer, thereby adding a third layer of mediation to the project?

The repetition inherent to this photographic process—the same location at the same time of year and the same time of day—challenges the viewer of these images to reconcile the passage of time through this witnessing. By representing a specific place or event repeated through time, the viewer is encouraged to unquestioningly accept the image as ontologically stable and supported by the archival nature of the series of images, without questioning either the aesthetic framework of the image, the scientific mediation of evidence or the meaning of photographic arrest. Whether they seek to scientifically document geological and ecological changes or solely to analyse the effects of time on the landscape,

32. Joan Leach, "Scientific Witness, Testimony, and Mediation," in *Media Witnessing: Testimony in the Age of Mass Communication*, Paul Frosh and Amit Pinchevski (eds.), Basingstoke, Palgrave Macmillan, 2008, p. 194.

33. *Ibid.*, p. 183-184.

both in terms of a self-described artistic or scientific practice, the investigation of the use of repeat photography in the presentation of evidence for changing landscapes complicates the understanding of photography as providing evidentiary truth. The Bridgland and *RMRP* photographs, steeped in photographic traditions as well as in the scientific and cultural debates of their times, must be understood to function, not as simplistic records of empirical data, but as indicators of changing cultural values: towards the landscape, towards photography, and towards the role of the objective witness. What is made equally clear through this analysis is that the images produced must be understood to be mediated by the photographers, who are influenced by their aesthetic and scientific intentions and backgrounds and, more fundamentally, by the acceptance of photography as an evidentiary witness to a moment in time.