

# The Vicissitudes of the Image: Materiality and the Environment in the *Old Growth* Project

## AUTHOR BIO

Born in New Zealand and based in Australia, Grayson Cooke is an interdisciplinary scholar and media artist, Associate Professor of Media in the School of Arts and Social Sciences at Southern Cross University. Grayson has presented media art and live audio-visual performance works in Australia and internationally, and he has exhibited and performed in major international festivals such as the Japan Media Arts Festival, the WRO Media Art Biennale, the Imagine Science Film Festival in New York, VIDEOFORMES in France, TIVA in Taipei, and the FILE Festival in Sao Paulo. As a scholar he has published widely in academic journals, and he is also an editor for the scholarly journal "Transformations." He holds an interdisciplinary PhD from Concordia University in Montreal.

Grayson Cooke

## ABSTRACT

What can an image do? And what can we do with images? These are broad questions, and need narrowing in any case, just as a concept of "the image" needs defining. After all, we live in a culture of images, they explode across our screens and public spaces in so many forms that any discussion of the image is reliant on context to be useful. This paper addresses these questions within the context of media art: the aim of this paper is to explore ways in which artistic enquiry and production can contribute to the discourse around environmental issues, particularly within the context of the Anthropocene, where humanity's influence on global geological and atmospheric conditions is understood to constitute a new geological epoch. I will explore my *Old Growth* project as a way of thinking through this problematic. The *Old Growth* project is a series of three video works that explore the effects of anthropogenic climate change and resource extraction, through a kind of material allegory or media analogue, whereby photographs of a series of sedimentary or accretive environments are subjected to chemical degradation. Across the three works, the project conducts both an environmental critique *and* a material enquiry, by using photographic media and corrosive chemicals to "materialize" environmental degradation along different channels than the documentary record.

## KEYWORDS

Image, materiality, archive, memory, art/science, environment, Anthropocene, photography

The aim of this paper – as with this issue of *Transformations* – is to explore ways in which artistic enquiry and production can contribute to the discourse around environmental issues, particularly within the context of the Anthropocene, where humankind’s influence on global geological and atmospheric conditions is understood to constitute a new geological epoch. In this paper I will discuss my *Old Growth* project as a way of thinking through this problematic.

The *Old Growth* project is a series of video works that explore the effects of anthropogenic climate change and resource extraction, via a process in which photographs of a series of sedimentary or accretive environments are subjected to chemical degradation. Time-lapse macro-photography is used to record these processes, where photographic slide film is placed in a petri dish and lit from below, and immersed in a chemical solution. There are three works in this series, “Frack,” “Deforest” and “Bleach.” “Frack” explores “virtual fracking” – it uses chemicals used in hydraulic fracturing (hydrochloric acid, acetic acid and sodium hydroxide) to dissolve photographs of sedimentary rock. “Deforest” uses sulphuric acid (a highly corrosive acid which burns to the touch) to melt photographs of old growth rainforest. “Bleach” uses bleach and nitric acid to dissolve photographs of the Great Barrier Reef. Each video is accompanied by a soundtrack derived from the environment in question: “Bleach” uses hydrophone recordings from sub-tropical Queensland and New South Wales; “Deforest” uses acoustic recordings from the Bunya Mountains in South-East Queensland, the site of the photographs used in the project; “Frack” uses sonifications of seismic data from a range of Australian territories.

Each work operates as a media/material analogue for humankind’s effects on the environment; hydrochloric acid, for example, is used in fracking to dissolve fissures in sedimentary rock, and in this project it “fracks” the emulsion, seeking the “fissures” in the image where less silver is deposited on the celluloid. “Bleach” uses sodium hypochlorite and nitric acid to reference ocean acidification and the resultant coral bleaching. Across the three works, the project conducts both an environmental critique *and* a material enquiry, by using photographic media and corrosive chemicals to “materialize” environmental degradation along different channels than the documentary record. It exploits the mimetic faculty of the camera, and the capacity of composition, temporality and motion to focus and sustain attention.

These works have been shown at galleries and festivals in a range of configurations. The three videos have each been shown separately as single-channel works. In addition, the works have been combined into a three-screen installation for the Alchemy Film and Moving Image Festival in Hawick, Scotland, and re-worked for the 16-screen 8K “Discovery Wall” videowall on Southern Cross University’s Lismore Campus. As a quick audio-visual introduction to the project, documentation of this installation can be viewed at the URL below.

>> <https://vimeo.com/145454724> <<

## Thinking Into The World

Within the context of art's capacity to address environmental concerns, I'd like to propose media art – with its engagement of multiple sensual registers and its employment of technologies of recording and reproduction – as a way of *thinking into the world*. Art is a manifestation of thought and a way of thinking with and through practice; Paul Carter's well-known formulation of "material thinking" is both an argument for the research status of creative production, and for the notion that thought can be undertaken through physical form and action as much as cognitive process (Carter xi). As Jacques Rancière puts it in *The Future of the Image*, at stake is "the way in which, by assembling words or forms, people define not merely various forms of art, but certain configurations of what can be seen and what can be thought, certain forms of inhabiting the material world" (91). Because these configurations "are at once symbolic and material" (ibid.), art can be understood as a kind of "practical philosophy" – by which I suggest not a philosophy dedicated to everyday concerns, but a strategy for pushing the bounds of knowledge through material means.

In this sense, then, *thinking into the world* suggests media art is a means of exploring phenomena for what they can give us to think. Both artistic and scientific modes of knowing and representing are mobilized in this process. The notion of representing phenomena mimetically is fundamental, as it is a concept and practice which finds itself at home equally in the artistic and scientific worlds. Realism across various artistic mediums and movements is allied with the "mechanical objectivity" of scientific imaging, a practice and ideology that, as Lorraine Daston and Peter Gallison have teased out in their monumental work *Objectivity*, was to supercede the notion of "truth to nature" and substitute the objective measuring instrument for the Natural Philosopher's discerning eye (see Daston & Gallison). Each of these practices involve the depiction of a thing that is in the world in order that it is made available for contemplation, through whatever lens or lenses (e.g. scientific, aesthetic, imperial, colonial etc. or a combination thereof) the viewer finds appropriate. And of course the camera, with its capacity for recording optical phenomena over time, and its associated techniques of framing and focusing and its multiple axes of movement, stands as the exemplary technology for this depiction.

In addition to mimeticism, what we could call abstract impressionist or expressionist production, in whatever medium, that which stretches the bounds of figuration or abandons them entirely, likewise allows us an incredible exploration of phenomena, including the phenomenon of experience. For beyond the question of mimetic or objective representation, thinking into the world must also be about providing sensual and conceptual strategies for experiencing phenomena in new ways – experiencing "novel apprehensions" as Steven Scrivener puts it (see Scrivener). Chris Taylor, director of the "Land Arts of the American West" program at the University of New Mexico, encapsulates the aim of such a process: "The challenge is to look at the ground, at what is present, and ask ourselves what can we make of this. What can we make of the shaping of our own planet? What story does it tell?" (Taylor et al 12).

Taylor's comments are made in the context of a program dedicated to exploring the "land art" movement in environmental arts, a movement that begins in the 1960s with the works of artists such as Robert Smithson. This reference is apposite of course in the context of the *Old Growth* project, which is concerned with sedimentary environments as the "memory of the earth." Although a great deal of land art's rationale related more to a protest against the gallery system and (particularly in Smithson's case) an ambivalence towards a romanticist view of Nature (Menard 294), land art, and Smithson's conception of a deep connection between cognitive and geological processes, have a great deal of relevance to our contemporary environmental issues (Smithson 82). In a 1970 interview with Philip Leider, founding editor of *Artforum*, Robert Smithson was asked about his political stance. His response was that he was "interested in the politics of the Triassic period" (Turpin 173). We could take this in a number of ways, and it could even have been a throwaway comment or abstract provocation – but one of the ways in which it resonates most strongly today is that the Triassic, a geologic period spanning between 50-250 million years ago, is a period largely defined by recovery from the end-Permian mass extinction event, a worldwide collapse understood to have been caused by volcanic activity in Siberia and termed "the most dramatic event to impact life on Earth" (Sahney & Benton 759). The politics of the Triassic are central, today, as they highlight the troubled threshold between the threat of catastrophic climate change and the economics of resource extraction; the question of the Triassic is whether to heed its message or to continue burning its coal.

How else can we story the world? Smithson's response to the question proposes, essentially, the complexity of art as a form of expression, its dovetailing of conceptual concerns with material practice. Media art, which can work with images, sound and tactility, has the capacity to communicate simultaneously on multiple registers – because it can engage multiple senses at the same time it has a *synchronic* dimension that linear written or spoken language cannot access in quite the same way, just as it also has a *durational* dimension and so works with the question of *attention*, it unfolds and develops over time, the way thought does. It operates intellectually, affectively and sensually, and can make appeals across these registers all at the same time. It operates on the logic of "both/and" – and can thus make multiple "utterances" at the same time that do not necessarily cohere into a single "statement" but that rather resonate with and against each other.

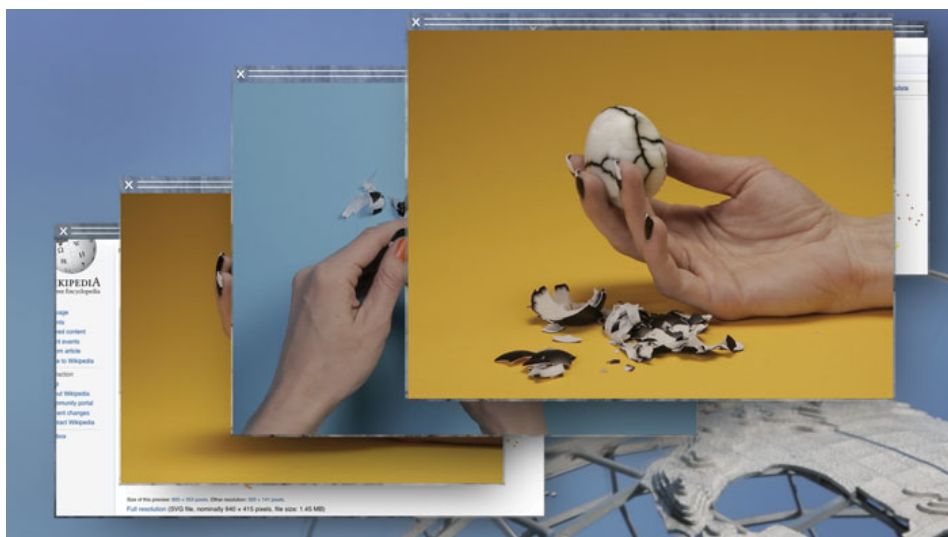
Media art also engages the question of the medium, the support, alongside whatever is carried by that medium – it has an intrinsic concern both with form and content and with critiquing the tendency to split "the image" into material form and semiotic content. Media archaeologist Jussi Parikka, for example, links thinking about media and media art to the environmental underpinnings of our contemporary media technologies. His book *A Geology of Media* explores how geology as a way of knowing the world is also a way of studying media as technological, economic, cultural and environmental phenomena: "Geology becomes a way to investigate [the] materiality of the technological media world. It becomes a conceptual trajectory, a creative intervention to the cultural history of the contemporary" (Parikka 4). Parikka

is discussing the components of new technologies and media in the main – the use of rare earth minerals such as Lithium (Li) in laptop batteries for example, or the Indium (In) used in LCD displays and photo-voltaic solar cells (Parikka 51) – but of course his logic can be applied to prior media forms as well, such as the plant matter required for the manufacture of cellulose acetate film and the silver halide crystals required to make this film photo-sensitive. Parikka conducts a kind of conceptual “reverse-engineering” of media technologies, teasing apart the environmental and economic underpinnings of their components in either manufacture or extraction. In doing so he demonstrates that the media technologies that humankind is proliferating are not static standalone “objects” or neutral disseminators of cultural “content,” but, rather, are complex networked “forms” tied to a vast array of contexts. Thinking into the world, here, involves peering into its component parts, going “beneath” or “beyond” the surface so as to manifest the many elements at play.

I’m guided in this thinking by Walter Benjamin’s figure of the constellation, the idea that “image is that wherein what has been comes together in a flash with the now to form a constellation” (Benjamin *The Arcades Project*, N2a; N3). Benjamin is writing about the dialectical image and ways of thinking the image of the past, the dialectical image as the insertion of discontinuity into history: “the essence of the dialectical image is its polyvalence – as object in the world, as representation, as analytic tool, as rhetorical device, as figure” (Mitchell 205). This idea of the image as a constellation is relevant to a broader understanding of the complexity of media art, though, because it’s an optical metaphor. The constellation that comprises this notion of the image “comes into focus” only when all its aspects are aligned from a given standpoint. From another standpoint it is just random stuff – and so it is a question of shifting one’s perspective until the disparate elements align. We could say that media art “constellates” – or has the power to constellate – and so the question is: what elements do we bring into alignment?

To align the elements of media art’s potential for thinking into the world, I’d like to briefly discuss a work that for me crystallizes this dense synchronic and durational capacity of media art: Camille Henrot’s *Grosse Fatigue* (2013). This single-channel video project presents a breathless rush through the Smithsonian Institution collection, which appears both in direct video and photographic documentation, and in sequences where these images and material from social media are manipulated and piled on top of each other, appearing and disappearing in multiple windows as if within a computer interface (Fig. 1). The project premiered at the Venice Biennale in 2013, and has since appeared in galleries and festivals worldwide. *Grosse Fatigue* seeks to tell a kind of pan-dimensional Creation story and “story of everything,” taking as its object the Smithsonian as a site of knowledge – a site for the storage of aspects of the world, for measurement, for collection, for examination over time, for preservation and conservation, and for education, for knowledge dissemination through public strategies.

**Fig. 1** Camille Henrot, “Grosse Fatigue”. © Camille Henrot



To make factual statements about the breadth of the Smithsonian as an institution, to list its structure and capacities, might give an audience an intellectual understanding of the museum’s scope and reach, but it would not necessarily give insight into the broader significances or conceptual uses to which such an understanding could be put. The “art” in Henrot’s project, then, lies in its strategy of presentation or what I would call its “image strategy”; the constellation of the image sources and cultural “worlds” it brings together in still image and video, the codes it invokes through its soundtrack, which involves hip hop music and spoken word poetry, and its use of the computer interface quite literally as informational and presentational interface.

This image strategy unites form and content; it runs the taxonomic cataloguing and databasing of knowledge in its scientific mode, against the computer interface and social media as our contemporary mode of engaging with and sharing this knowledge. The project effectively cross-breeds scientific ways of knowing with artistic ways of knowing, thinking and feeling. It also subjects images to a certain kind of force, a force which is now ubiquitous: the networked world of the digital image. *Grosse Fatigue* exemplifies thinking into the world through finding out what *happens* to the image, through exploring the forces that are brought to bear upon it; the visitudes of the image.

### Old Growth

The *Old Growth* project, as with Henrot’s work, is explicitly concerned with what happens to the image; with the forces that can be brought to bear upon the image in its very materiality, and how these forces operate as a media analogue for dynamics operating within the environment at large.

*Old Growth* consists of time-lapse macro-photography of colour-positive slide film being chemically degraded. It builds, both conceptually and practically, upon previous work conducted in collaboration with environmental scientist Amanda Reichelt-Brushett, in which we explored the effects of a wide range

of chemical compounds on photographic negatives. This earlier project – which resulted in two video works entitled *after | image* and *AgX* – was conceived as an enquiry into the concept of material memory, and the correlative proposition and experience of “material forgetting.” That is, because photographic and film media frequently function as a form of external memory, storing visual records of events, people and places that are significant both to individuals and to states and nations, the degradation or disappearance of such records can be understood as a form of material forgetting, bringing with it all the effects of forgetting such as a sense of loss or absence, anxiety and confusion, or conversely, a sense of freedom and release (see Cooke & Reichelt-Brushett).

*after | image* and *AgX* worked with a personal archive and individual memory, using images that I had shot when I studied photography at high school, that had been stored in my parents’ attic for 20 years. In seminar talks and gallery presentations, as well as in private communications, the question I have been asked most often is whether I have taken copies of the photos I destroyed, and the shock expressed when I tell people that “No, they’re really gone” is always palpable. A great deal of the pathos and affective charge of the project comes from this use of the personal image, and the sense of its fragility when rendered as an image-object faced with a corrosive acid (Fig. 2).

**Fig. 2** Grayson Cooke, “AgX.”



The shock people expressed at my admission that the photographs were indeed irrevocably destroyed – one media arts colleague described the project as a kind of “treason” – is what indicated to me that I had gotten to the nub of my enquiry, demonstrating the powerful affective charge held within the act of destroying images in the name of an active material forgetting. Seeking to test the transferability of this effect and affect then, I conceived *Old Growth* as an extrapolation from this logic: if it is shocking to witness the destruction of a personal image archive, what shock would register were other kinds of images and archives to be destroyed in a similar manner? If personal memory is to be held sacrosanct, and the material objects that frequently store this



memory are to be given an essentially “sacred” status (with all the sacrificial irony the use of such a term suggests – viz. Agamben; Girard; Derrida), how would the destruction of extra-personal memory be approached?

It was this questioning that led me to the idea of degrading images of environmental archives, environments that have formed over time through sedimentary or accretive processes, and that therefore store “material memories” of the conditions of the earth, in the same way that our personal and national archives store memories of our individual and collective pasts. Environmental scientists treat environmental archives the way an archivist treats museums and libraries – as repositories of vital information from the past. The core sample, for instance, is a historical research pathway, it delves directly into the archive, cutting transversally across strata and following the logic whereby *depth equals time* (Parikka 13). Trees are cored to assess their age in relation to climatic conditions; deep Antarctic ice is cored to investigate changes in carbon dioxide levels over hundreds of thousands of years (CDIAC).

*Old Growth* thus seeks a media analogue for the effects of anthropogenic climate change and resource extraction on the environment at large; it subjects the image as a memory object to forces comparable to those encroaching on the memory of the earth. In so doing it proposes that if environmental archives were valued in the same way as human archives, perhaps the question of resource extraction and the exploitation of “standing reserve,” and its resultant destruction of environments that take hundreds, thousands or millions of years to grow, would be approached differently.

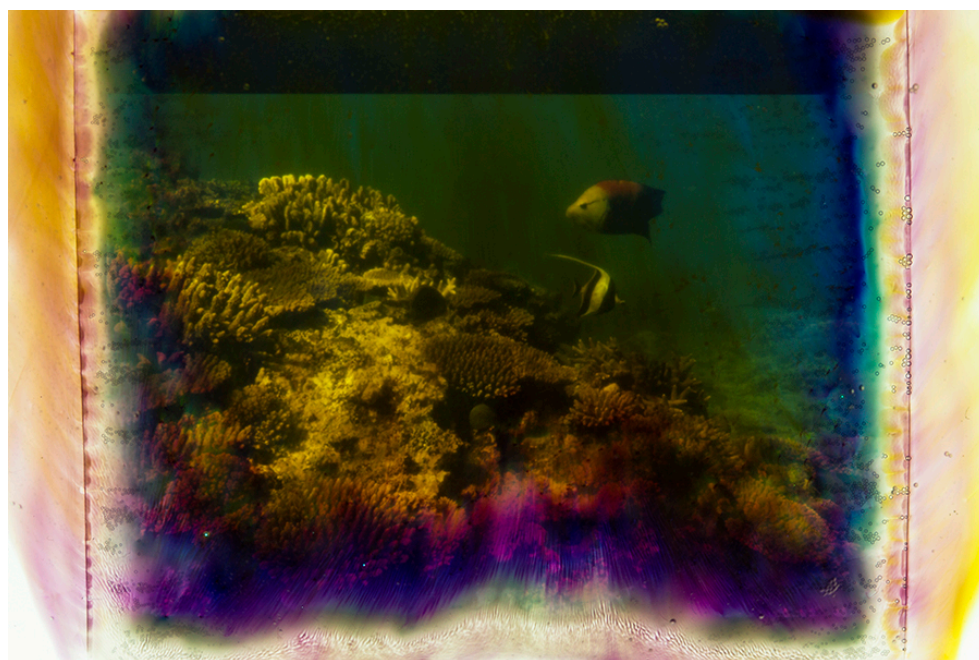
The vicissitudes of the image are key here – and the possibility that we might react differently to what happens to an image *in* a given environment, in all its chemical reality, from how we react to images *of* the environment, which when presented in a purely factual or documentary mode speak differently than when presented in an artistic mode, with all its concurrent affective, sensuous and conceptual registers. *Old Growth*'s method of thinking into the world rests on a materialist logic whereby content is always a function of form in the constitution of the image object, and the image object is always a function of its environment and the forces mustered therein.

Because it unfolds durationally, the project charts an experiential mapping of what happens to the image under a range of conditions. In *The Future of the Image*, Jacques Rancière proposes a continuum of what he calls the “naked” image through the “ostensive” image to the “metamorphic” image (22-27). Where naked and ostensive images would operate on a logic of mimeticism and factual evidence in a range of documentary, artistic and scientific contexts, the metamorphic image (an appropriately geological term) would “set out to displace the representations of imagery, by changing their medium, by locating them in a different mechanism of vision, by punctuating or recounting them differently” (27). The metamorphic image changes over time, it is subject to forces – the forces of history even. This would also align with the strategy Rancière names “defiguration,” wherein “figures are wrenched from the space of representation and reconfigured in a different space” (77).



We can see how clearly *Old Growth* works in such a schema, with its collapsing of content into form; the image literally melts, shifting from representative imagery to swirls of colour and texture. Crucially however, this is not a stylistic choice on the part of the artist to move from representation to abstraction: the evident truth of these images is that what the audience sees is what really happened in the petri dish. This is literally what happens when, for example, cellulose acetate film is submerged in household bleach (Fig. 3).

**Fig. 3** Cellulose acetate film in sodium hypochlorite (NaClO).



The notion of mimetic veracity in its presentation of things “as they are,” then, is central to the project. The tradition of mechanical objectivity is my guide here; although it is a notion that has been reconfigured many times since it rose to be the prominent mode of scientific representation, it is a vital touchstone for any treatment of the image and its possibilities. But this project vacillates in what it does with this veracity; it is fundamentally equivocal, constantly bringing in and out of alignment the referential world of actual environmental destruction, the vicissitudes of the image within the image world, and the brute reality of phenomena in the petri dish; the dangerously exothermic but rather beautiful world of electron transfer and ion exchange.

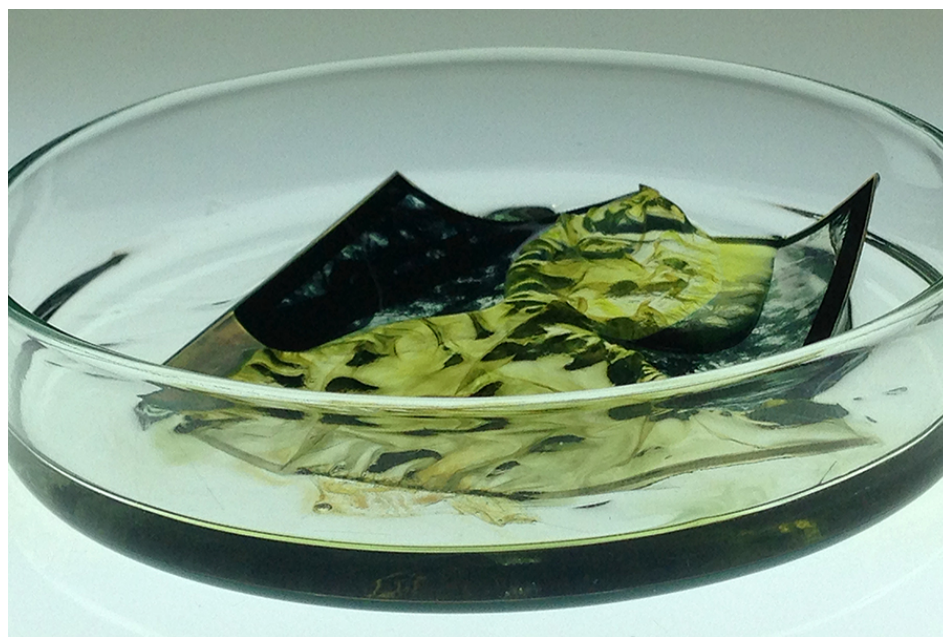
### Deforest

“Deforest” is the most metaphorical of the works, in terms of its image strategy, given the lack of any direct tie between sulphuric acid and deforestation. There is without question a fiery quality to the image however, a function of sulphuric acid’s vitriolic heritage, and it reminds us of what is at stake here: deforestation is one of the key planks of anthropogenic climate change. It is responsible for around 12% of the world’s greenhouse gas emissions, and also causes erosion and biodiversity loss (van der Werf et al

737). Within the context of the Anthropocene, deforestation is an urgent touchstone for the threshold between economic and environmental imperatives in both developed and developing nations. Forests are vital carbon sinks, and hence are also repositories of extra-human time and historical atmospheric information. The burning, logging and clearing of forests then has an informational as well as environmental effect. It is this double sense of what is at stake with deforestation that this work attempts to bring forth.

The photographs in this work were shot in the Bunya Mountains in South-East Queensland, a temperate rainforest of immense significance to Indigenous peoples of the area because of the festivals held there when the nuts of the bunya pine were ripe. Being protected as National Park, the area is not threatened by deforestation – it stands in for rainforest around the world that experiences a much greater degree of threat, such as the rainforests of Borneo or the Amazon. The photographs were shot on 6x6cm medium format colour negative film, then digitally scanned and printed back out to colour positive film. It is this large surface area of the image that gives this work its richness – the surface of the image becomes an entire landscape under threat, a topology that buckles, twists and subsides as it is digested. Documentation images of this process depict the formation of ridges and faultlines as the acid makes its way through the film (Fig. 4).

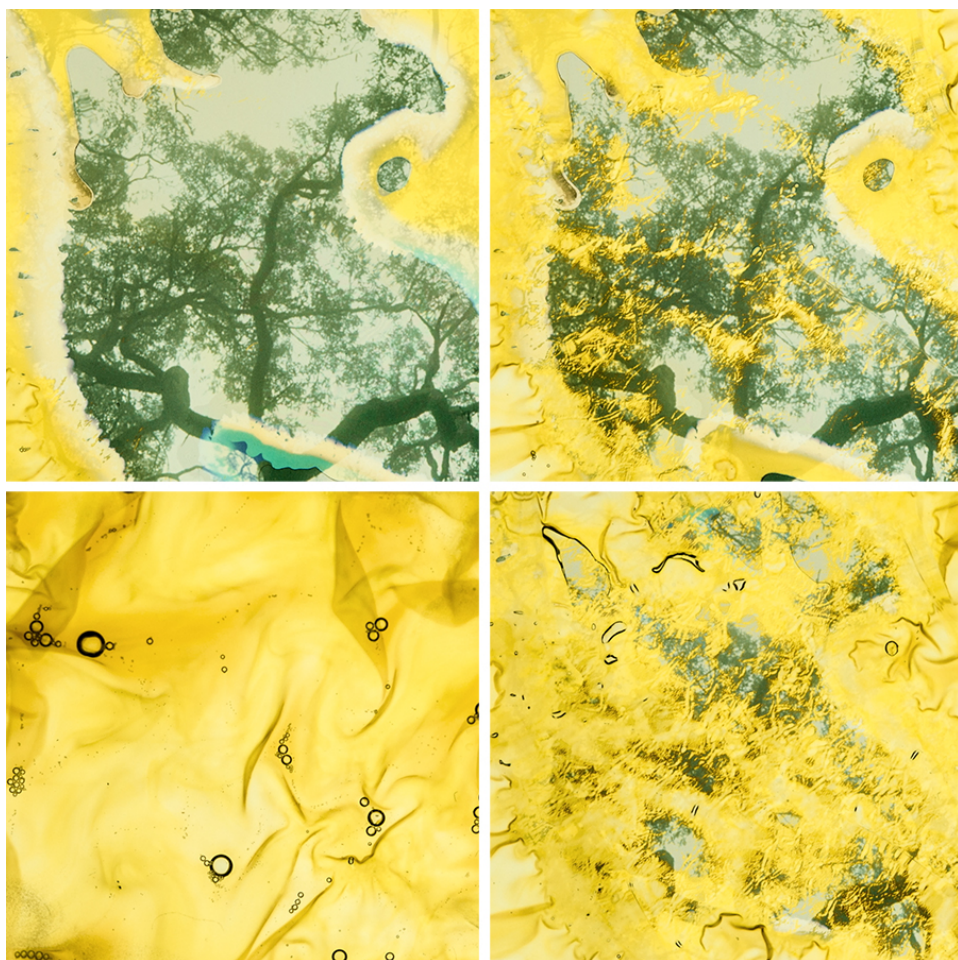
**Fig. 4** Cellulose acetate film in sulphuric acid ( $H_2SO_4$ ).



Sections of the image are protected at times during this process, as friction between the film and the base of the petri dish, and the tension between edges of the film held down by cellulose tape, causes pockets of air to be trapped in the centre of the film (Fig. 5). In these bubbles the forest appears to hold out momentarily, as if “making a stand” against the encroaching forces. The logic of acid digestion however, is total, and eventually the bubble is burst as the surrounding film is weakened and consumed.



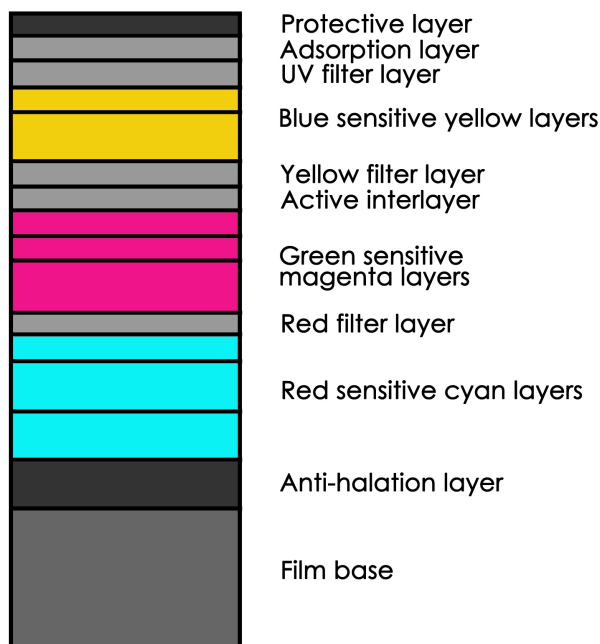
**Fig. 5** Grayson Cooke,  
 “Deforest” image sequence.  
 Clockwise from top left.



### Bleach

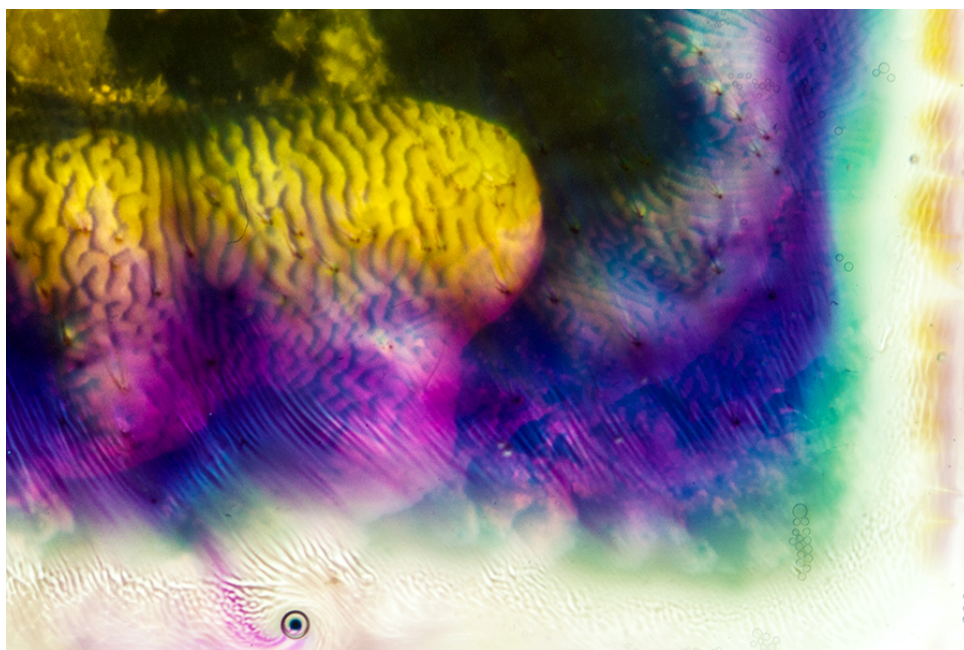
In “Bleach” we see the colour separation effect for the first time; here, the photographic image begins to be rendered as an object with depth – and not in a topographic sense, as surface undulations, but as something with depth within itself, something comprised of strata in a geological sense. Figure 6 shows the structure of colour film – we can see it is separated into many layers; apart from the various protection layers and the base, the film is separated into filter layers and dye layers. Yellow, magenta and cyan are the main colours present in colour film.

**Fig. 6** The structure of colour film.



As the bleach enters into the structure of the film, it works primarily on the dye layers. Beginning at the edges of the image object, the bleach works from the top down, going through the yellow, magenta and cyan layers one after the other, in each case loosening the dyes from their gelatin support in the emulsion. Thus firstly we see the yellow dyes leach out of the image, followed by magenta and then cyan. Each dye layer floods the image with colour, then is swallowed up by the layer that comes below (Fig. 7).

**Fig. 7** Sodium hypochlorite, sequential bleaching of dye layers.



This is the very structure of colour as visible light that is taken apart here – which is also the point of a coral reef, which is to be filled with colour, because colour denotes life. Single-celled organisms called zooxanthellae inhabit the coral, and it is these microscopic algae that in part give coral reefs their colouration. Unlike the silver halide crystals of photographic film, which

are only photo-sensitive, the zooxanthellae are also photosynthetic, containing chlorophyll and a range of other light-sensitive pigments which in turn reflect and absorb different wavelengths of light to bring colour to the reefs.

The zooxanthellae are also highly sensitive to changes in water temperature and water quality. Ocean acidification caused by the absorption of carbon dioxide released into the atmosphere by human activity, and ocean warming caused by the increase of greenhouse gases in the atmosphere, can cause the zooxanthellae to abandon the coral, leaving the coral bleached and without colour. We see a comparable effect in the effect of bleach on photographic film, where the dyes are ejected out the edges of the film, forming lovely clouds of pure colour that drift out and up from where they resided in the film (Fig. 8). Here the media analogy underpinning this project is made explicit, whereby coral is to the ocean as the slide film is to its environment; in this case, household bleach and a corrosive acid.

**Fig. 8** Sodium hypochlorite, ejection of dye.



### Frack

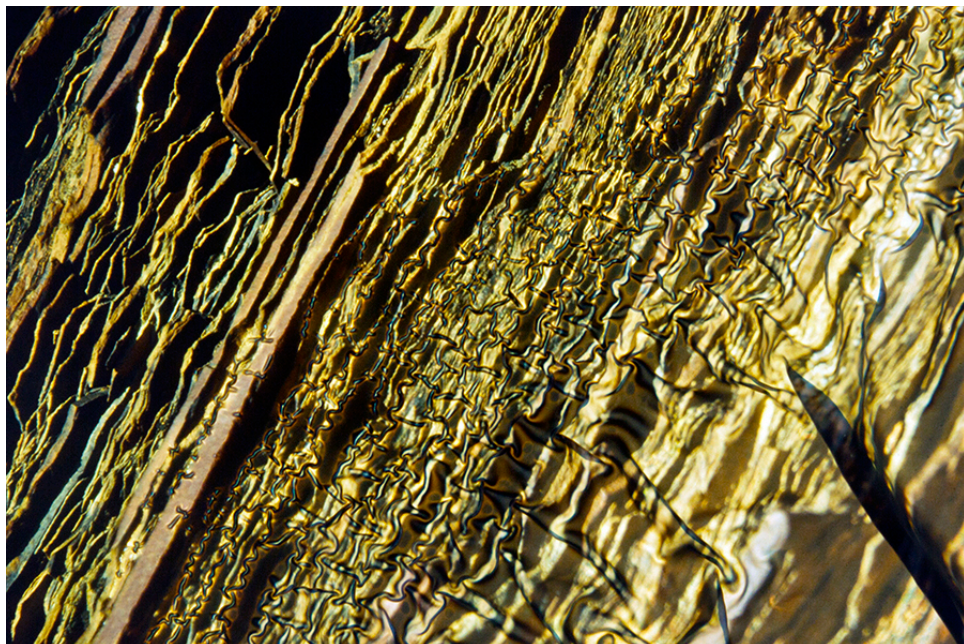
Sedimentary rock is one of the three main types of rock on Earth. Unlike igneous rock, which is volcanic rock and magma thrust outwards from deep below the Earth's crust, sedimentary rock forms on the surface. Limestone, for instance, is one of the most prominent of the sedimentary rocks, its striking white colour a function of calcium formed from the skeletal fragments of countless marine organisms, compacted over millions of years. Great sheaves of limestone ring the coastlines of many countries, tumbled and tipped by incredible forces of compaction and uplift. Limestone tells a story of immense time-scales, of an unceasing lapping of oceans on shores of an unbelievable strangeness.

Sandstone and shale – the two sedimentary rocks used in this project – tell similar stories. They evoke the shifting of waterways and coastlines, seismic uplift and runoff. They are frequently rich in minerals, and form one of the key cornerstones of resource extraction. Shale, for example, is one of the rocks where gas extraction requires hydraulic fracturing or “fracking” – the injection of corrosive acids and salts to fracture rock and free natural gas. Fracking has been common practice in the mining industry for a number of years, but it has recently become controversial as communities near fracking wells complain of health problems, and accounts of the contamination of the water table grow. Interestingly, the deep-injection disposal of waste fluid is also understood to cause earthquakes, with the United States Geological Survey (USGS) having studied the issue of “induced seismicity” since at least the 1980s (see USGS).

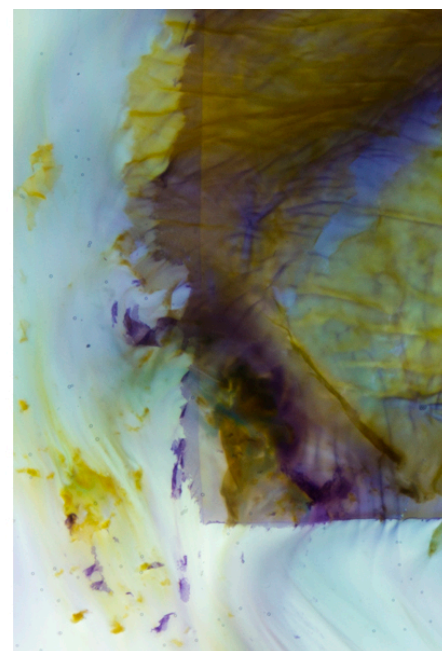
In this project, we see images of sedimentary rock (sandstone from Bouddi National Park in NSW and shale from Arkaroola in the Northern Flinders Ranges of South Australia) destroyed by sodium hydroxide, hydrochloric acid and acetic acid. Sodium hydroxide – also known as caustic soda – is a highly corrosive substance mainly used in cleaning products. In fracking, it is used as a pH adjustor, because it is extremely alkali (Fracfocus). And when it interacts with photographic film, it is dramatic in its effects. It begins by lifting and rippling the entire image off the film base, as it immediately digests the gelatin in which the image layers are suspended (Fig. 9). Like sodium hypochlorite, it then leaches the dyes from every layer in the film, but rather than loosening the dye itself it separates the dye layers like tissue paper, rendering the photographic film essentially as a kind of sedimentary construction, composed of strata that signify not immense time-scales that have been compacted, but different wavelengths of light and colour (Fig. 10). That is, sodium hydroxide “addresses” the film in the same way that a core sample or mining operation addresses the strata of the earth, it proposes a depth to the image, though measured in microns not metres, and demonstrates one of the most explicit instances in this project where the image as “content” subsides or de-composes into material form.



**Fig. 9** Cellulose acetate and sodium hydroxide (NaOH).



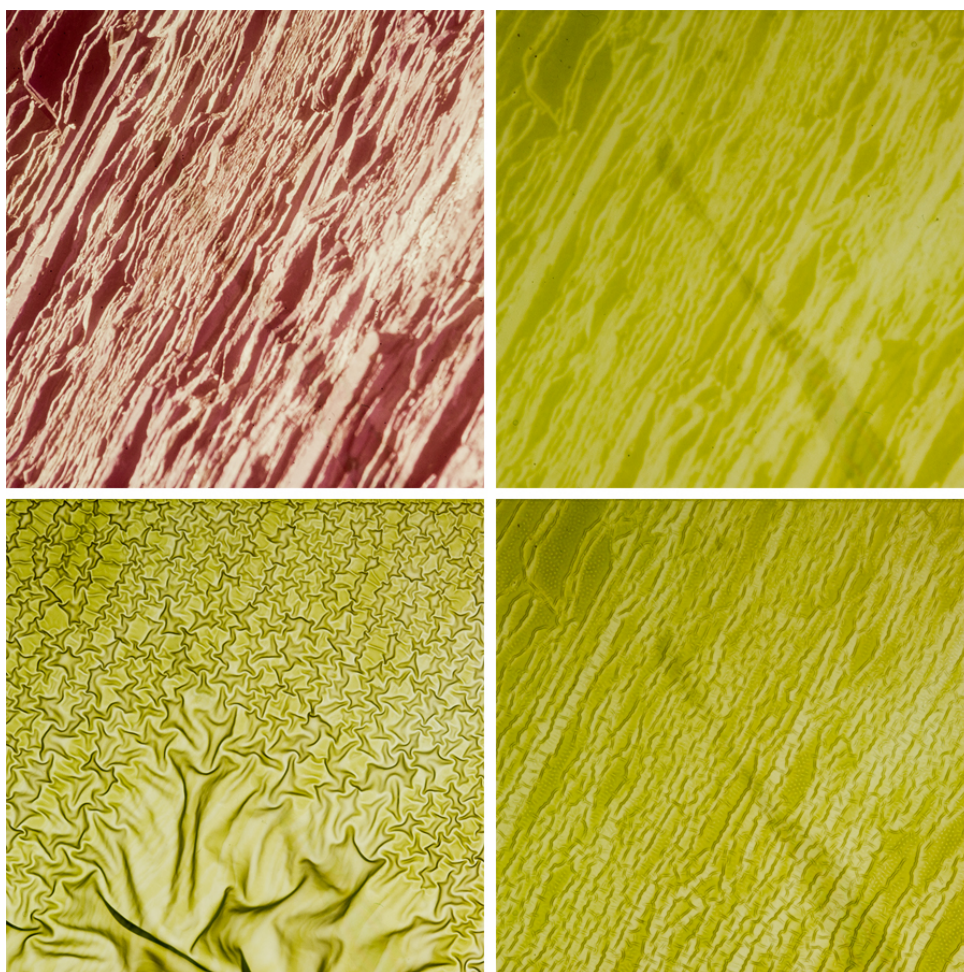
**Fig. 10** Separating the dye layers.



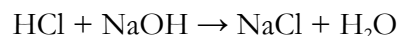


Hydrochloric acid, on the other hand, is a strong acid – it is used in fracking to dissolve minerals and force fissures in rock to help release the gas. When brought into contact with photographic film, it immediately bleaches most of the colour out of the image, then appears to halt its effects, with little happening for more than an hour save for the continued gradual lightening of the image. Eventually however, the acid makes its way into the structure of the film, and begins to digest the gelatin holding the film together. This is when the acid fracks the film in the same way it fracks rock: the acid seeks the points of least resistance in the film, the lighter areas of the image where less silver is deposited in the film, and which correspond to the linear strata visible in the rock (Fig. 11)

**Fig. 11** Cellulose acetate and hydrochloric acid (HCl). Clockwise from top left. Overall duration approx. 2 hours.



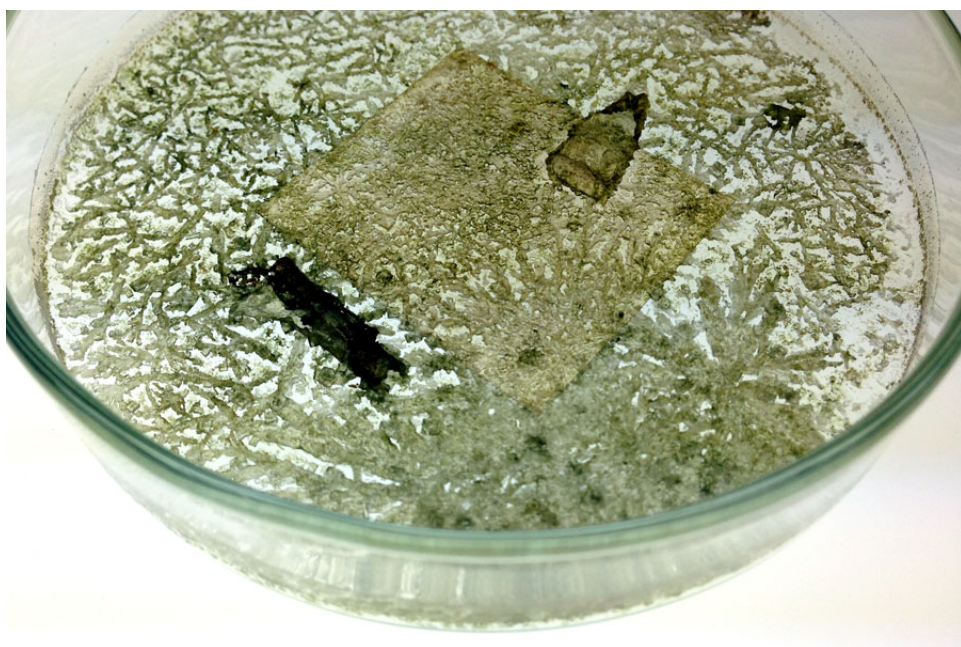
Of even greater relevance, however, and providing the most direct media/material analogue in the project, the tightest link between the image world and the world at large, are the sequences where hydrochloric acid is added to sodium hydroxide (formula 1). These substances are almost direct opposites in terms of pH – hydrochloric acid, being a strong acid, has a very low pH, while sodium hydroxide is a powerful base and can have a pH as high as 14.



**Formula 1: Neutralization reaction**

When they are added together, as in the formula equation above, a neutralization reaction occurs; this is where the two substances combine and rapidly exchange hydrogen and oxygen ions, generating immense heat and creating intense dynamics within the environment. In the video we see a sudden rushing of dark material from the top of the frame resulting in the swirling formation of tiny black particles that eventually form into crystals (Fig. 12). The end result is neutral: sodium chloride and water. And so what we see in the petri dish, with the intense movement and formation of grubby black crystals, is essentially comparable to what results from hydraulic fracking, and sits in storage ponds and deep-injection wells the world over; very dirty salty water.

**Fig. 12** Neutralization reaction results after evaporation – sodium chloride crystals and the remaining film base.



## Conclusion

This project seeks to explore issues facing the world as a result of anthropogenic climate change and resource extraction – and it does so in a realm which engages *both* a kind of scientific “mechanical objectivity” in imaging, and the conceptual and affective dimension of the image. The project does not simply seek to “represent” an aspect of the environment, nor does it rely purely on a documentary presentation of fact. Rather, it seeks media/material analogies for the vicissitudes of the environment via the vicissitudes of the image.

In the terms developed earlier in this paper, this is the project’s *image strategy* and mechanism for *thinking into the world*. Put differently, we could think of this as a way of doing “science communication by other means”; a way of talking about – making art about, making audible and visual, making experiential – the environmental issues that science uncovers, but in such a way that parallel epistemes are invoked and yoked together. Thus as much as the project consists of mechanically produced images of phenomena occurring in a controlled environment – the hallmark of scientific imaging’s

mechanical objectivity and also of artistic realism's rationale of *depicting* the world – it becomes a form of *thinking* into the world through an image strategy that is essentially recursive: we see images of *images* being destroyed, the content is borne out in the form.

It seems to me that this is an immensely fruitful space in which to work – in terms of the wealth of activity already being undertaken internationally around cross-breedings of art and science, in terms of the epistemological richness such an approach presupposes, and in terms of the urgency of the message. Because of the sensual registers it invokes and its tie to technological developments, media art is well positioned to play a key role in the development of this language and the dissemination of its statements, and *Old Growth* seeks to make a small contribution to this process. Through what happens to the image we see oceans come and go, we hear the grinding of stones and the lapping of waters on the shores of supercontinents that broke up when Earth was populated only by single-celled organisms. This is the promise of an image practice informed by both scientific and artistic modes of enquiry: that in its material and its concept it might focus attention on the forces that have shaped and will shape the earth, anthropogenic and otherwise.

### Acknowledgements

I would like to acknowledge the anonymous reviewers of this paper for their very helpful comments, as well as the guidance and support of Amanda Reichelt-Brushett, who has been my scientific mentor and provocateur throughout this project and other collaborations.

### Works Cited

- Agamben, Giorgio. *State of Exception*. Chicago: University of Chicago Press, 2005.
- Benjamin Walter. *The Arcades Project*. Trans. Howard Eiland & Kevin
- McLaughlin. Cambridge MA and London: Harvard University Press, 1999.
- Carter, Paul. *Material Thinking*. Melbourne: Melbourne University Press, 2004.
- CDIAC. “800,000-year Ice-Core Records of Atmospheric Carbon Dioxide (CO<sub>2</sub>).” *Carbon Dioxide Information Analysis Centre*.  
[http://cdiac.ornl.gov/trends/co2/ice\\_core\\_co2.html](http://cdiac.ornl.gov/trends/co2/ice_core_co2.html).
- Cooke, Grayson, and Amanda Reichelt-Brushett. “Archival memory and dissolution: The *after* | *image* project.” *Convergence* 21.1 (2015): 8–26.



- Daston, Lorraine, and Peter Gallison. *Objectivity*. New York: Zone Books, 2007.
- Derrida, Jacques. *Dissemination*. Trans. Barbara Johnson. London: The Athlone Press, 1981.
- FracFocus. "What Chemicals Are Used: FracFocus Chemical Disclosure Registry." <https://fracfocus.org/chemical-use/what-chemicals-are-used>.
- Girard, René. *Violence and the Sacred*. New York: Continuum, 2005.
- Menard, Andrew. "Robert Smithson's Environmental History." *Oxford Art Journal* 37.3 (2014): 285-304.
- Mitchell, W.J.T. *Iconology: Image, Text, Ideology*. Chicago and London: University of Chicago Press, 1986.
- Parikka, Jussi. *A Geology of Media*. Minneapolis & London: Minnesota U.P, 2015.
- Rancière, Jacques. *The Future of the Image*. London & New York: Verso, 2009.
- Sahney, Sarda, and Michael Benton. "Recovery from the most profound mass extinction of all time." *Proceedings of the Royal Society* 275 (2008): 759–765.
- Scrivener, Steven. "The art object does not embody a form of knowledge." *Working Papers in Art and Design* 2 (2002): <http://www.herts.ac.uk/research/other/art-design/research-into-practice-group/production/working-papers-in-art-and-design-journal/volume-2-research-into-practice-2002>.
- Smithson, Robert. "A Sedimentation of the Mind: Earth Projects." *Artforum* (September 1968): 82-91.
- Taylor, Chris, William L. Fox, Flora Vilches, Gonzalo Pedraza, Rodrigo Perez de Arce, Pilar Cereceda, and Andres Rivera. *Incubo Atacama Lab*. Santiago: Incubo, 2008.
- Turpin, Etienne. "Robert Smithson's Abstract Geology: Revisiting the Premonitory Politics of the 'Triassic.'" *Making the Geologic Now*. Eds. Elizabeth Ellsworth & Jamie Kruse. New York: Punctum Books, 2013. 173-178.
- USGS. "Induced Earthquakes." <http://earthquake.usgs.gov/research/induced/>.
- Ven der Werf, G.R, D.C. Morton, R.S. DeFries, J.G.J. Olivier, P.S. Kasibhatla, R.B. Jackson, G.J. Collatz and J.T. Randerson. "CO<sub>2</sub> emissions from forest loss." *Nature Geoscience* 2.11 (2009): 737–738.