

Air works: air as material in contemporary installation and performance art in a time of climate emergency

Author:

Parsons-Lord, Emily

Publication Date:

2021

DOI:

<https://doi.org/10.26190/unsworks/22584>

License:

<https://creativecommons.org/licenses/by-nc-nd/3.0/au/>

Link to license to see what you are allowed to do with this resource.

Downloaded from <http://hdl.handle.net/1959.4/70925> in <https://unsworks.unsw.edu.au> on 2024-04-30

AIR WORKS

EMILY PARSONS-LORD



AIR WORKS:
**Air as material in contemporary installation and
performance art in a time of climate emergency**

Emily Parsons-Lord

A thesis in fulfilment of the requirement for the degree
of Doctor of Philosophy

School of Art & Design
Faculty of Arts, Design & Architecture

January, 2021

Thesis/Dissertation Sheet

Surname/Family Name	:	Parsons-Lord
Given Name/s	:	Emily Kathleen
Abbreviation for degree as give in the University calendar	:	PhD
Faculty	:	Faculty of Arts, Design & Architecture
School	:	School of Art & Design
Thesis Title	:	"AIR WORKS: Air as material in contemporary installation and performance art in a time of climate emergency"

Abstract 350 words maximum: (PLEASE TYPE)

Air is a politically incisive material in the climate emergency. Transcending national and political boundaries, air activates a power dynamic distributed asymmetrically between users (breathers/protesters), carbon contributors (polluters), and those of our elected rank (policymakers). This thesis proposes air as a new aesthetic of the climate crisis.

This practice-led research (re)considers the creative potential of the material of air in contemporary art and performance through experimentation with its physical components and affective qualities. Air simultaneously and uniquely embodies lyrical imaginative thinking and physiological experience. The research draws from contemporary artists Latai Taumoepeau, Teresa Margolles, Katie Paterson and Olafur Eliasson, as well as the artist's own extensive body of work. Developed alongside the dissertation are artworks, or AIR WORKS, that critically interrogate the embodied material reality of the climate crisis and the creative possibilities of feminist perspectives. Across four installation and performance works, the material of air narrates evolutionary pasts, maps the dimensions of the current climate crisis, and imagines possible ongoing climate futures.

This dissertation connects air to material feminisms, exemplifying the co-constitutive nature of language and material (Alaimo and Hekman). Air's invisibility demonstrates material feminisms as it facilitates normal physical, emotional and intellectual functioning as well as eliciting imagination. Critical feminist perspectives underscore the material investigation of air (Star, Dunn, Puig de la Bellacasa, Neimanis) and the climate crisis aesthetic (Yusoff and Gabrys, Wazana, Tompkins, Wynter). Storytelling as feminist practice (Haraway, King, Le Guin) assembles speculative pasts, presents, and futures, and imagines creative feminist alternatives.

The AIR WORKS and this dissertation make important contributions to new knowledge by expanding an understanding of air as material through the innovative manipulation of the chemical and biophysical components of air in performance and installation. The AIR WORKS present air as a potent aesthetic of international power relations relating to the climate crisis. This research demonstrates that air creatively invents and shapes feminist climate futures.

Declaration relating to disposition of project thesis/dissertation

I hereby grant to the University of New South Wales or its agents a non-exclusive licence to archive and to make available (including to members of the public) my thesis or dissertation in whole or in part in the University libraries in all forms of media, now or here after known. I acknowledge that I retain all intellectual property rights which subsist in my thesis or dissertation, such as copyright and patent rights, subject to applicable law. I also retain the right to use all or part of my thesis or dissertation in future works (such as articles or books).

12/1/21

Date

Signature

The University recognises that there may be exceptional circumstances requiring restrictions on copying or conditions on use. Requests for restriction for a period of up to 2 years can be made when submitting the final copies of your thesis to the UNSW Library. Requests for a longer period of restriction may be considered in exceptional circumstances and require the approval of the Dean of Graduate Research.

ORIGINALITY STATEMENT

'I hereby declare that this submission is my own work and to the best of my knowledge it contains no materials previously published or written by another person, or substantial proportions of material which have been accepted for the award of any other degree or diploma at UNSW or any other educational institution, except where due acknowledgement is made in the thesis. Any contribution made to the research by others, with whom I have worked at UNSW or elsewhere, is explicitly acknowledged in the thesis. I also declare that the intellectual content of this thesis is the product of my own work, except to the extent that assistance from others in the project's design and conception or in style, presentation and linguistic expression is acknowledged.'

Signed

Date 12/1/21
.....

COPYRIGHT STATEMENT

'I hereby grant the University of New South Wales or its agents a non-exclusive licence to archive and to make available (including to members of the public) my thesis or dissertation in whole or part in the University libraries in all forms of media, now or here after known. I acknowledge that I retain all intellectual property rights which subsist in my thesis or dissertation, such as copyright and patent rights, subject to applicable law. I also retain the right to use all or part of my thesis or dissertation in future works (such as articles or books).'

'For any substantial portions of copyright material used in this thesis, written permission for use has been obtained, or the copyright material is removed from the final public version of the thesis.'

Signed

Date 20/6/21

AUTHENTICITY STATEMENT

'I certify that the Library deposit digital copy is a direct equivalent of the final officially approved version of my thesis.'

Signed

Date 20/6/21

INCLUSION OF PUBLICATIONS STATEMENT

UNSW is supportive of candidates publishing their research results during their candidature as detailed in the UNSW Thesis Examination Procedure.

Publications can be used in their thesis in lieu of a Chapter if:

- The candidate contributed greater than 50% of the content in the publication and is the “primary author”, ie. the candidate was responsible primarily for the planning, execution and preparation of the work for publication
- The candidate has approval to include the publication in their thesis in lieu of a Chapter from their supervisor and Postgraduate Coordinator.
- The publication is not subject to any obligations or contractual agreements with a third party that would constrain its inclusion in the thesis

Please indicate whether this thesis contains published material or not:



This thesis contains no publications, either published or submitted for publication
(if this box is checked, you may delete all the material on page 2)



Some of the work described in this thesis has been published and it has been documented in the relevant Chapters with acknowledgement
(if this box is checked, you may delete all the material on page 2)



This thesis has publications (either published or submitted for publication) incorporated into it in lieu of a chapter and the details are presented below

CANDIDATE'S DECLARATION

I declare that:

- I have complied with the UNSW Thesis Examination Procedure
- where I have used a publication in lieu of a Chapter, the listed publication(s) below meet(s) the requirements to be included in the thesis.

Candidate's Name	Signature	Date (dd/mm/yy)
Emily Parsons-Lord		12/1/21

Table of Contents

<i>List of figures</i>	<i>iii</i>
<i>Acknowledgements</i>	<i>v</i>
<i>Abstract</i>	<i>vi</i>
<i>Chapter 1: An introduction to air thinking</i>	<i>1</i>
1.1 Introduction	3
1.2 The physicality of the material air in art	11
1.3 An urgency in air	13
1.4 Situating the research	15
1.5 A disciplinary context for considering air	17
1.5.1 Art context	17
1.5.2 Environmental humanities context	37
1.6 A feminist perspective on the material nature of air	42
1.7 Outline of chapters	43
1.8 How to read this dissertation	54
<i>Chapter 2: Air as material</i>	<i>56</i>
2.1 Introduction	58
2.2 Feminism as method	59
2.3 Material and materiality	69
2.3.1 Air as material in relation to the body as material	72
2.3.2 Air materiality	74
2.4 Material feminisms	80
2.5 <i>Different Kinds of Air, a Plant's Diary</i>	83
2.6 The linguistic: storytelling	86
2.6.1 <i>Different Kinds of Air, a Plant's Diary</i> : some stories of the airs	89
2.7 Decentring the human: materials in deep time and planetary scales	95
2.7.1 Donna Haraway: sympoiesis and naturecultures	95
2.7.2 Astrida Neimanis: water and bodies	97
2.7.3 Kathryn Yusoff: coal and racial mattering	101
2.8 <i>Things Fall Apart</i>	103
2.9 Decentring the human: a look to the future	111
2.10 Conclusion	113
<i>Chapter 3: Air as politics</i>	<i>116</i>
3.1 Introduction	118

3.2 <i>Our Fetid Rank (Margaret Thatcher's bottom lip and Bill Clinton's Tongue)</i>	120
3.2.2 Audience experience of the work	126
3.3 A politics of air	128
3.3.1 Containment of air as political object	128
3.3.2 Air as boundary object	130
3.3.3 Art as boundary object	133
3.3.4 Air-commons	137
3.3.5 Air as Infrastructure	142
3.3.6 Responsibility for maintenance	148
3.4 The condition of the current climate crisis	149
3.5 Didacticism as feminist act	151
3.6 What does <i>aesthetics</i> mean in the climate crisis?	153
3.6.1 Graphs, diagrams, analogies	156
3.6.2 Yusoff and the polar bear	159
3.7 Another aesthetics of climate crisis, meaning more than beauty	162
3.7.1 Johnson and embodied aesthetics	162
3.7.2 Wynter via Tompkins: aesthetics is a performance of power	164
3.8 Examples of artworks as climate politics, an analogue with water	167
3.8.1 Latai Taumoepeau: body as material	167
3.8.2 Olafur Eliasson: <i>Ice Watch</i>	172
3.9 Conclusion	176
Chapter 4: Air as storytelling	179
4.1 Introduction	181
4.2 Climate hero stories and carrier bag alternatives	183
4.3 Imagination and the climate	184
4.4 Storytelling for survival: Donna Haraway	188
4.5 <i>Pastpresents</i> : the materials in climate futuring	191
4.6 Hero narratives of climate crisis: the IPCC	194
4.7 The potential for art to influence climate futures (in the carrier bag)	198
4.8 The hero story in climate crisis solution proposals: geoengineering	200
4.8.1 Solar radiation management	201
4.8.2 <i>Then Let Us Run (the sky is falling)</i>	204
4.8.3 Carbon dioxide reduction	210
4.8.4 Katie Paterson's <i>Future Library</i>	212
4.9 Conclusion	216
Conclusion	218
Bibliography	223

List of figures

Figure 1. Emily Parsons-Lord, <i>If you cut into the present the future leaks out</i> , 2020	5
Figure 2. Emily Parsons-Lord, <i>Breath of Venus :: Breath of Mars</i> , 2013	9
Figure 3. Simon Faithfull, <i>Escape Vehicle no. 6</i> , 2004	11
Figure 4. Cover of Lucy Lippard's <i>Six Years</i> , 1973	19
Figure 5. Yves Klein, <i>Leap into the Void</i> , 1960	22
Figure 6. Yves Klein, installation view of <i>The Void</i> , 1958	23
Figure 7. Judy Chicago, <i>Immolation</i> , 1972	26
Figure 8. Cat Jones, <i>Somatic Drifts</i> , 2014	30
Figure 9. Maria Fernanda Cardoso, <i>Museum of Copulatory Organs</i> , 2012	30
Figure 10. Beatriz da Costa, <i>Pigeon Blog</i> , 2006–2008	33
Figure 11. Jalila Essaïdi, <i>2.6g 329m/s</i> , 2011–13	35
Figure 12. Eduardo Kac, <i>Alba</i> , 2002	35
Figure 13. Emily Parsons-Lord, <i>The Airrairium</i> , 2015	45
Figure 14. Emily Parsons-Lord, <i>Our Eyes Were of No Use to Us</i> , 2016 (left) and <i>The Confounding Leaving</i> , 2016 (right)	46
Figure 15. Emily Parsons-Lord, <i>Things Fall Apart</i> , 2017	47
Figure 16 Emily Parsons-Lord, <i>Our Fetid Rank (Margaret Thatcher's bottom lip and Bill Clinton's tongue)</i> , 2015	49
Figure 17. Latai Taumoepeau, <i>i-Land-x-Isle</i> , 2013	51
Figure 18. Emily Parsons-Lord, <i>Then Let Us Run (the sky is falling)</i> , 2018	52
Figure 19. Judy Chicago, <i>The Dinner Party</i> , 1974–79	61
Figure 20. Judy Chicago, <i>Smoke Bodies</i> , 1972	63
Figure 21. Judy Chicago, <i>Smoke Goddess/Woman with Orange Flares</i> , 1972	64
Figure 22. Emily Parsons-Lord, <i>Things Fall Apart</i> , 2017	65
Figure 23. Emily Parsons-Lord, <i>A raging event of continual noise (the Sun)</i> , 2018	66
Figure 24. (top left) Leonardo Da Vinci, detail of <i>Genevra d'Benci</i> , 1474. (top right) Raphael, <i>An Allegory</i> , 1504. (bottom) Wang Hui, <i>Scroll 9</i> , 1692–1695, detail of handscroll showing view of Shaoxing	76
Figure 25. Robert Barry, <i>Inert Gas Series/Helium, Neon, Argon, Krypton, Xenon/From a Measured Volume to Indefinite Expansion</i> , 1969	78
Figure 26. Emily Parsons-Lord, <i>The Airrairium</i> , 2015	79
Figure 27. Emily Parsons-Lord, <i>Different Kinds of Air, a Plant's Diary</i> , 2014	83
Figure 28 Documentation of glass stopcock valve mechanism and stainless-steel straw, Emily Parsons-Lord, <i>The Airrairium</i> , 2015	84
Figure 29. Diagram of sound waves	88
Figure 30. Emily Parsons-Lord, <i>Different Kinds of Air, a Plant's Diary</i> , 2014	90
Figure 31. Emily Parsons-Lord, <i>Different Kinds of Air, a Plant's Diary</i> , 2014	91
Figure 32. Emily Parsons-Lord, <i>Different Kinds of Air, a Plant's Diary</i> , documentation of bags retained by anonymous participants of the performance.	94
Figure 33. Emily Parsons-Lord, <i>Things Fall Apart</i> , 2017	100
Figure 34. Emily Parsons-Lord, <i>Things Fall Apart</i> , 2017	103
Figure 35. Emily Parsons-Lord, <i>Things Fall Apart</i> , 2017	105
Figure 36. Emily Parsons-Lord, <i>Things Fall Apart</i> , 2017	107
Figure 37. Emily Parsons-Lord, <i>Things Fall Apart</i> , 2017	108
Figure 38. (left) Teresa Margolles, <i>En el Aire</i> , 2003, (right) <i>Aire</i> , 2004	109
Figure 40 Emily Parsons-Lord, <i>Our Fetid Rank (Margaret Thatcher's bottom lip and Bill Clinton's tongue)</i> , 2015	120
Figure 41. Emily Parsons-Lord, <i>Our Fetid Rank (Margaret Thatcher's bottom lip and Bill Clinton's tongue)</i> , 2015	123
Figure 42. Emily Parsons-Lord, <i>Our Fetid Rank (Margaret Thatcher's bottom lip and Bill Clinton's tongue)</i> , 2015, documentation of chewing gum	124
Figure 39. Emily Parsons-Lord, <i>Our Fetid Rank (Margaret Thatcher's bottom lip and Bill Clinton's tongue)</i> , 2015	125
Figure 44. "Pure Holy Land Air," eBay sale item, July 2014	129
Figure 45. Amy Balkin, <i>Public Smog</i> , 2004–2008	140

Figure 46. <i>The Guardian</i> , November 2019, Hindu women had to immerse themselves into the polluted waters of the Yamuna River	146
Figure 47. Image of the Sydney city skyline from corner of Cleveland St and Regent St, 10th December, 2019	147
Figure 48. Image of artist's studio during the bushfires, 6th Dec, 2019	147
Figure 49. Al Gore in <i>An Inconvenient Truth</i> , 2006	157
Figure 50. Latai Taumoepeau, <i>Repatriate I</i> , 2016	169
Figure 51. Latai Taumoepeau, <i>i-Land-x-Isle</i> , 2013	171
Figure 52. Olafur Eliasson with Minik Rosing, <i>Ice Watch</i> , 2014	173
Figure 54. Nassir Mufti, <i>Multispecies Cat's Cradle</i> , 2011	189
Figure 57. Emily Parsons-Lord, <i>Then Let Us Run (the sky is falling)</i> , 2018	204
Figure 58. Emily Parsons-Lord, <i>Then Let Us Run (the sky is falling)</i> , 2018	206
Figure 59. Katie Paterson, <i>Future Library</i> , 2014–2114, process documentation	212
Figure 60. Katie Paterson, <i>Silent Room</i> , 2014–2114, concept illustration	215

Acknowledgements

I would like to express my gratitude to my supervisors who have been so patient and encouraging. Thank you Lindsay Kelley and Kate Dunn for your enormous generosity, wealth of knowledge, thoughtful insights, and support through a difficult time.

The generosity of people in various disciplines that I have niggled and inveigled to help me has been overwhelming. Thank you Tim Lathouris, Tulleah Pearce, Sarah Robottam, Kelli McCluskey, Monica Gagliano, Kosta Tsoutas, Emma Webb, Penelope Parsons-Lord, Tarsh Bates, Devon Ward, Mark Edwards, Loren Kronemyer, Jeff Khan, and Ionat Zurr.

Thank you to my community of artists who contribute to my rich cultural and creative life and who, in so many lateral and intersecting ways, influence how I make art and how I think about art. I have had so many interesting, insightful and hilarious conversations that help shape my work. Tom Blake, Lisa Sammut, Genevieve Reynolds, Talia Smith, Jess Bradford, Belem Lett, David Greenhalge, Maeve Parker, Tulleah Pearce, Ros Helper, Blue Castles, Shahman Suku, Katie Winton, Shannon Williamson, Heath Franco and Latai Taumoepeau, thank you!

I write in loving memory of my beautiful mum, Amanda, who passed away before it was finished. Thanks to my wonderful family, Penelope, Luke, and Nuala for supporting me in all of my endeavours with kindness and love, and to Dora for always keeping me warm.

Abstract

Air is a politically incisive material in the climate emergency. Transcending national and political boundaries, air activates a power dynamic distributed asymmetrically between users (breathers/protesters), carbon contributors (polluters), and those of our elected rank (policymakers). This thesis proposes air as a new aesthetic of the climate crisis.

This practice-led research (re)considers the creative potential of the material of air in contemporary art and performance through experimentation with its physical components and affective qualities. Air simultaneously and uniquely embodies lyrical imaginative thinking and physiological experience. The research draws from contemporary artists Latai Taumoepeau, Teresa Margolles, Katie Paterson and Olafur Eliasson, as well as the artist's own extensive body of work. Developed alongside the dissertation are artworks, or AIR WORKS, that critically interrogate the embodied material reality of the climate crisis and the creative possibilities of feminist perspectives. Across four installation and performance works, the material of air narrates evolutionary pasts, maps the dimensions of the current climate crisis, and imagines possible ongoing climate futures.

This dissertation connects air to *material feminisms*, exemplifying the co-constitutive nature of language and material (Alaimo and Hekman). Air's invisibility demonstrates material feminisms as it facilitates normal physical, emotional and intellectual functioning as well as eliciting imagination. Critical feminist perspectives underscore the material investigation of air (Star, Dunn, Puig de la Bellacasa, Neimanis) and the climate crisis aesthetic (Yusoff and Gabrys, Wazana, Tompkins, Wynter). Storytelling as feminist practice (Haraway,

King, Le Guin) assembles speculative pasts, presents, and futures, and imagines creative feminist alternatives.

The AIR WORKS and this dissertation make important contributions to new knowledge by expanding an understanding of air as material through the innovative manipulation of the chemical and biophysical components of air in performance and installation. The AIR WORKS present air as a potent aesthetic of international power relations relating to the climate crisis. This research demonstrates that air creatively invents and shapes feminist climate futures.

Chapter 1: An introduction to air thinking



The air above you extends 400 km and weighs about one and a half tonnes. To read this paper you will take 181 minutes, consume 1358 litres of air, enriching it 100 times in carbon dioxide, which creates 54.32 litres of carbon dioxide, or a cube of dry ice 8 cm x 8 cm. Not a carbon-neutral paper.

1.1 Introduction

I have been enamoured by air as a material in my creative practice for many years. Thinking through air allows you to simultaneously grasp planetary and atomic scales, to slide through time and space with whimsy. Air is a shape-shifter. The invisibility of air is an invitation to imagine its form. The physical reality of air — its density, weight, chemical make-up and velocity — is so ubiquitous we can forget it's there.

Air is simultaneously local and global, encompassing the effects of breathing as well as the governance of polluters and policymakers. Air is where what we jettison into seeming oblivion is returned. Nothing disappears, it is caught by the air. It is a physical site, as well as a place we can project our imaginations onto.

What stirs the wind? What does air look like? What does it feel like to move through the slow gradient of air pressure into the vacuum of space? What kinds of bodies would we have evolved if the air pressure was higher, or lower? Where does the air end and the sky begin? Is it possible to trace where carbon dioxide exhausted from my body has been taken up into the hard body of a plant?

What is local when our collective imagining expands past the planet, and our physical engagement with materials circumnavigates the earth? What is local time when we live in a moment where a single human lifespan can shape the geologic?

Air in art and literature often signifies emptiness, the absence of something else. Air becomes a receptacle that is ripe to fill with creativity, dreams, potential. Or fill with the heavy idea of a void.

But air is material, a combination of elemental gases, molecules of atoms, volatile chemicals, vapour, and the reverberations of waves: radio, sound, light. Each breath of air is chemically different from the one before. The physical reality of air is different in different places yet is all assembled under one tiny elastic three-letter word. Every moment spent thinking about air is simultaneously experiencing the effects of air on the body, the mind, and one's emotional state.

As discourse of climate collapse reaches higher prevalence in mainstream Western news, air is gaining in political potency. The messy, growing collections of observation, study and research (from multiple perspectives, geographies, and popular credibility) of the scope and character of the climate crisis (which inevitably returns greater questions) centre air as a material for heat retention and its unquantifiable knock-on effects. My recent artwork, *If you cut into the present the future leaks out* (2020), investigates the crumbling and buckling of infrastructures not designed to withstand the predicted heat of the climate emergency. Heated from behind, a reservoir of gallium drips through a cut in the wall and falls into the gallery. Global heating, like air, is visible from the effect it has on earth systems and human constructions. Heat is another material of the climate crisis, residing in the earth and the air.

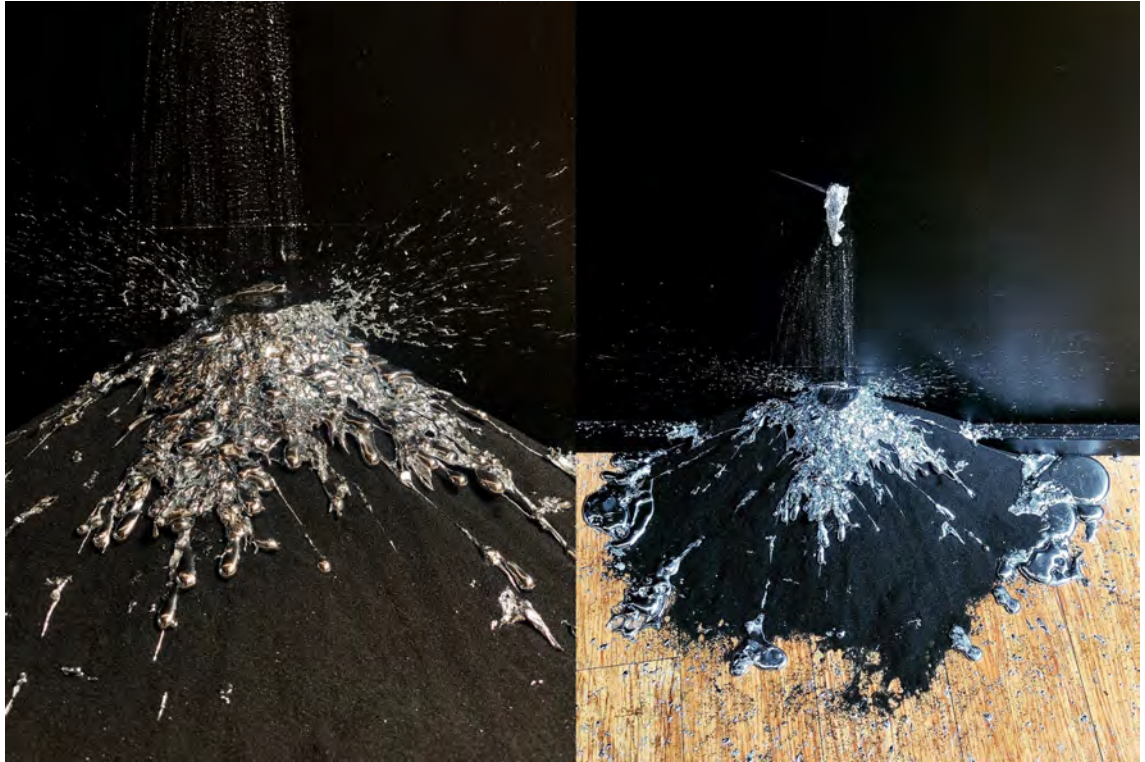


Figure 1. Emily Parsons-Lord, *If you cut into the present the future leaks out*, 2020, Dominik Mersch Gallery, Sydney, as part of *Secret Garden*, curated by Alanna Irwin and Ashleigh Jones. Image courtesy of the artist. Gallium is heated from behind the wall and drips through into the gallery.

Air is the invisible accumulated result of the interplay between decision-making, human action, and natural systems. Successive generations of humans populating governments and industries, tacitly consenting to jettison the mostly invisible by-products into air (and oceans). Compounding years of temperature rise, drought, and smog are the reverberations of decisions already made; the invisible malign.

Definitions of air are incomplete, and porous. The Oxford English Dictionary defines *air* as "the invisible gaseous substance surrounding the earth, a mixture mainly of oxygen and nitrogen."¹ It makes allowances for the necessity and qualities of breathing "fresh air" and designates the location as "the free and

¹ The Oxford English Dictionary, "Air," in *Oxford English Dictionary, The* (London: Oxford University Press, 2005).

unconfined space above the surface of the earth."² The *airwaves* is a term for transmitting broadcast radio, while *air* is the colloquial term for severing contact with the ground in skating, skiing, biking and so on (tubular, radical). In verb form, it is the act of expressing an opinion or grievance, a broadcast on radio or television (to 'air a programme') and the process of ventilating a room or material.

The unfixed and invisible nature of the air encourages metaphors that influence how humans imagine space, movement, flight, feelings, imagination, dreams, verticality, and ecological poetics.³ The idiomatic usage of *air* in these definitions nods to some of the metaphorical meanings revealed in language, such as to describe a mood, or feeling of an occurrence, person, or situation. This usage expresses the invisible and intangible feelings and thoughts that may exist between social bodies and the space that confines them, using the *air* as a metaphor for being in the mood. *Air* may be thick with tension and cut with a knife.

These definitions lack a more exhaustive consideration of the physical material that comprises *air* and its dynamism. *Air* is a clatter of invisible materials that dance, swirl, wave, radiate, and collide. These materials are physical, chemical, biological, and increasingly technological.⁴ Moving through and alongside the combination of gaseous molecules are other physical phenomena such as light, cosmic rays and many other kinds of radiation, charged ions, sound waves — which are small changes in air pressure (sound is *air*) — and heat. The *air* is a

² *ibid.*

³ For beautiful and expansive considerations of *air* as both material and ecological poetics, see S. Connor, *The Matter of Air: Science and Art of the Ethereal* (Reaktion Books, 2010). Gaston Bachelard, "Air and Dreams : An Essay on the Imagination of Movement," (Dallas: Dallas : Dallas Institute Publications, Dallas Institute of Humanities and Culture, 1988).

⁴ Connor, *The Matter of Air: Science and Art of the Ethereal*. 14–16.

shield to the earth from ultraviolet radiation and other cosmic detritus, from meteorites to solar flares.

Technological interventions include the manipulation of electromagnetic waves and human-made objects such as planes, rockets, balloons and microplastics. The technological manipulation of the qualities of the air start with mechanical uses of wind and air pressure, such as sail ships, ballooning, barometers, and thermometers, and extend into electrical signalling such as radio and digital transmissions.⁵

Chemical and biological materials inhabit the air, such as CFCs, trace elements, greenhouse gases, water vapour, free DNA, volatile compounds like pheromones, scents, dust, insects, birds, bacteria, viruses, and myriad microtaxa.⁶ The emerging field of air biogeography investigates and tracks the air-geographic movements, lifecycles, and success of microbial cells and bacteria from a health and climate perspective. Hundreds of thousands of individual microbial cells can exist in a single cubic metre of air,⁷ making air as “alive as soil or water.”⁸ They are capable of metabolising and reproducing in the water vapour of clouds and of being transported over vast distances,⁹ making air a unique habitat in its own right.¹⁰

⁵ Monika Bakke, *Going Aerial: Air, Art, Architecture* (Jan van Eyck Academie, 2006). 6.

⁶ Ann M. Womack, Brendan J. M. Bohannan, and Jessica L. Green, "Biodiversity and Biogeography of the Atmosphere," *Philosophical Transactions of the Royal Society B: Biological Sciences* 365, no. 1558 (2010). 3649.

⁷ S. M. and Butler Burrows, T. and Jöckel, P. and Tost, H. and Kerkweg, A. and Pöschl, U. and Lawrence, M. G., "Bacteria in the Global Atmosphere – Part 2: Modeling of Emissions and Transport between Different Ecosystems," *Atmospheric Chemistry and Physics* 9, no. 23 (2009); S. M. Burrows et al., "Bacteria in the Global Atmosphere – Part 1: Review and Synthesis of Literature Data for Different Ecosystems," *Atmos. Chem. Phys.* 9, no. 23 (2009). 9281.

⁸ Womack, Bohannan, & Green, "Biodiversity and Biogeography," 3645.

⁹ S. M. and Elbert Burrows, W. and Lawrence, M. G. and Pöschl, U., "Bacteria in the Global Atmosphere - Part 1: Review and Synthesis of Literature Data for Different Ecosystems," *Atmospheric Chemistry and Physics* 9, no. 23 (2009). 9264.

¹⁰ Womack, Bohannan, & Green, "Biodiversity and Biogeography," 3649.

As the definition of air is gaining a more dynamic material make-up, it is important to untangle the distinction between *air* and *atmosphere* and determine the relationship between them. These words are often used interchangeably but have significant nuances in both material and metaphorical usage. Atmosphere is the air-weather-climate system surrounding Earth, and also the equivalent gaseous envelope surrounding other planets. However, there is a sticky relationship between these words where they are still sometimes used interchangeably.

The Oxford English Dictionary defines atmosphere as “the envelope of gases surrounding the earth or another planet,” but also “the air in any particular place.”¹¹ Atmospheric scientist Richard Wilson determined that the term *atmosphere* describes the weather including clouds and storms, and that atmosphere also includes climate.¹² However, definitions of atmosphere do not account for its other invisible material parts; instead, it describes the space between a planet’s surface and the vacuum of space — on other planets this means places comprised of gases invisible and sometimes visible that would not support familiar Earth life.

Early research in this thesis produced the artwork *Breath of Venus :: Breath of Mars* (2013), which recreated the chemical composition of the atmospheres on Venus and Mars. Presented as a clear bag of these atmospheres, the audience could watch as air plants (*Tillandsia fuchsii* v *gracilis* and *Tillandsia ionantha*) either take their new environments in their stride, or succumb to the atmosphere.

¹¹ The Oxford English Dictionary, “Atmosphere,” in *Oxford English Dictionary, The* (London: Oxford University Press, 2005).

¹² Richard Wilson, *Atmosphere*, vol. 1st ed (Chandni Chowk, Delhi: Global Media, 2007), Book.3.

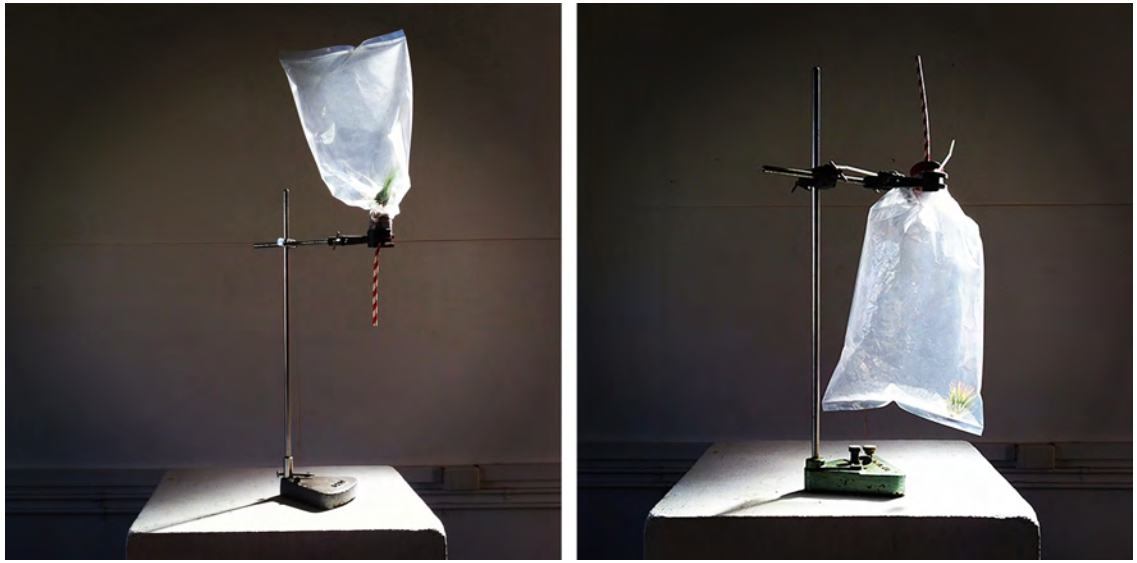


Figure 2. Emily Parsons-Lord, *Breath of Venus :: Breath of Mars*, 2013. Dimensions variable. Installation image. Courtesy of the artist.

Where air departs from atmosphere is in its being necessarily local to Earth and supporting familiar aerobic life. The characteristic of air that distinguishes it from atmosphere is that it is breathable, that it sustains life, that it is ours: human. Air is the environmental condition through which humans, and all aerobic life forms, evolved. Life has been shaped by levels of oxygen, air pressure, temperature, and other factors. Air is in service to humans and other aerobic animals. Humans become-with air. Air is entangled in a long-term relationship with the evolution of life, each effecting the other in an ongoing cycle.¹³

The air on Earth becomes atmosphere where it is unfamiliar, through altitude/verticality, for example. At the farthest (lightest/shallowest) edges of air, where it gradates into the vacuum of space, the outer limits are called the

¹³ M. Bakke, "Deep Time Environments: Art and the Materiality of Life Beyond the Human," *Journal of Electronic Publishing* 19, no. 2 (2016); M. W. Claire, "Clues to Atmospheric Evolution in Earth's Ancient Sediments," *Mineralogical Magazine* 77, no. 5 (2013).

upper atmosphere.¹⁴ Where the air is not breathable, it is stripped of its title and sublimates into the term *atmosphere*.

Air is not static and has changed drastically over the course of the Earth's history, oscillating between being affected by life and effecting how life can evolve.¹⁵ Tracing life back through time, through the five distinct extinction events, through changes to climate, the breathable air alters drastically.¹⁶ The earliest gaseous chemistry on Earth was mostly hydrogen, followed by carbon dioxide and methane and sulphur; these are all referred to as early atmospheres.¹⁷ As such, air has local temporality, becoming atmosphere when the chemical make-up does not support human life, such as in these previous eras in the deep history of life on Earth.

Hence, air is a human invention. Air is local to our planet, and also to our current time and species. Air is defined by (or through) its ability to support

¹⁴ Richard A. Anthes, "The Atmosphere," (Columbus, Ohio: Columbus, Ohio : C. E. Merrill Pub. Co., 1975). 5.

¹⁵ See J. R. Petit et al., "Climate and Atmospheric History of the Past 420,000 Years from the Vostok Ice Core, Antarctica," *Nature* 399, no. 6735 (1999); Susan Solomon et al., "Irreversible Climate Change Due to Carbon Dioxide Emissions," *Proceedings of the National Academy of Sciences of the United States of America* 106, no. 6 (2009). Robert A. Berner and Donald E. Canfield, "A New Model for Atmospheric Oxygen over Phanerozoic Time," *American Journal of Science* 289, no. 4 (1989): 333–61; P. N. Pearson and M. R. Palmer, "Atmospheric Carbon Dioxide Concentrations over the Past 60 Millions Years," *Nature* 406, no. 6797 (2000): 695–99; A. Bekker et al., "Dating the Rise of Atmospheric Oxygen," *ibid.* 427, no. 6970 (2004); Gabrielle Walker, *An Ocean of Air: Why the Wind Blows and Other Mysteries of the Atmosphere*, 1st ed. (London: Bloomsbury, 2007). Paul J. Crutzen and Veerabhadran Ramanathan, "The Ascent of Atmospheric Sciences," *Science* 290, no. 5490 (2000); Julia Pongratz et al., "Coupled Climate–Carbon Simulations Indicate Minor Global Effects of Wars and Epidemics on Atmospheric Co₂ between Ad 800 and 1850," *The Holocene* 21, no. 5 (2011).

¹⁶ P. E. Cloud, "Atmospheric and Hydrospheric Evolution on the Primitive Earth. Both Secular Accretion and Biological and Geochemical Processes Have Affected Earth's Volatile Envelope," *Science (New York, N.Y.)* 160, no. 3829 (1968); Elizabeth Kolbert, "The Sixth Extinction?," *Science World* 71, no. 11 (2015); James Hatley, "The Virtue of Temporal Discernment Rethinking the Extent and Coherence of the Good in a Time of Mass Species Extinction," *Environmental Philosophy* 9, no. 1 (2012).

¹⁷ George H. Shaw, *Earth's Early Atmosphere and Oceans, and the Origin of Life*, ed. SpringerLink, 1st ed 2016. ed. (Cham : Springer International Publishing : Imprint: Springer, 2016); Anthes, "The Atmosphere." Claire, "Clues to Atmospheric Evolution in Earth's Ancient Sediments."

human life. But what if human life alters the air such that it no longer supports human life?

This time, when the world's collective attention is drawn towards the air as a mode to think through the climate crisis and our interconnectedness as humans, stimulates reflections about the decisions we make and how they reverberate across borders and vertically to where the air meets space. The following dissertation takes a material, political, imaginative and creative approach to interrogating the place that air can hold in ongoing discourses around the climate crisis.

1.2 The physicality of the material air in art

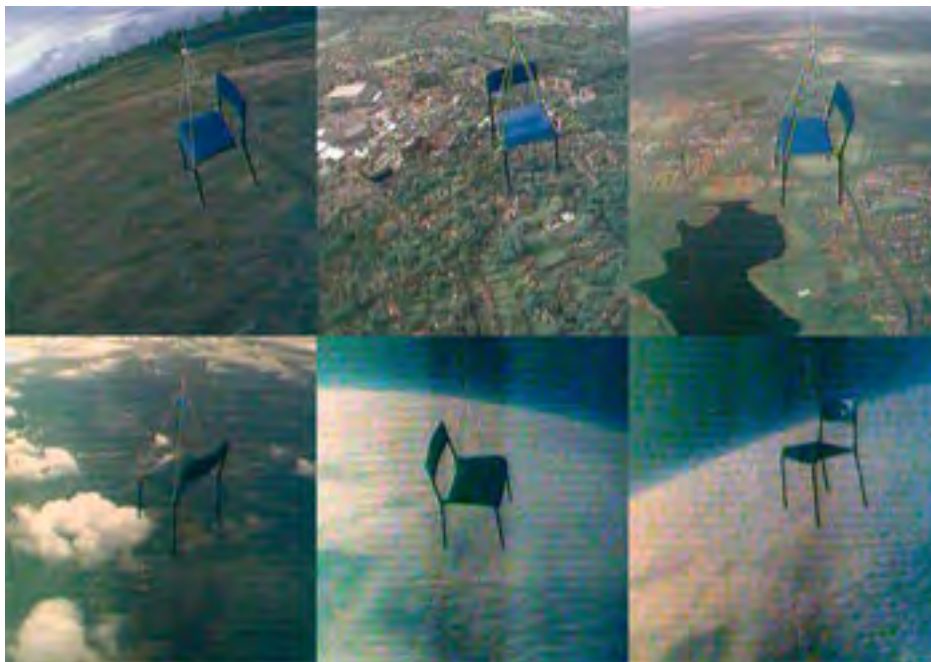


Figure 3. Simon Faithfull, *Escape Vehicle no. 6*, 2004, 25 min, video still. © Simon Faithfull
<https://www.simonFaithfull.org/works/escape-vehicle-6>.

A chair is lifted through the layers of the Earth's atmosphere, compelled upward by the lightness of helium contained within a weather balloon. A camera records the journey from the vantage point of the balloon, keeping the

chair, tied with rope, in frame. The sound of the GPS tracker ticks along like the tidal breathing of the viewer, the only sound besides the dulled baffling of air as the balloon ascends. The familiar shapes of fields, roads, and houses shrink underneath the chair, or are obscured by clouds — not unfamiliar, as it resembles the view from a plane. Digital noise crackles and bands across the image in flashes. The chair is suspended calmly. A cheap, mundane office chair tranquilly occupies the field of vision, as unaffected as it may look snug at a desk alongside a dying pot plant. The chair climbs as it turns and swings, the light dancing off it as the directions shifts. The chair, now much higher than expected, quivers the knees whilst at the same time abstracting the original view, high enough to feel the size, shape, and location of the planet within a solar system. The sky is now below, marbling the Earth, and above is the blackness of space. The chair and GPS tracker are constants. Some invisible line is crossed and suddenly the camera twists out of control; the chair recoils on its rope and jolts, dashing in and out of the frame that has until now held it so gently. The chair twists and shudders violently, tangles in the rope, a leg flies out of frame back to Earth. The chair is battered by an invisible force, breaks. And then. Is gone. It is plummeting to Earth, out of frame. The sound is cut and for a few minutes the clouds above the Earth and the blurred line into space silently remain in frame.

This is Simon Faithfull's *Escape Vehicle no. 6* (2004).¹⁸ It is the sixth in a series, evocatively titled *Escape Vehicles*, that show attempts to flee from Earth's relentless gravity and the stories that occupy those at the surface.

¹⁸ Simon Faithfull, *Escape Vehicle No.6*, 2004. Performance and video of chair being lifted into space. Arts Catalyst. <https://www.simonFaithfull.org/works/escape-vehicle-6>.

This work is useful to think through and about air. In twenty-five minutes, *Escape Vehicle no. 6* shifts in scale, from the specific, the human, to the scale of the planet and beyond. It is unanchored, carried by invisible currents through the space between the surface and the beginning of space. This seeming void is filled with air. Benign at first, but then violent, buffeting. A violent end to the notion of escape. There is no escape. Thinking at the planetary scale is enduring. The 'now' of the mass manufactured office chair is confronted with the cosmic time of the planet. The air persists through cosmic time, changing in response to life on Earth, and other Earth systems, caught in a cycle that tangles how life and the air shape one another.

Art is able to make the intimately familiar alien, and to shift perspective from the expected to the surprising. As with Simon Faithfull's *Escape Vehicle no. 6*, the fantasy of verticality, of flight, of freedom, of floating, is disrupted by the physical reality of air. The focus shifts from the chair and the view of the Earth below to the invisible violent presence of the unseen material of air.

Air is a material of movement, of scale, of force, of endurance, of transformation.

1.3 An urgency in air

The International Panel on Climate Change tracks greenhouse gas emissions globally, records the rate of increase, projects the rate of global heating and subsequent knock-on effects of these material changes.¹⁹ Records are broken at

¹⁹ P. Zhai V. Masson-Delmotte, H. O. Pörtner, D. Roberts, J. Skea, P.R. Shukla, A. Pirani, W. Moufouma-Okia, C. Péan, R. Pidcock, S. Connors, J. B. R. Matthews, Y. Chen, X. Zhou, M. I. Gomis, E. Lonnoy, T. Maycock, M. Tignor,, "Global Warming of 1.5°C. An IPCC Special Report on the Impacts of Global Warming of 1.5°C above Pre-Industrial Levels and Related Global Greenhouse Gas Emission Pathways, in the Context of Strengthening the Global Response to the Threat of Climate Change, Sustainable

an accelerating rate,²⁰ and local events, such as the 2019–2020 Australian bushfire season, have global consequences (and global causes).²¹

The contemporary collective consciousness reckons with the material reality of the climate crisis, and the causal role that human action plays in precipitating change. The air is a contested material of the climate crisis and a highly political space in this current moment. It is imperative to interrogate these materials and our relationship with them, and other forms of life on Earth. It is an urgent time to centre air in our reckoning.

The arts and creative practices are capable of decentring a familiar narrative of (hu)man redemption through technology, sciences, and governance. Artworks can build worlds, test visions, reconfigure innovative futures, tangible alternative presents, and bring the audience member into a haptic, physiological, and emotional proximity to possibility.

The body of works developed alongside this dissertation are called *AIR WORKS*: installation and performance works that use the material of air as a key tool to communicate in an intellectual and physical register. The *AIR WORKS* present the audience with an intimate physical and conceptual encounter with air. The delicate balance of gases that surrounds the planet sustains life,

Development, and Efforts to Eradicate Poverty," in *IPCC, 2018: Summary for Policymakers*, ed. T. Waterfield (Geneva, Switzerland: World Meteorological Organization, 2018).

²⁰ National Oceanic and Atmospheric Administration National Centers for Environmental Information NOAA National Centers for Environmental Information, "State of the Climate: Global Climate Report for Annual 2019," (published online <https://www.ncdc.noaa.gov/sotc/global/201913>: National Oceanic and Atmospheric Administration, 2020); Australian Bureau of Meteorology, "Annual Climate Statement 2019," in *Annual Climate Statement* (Bureau of Meteorology 2020).

²¹ Science Australian Government Department of Industry, Energy and Resources, "Estimating Greenhouse Gas Emissions from Bushfires in Australia's Temperate Forests: Focus on 2019-20," (Published online <https://www.industry.gov.au/sites/default/files/2020-04/estimating-greenhouse-gas-emissions-from-bushfires-in-australias-temperate-forests-focus-on-2019-20.pdf>: Australian Government, 2020)..

supplying our bodies with the resources needed to maintain peak physical and mental health. The pressure of air on and around us keeps our insides in the right place, sustains flight, and spreads sounds, dust, and animals across space. The invisible nature of air requires imagination to comprehend, and this freedom of thought activates an exciting potential to create. Differences to any of these qualities render the air unfamiliar. These artworks playfully interrogate these qualities of familiar air to make lyrical, politically potent, physical and imaginative engagements through performance and ephemeral installation.

1.4 Situating the research

This practice-based research is positioned at the intersection of contemporary art practice, materials research into air, and the findings and theories of the climate emergency.



These subject areas are connected through air. The research and studio practice loop and feed back into themselves through heuristic experimentation. The process of making work feeds into the research and the research feeds into the practice of making. These research fields are connected through air as a practical material and as fodder to consider theory and imagination.

This work is underscored by a feminist methodology, elevating and emphasising female and non-binary writers, artists, and theorists where possible. Feminism inhabits the principles of my practice and permeates through my studio exploration and expectations of feminist futures.

The AIR WORKS that are developed through this thesis are performances and ephemeral installations that use air, different compositions of the gaseous components of air, chemical volatiles that are carried in air, consciously released artificial additions to air, and the body of the audience member, who experiences the work and has a physiological encounter with air.

1.5 A disciplinary context for considering air

The AIR WORKS and accompanying scientific and theoretical research straddles both the praxis of contemporary art and its theoretical underpinnings. These fields overlap and inform my evolving studio practice. This section describes the historical precedents, the key figures in the lineage of these fields, and establishes the significant contemporaries within each field the AIR WORKS draw from.

The rich material, conceptual, and formal history of Western art is first excavated below, followed by the commensurate excavation of the field of environmental humanities. The scientific fields that feed in to both the subject and materials of the AIR WORKS, such as the atmospheric sciences, geological chemistry, or human breathing physiology, are integrated throughout the paper. Their links to specific AIR WORKS are referenced throughout the close analysis contained in each chapter.

1.5.1 Art context

The AIR WORKS encompass artistic disciplines using performance, ephemera, installation, and sculpture. The aesthetic is shaped by, but distinct from, conceptual art, ecofeminist art, art-science, and the aesthetics of climate crisis discourse. It is part of a contemporary turn that cannot be accurately expressed

in art-historical terms and is entangled with our contemporary environmental cataclysm and the current mood in global geopolitics and media.

Formally rooted in a lineage from the conceptual artists of the 1960s and 1970s, precedents to the AIR WORKS include Robert Barry, Joseph Kosuth, Yves Klein, John Baldessari, and others. The conceptual artists proposed that the concept, action, and process are more important than the final art object. The meaning of a given work is entirely separate from the physical manifestation of that idea. The art object is hence arbitrary and perfunctory, merely a trace recording of the idea as art. Art is the idea and need not necessarily be made physical.²² Language and ideas in this way undermined the primacy of the hitherto revered art object. This elevation of idea over object shattered previous ideals of art and aesthetics as beauty and refinement, and its modes of representation.

In her 1973 book *Six Years*, Lucy R. Lippard outlines, interrogates and catalogues the new style of art-making — Conceptual art with a capital ‘C’: “Conceptual art, for me, means work in which the idea is paramount and the material form is secondary, lightweight, ephemeral, cheap, unpretentious and/or ‘dematerialized’”²³ The book takes the form of an annotated photo-essay and collection of documents and interviews that chronicle the period from 1966 to 1972 during which Lippard maintains conceptual art effectively *dematerialised* the art object. Often touted as a conceptual work itself, the

²² See also Kavior Moon, "From Air to Architecture," in *Conceptualism and Materiality: Matters of Art and Politics*, ed. Christian Berger (Leiden: Brill, 2019). 79; Sol Lewitt, "Paragraphs on Conceptual Art," *Artform* 10, no. Summer (1967).

²³ Lucy R. Lippard, *Six Years : The Dematerialization of the Art Object from 1966 to 1972* (London: London : Studio Vista, 1973). vii. Originally published by Praeger, New York and Studio Vista, London, the book's full title is *Six Years: The dematerialization of the art object from 1966 to 1972: a cross-reference book of information on some aesthetic boundaries: consisting of a bibliography into which are inserted a fragmented text, art works, documents, interviews, and symposia, arranged chronologically and focused on so-called conceptual or information or idea art with mentions of such vaguely designated areas as minimal, anti-form, systems, earth, or process art, occurring now in the Americas, Europe, England, Australia, and Asia (with occasional political overtones) edited and annotated by Lucy R. Lippard.*

book opens by acknowledging the cultural and social movements of the time, namely the "Civil Rights Movement, Vietnam, the Women's Liberation Movement, and the counter-culture."²⁴ In the introduction to a later edition of the book, Lippard recalls that an atmosphere of imagining the deconstruction and reconfiguring of structures of the patriarchy and the establishment in the wider culture of the late 1960s opened the door for the full scope of the artists' imagination to counter and rebel, "unfettered by object status."²⁵

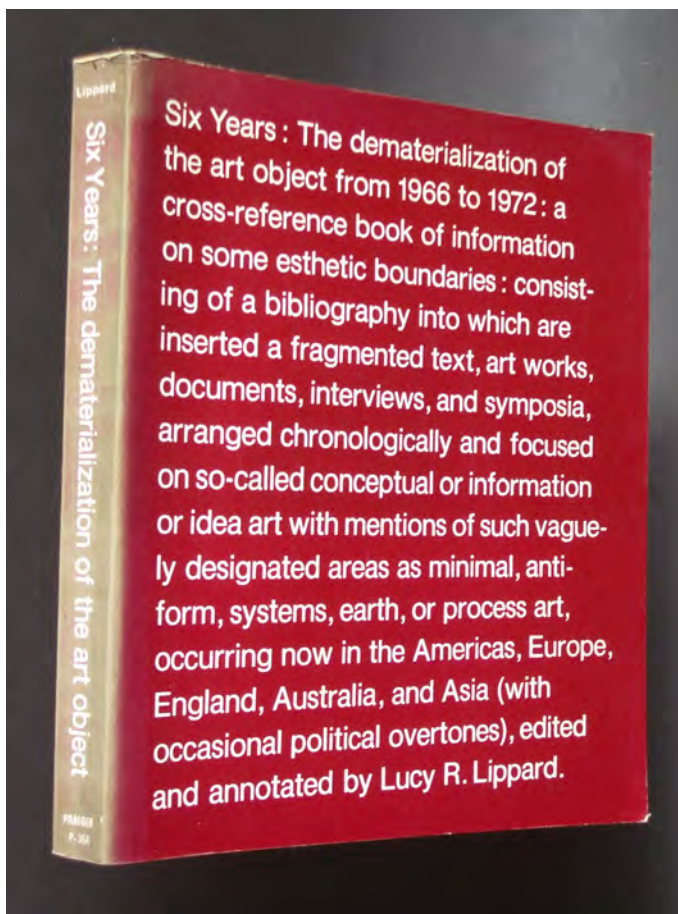


Figure 4. Cover of Lucy Lippard's *Six Years*, 1973, published by Praeger, New York and Studio Vista, London. Image from <https://www.abebooks.co.uk/book-search/title/years-dematerialization-art-object-1966/author/lucy-lippard>.

²⁴ Ibid.

²⁵ Ibid.

Air was used as a dematerialised object in the practices of a number of conceptual artists, including Marinus Boezem's 1965 *air doors*,²⁶ Yves Klein's *Void Room* (1961),²⁷ Robert Smithson's museum devoted to emptiness (1967),²⁸ and Art & Language's *The Air-Conditioning Show* (1966–67), amongst others.

The dematerialised and invisible nature of air for the conceptual artists was a handy analogue to express ideas of objecthood through air, where there is seemingly no material.

One of the fiercest efforts to engage air-the-material in an architectural mode is by Yves Klein and architect Werner Ruhnau (and later architect Claude Parent) and their ongoing project *Architecture de l'air*, that aimed to create structures, walls, ceilings, furniture, and other objects from pressurised planes of air.²⁹ The physical transparency of air architecture for Klein promoted a political and social transparency. This is an invisible architecture navigated by emotional, psychological and sensory apparatus. The function of this "immaterial" material included "vast envelopes of air that would cover entire cities and protect their inhabitants from adverse weather conditions. What Klein ultimately sought with his air architecture was a utopic return to Eden."³⁰

The art group Ant Farm, established in 1968, were also influenced by ideas of utopian sites and communities that resisted nascent consumerism. Ant Farm used air as architecture through inflatable structures intended to contribute to

²⁶ C. Berger, *Conceptualism and Materiality: Matters of Art and Politics* (Brill, 2019). 3. Marinus Boezem, *Air Doors*, 1965. Installation using warm and cool air. "Show V".

²⁷ Bakke, *Going Aerial: Air, Art, Architecture.*, 11–12.

²⁸ Robert Smithson, *Museum Devoted to Emptiness, Dialogue with Allen Kaprow*, 1967. Robert Smithson: The Collected Writings, ., 44.

²⁹ Moon, "From Air to Architecture." 70-77.

³⁰ Ibid. 77.

peripatetic and communal living.³¹ The inflatable as a form of architecture was dynamic, transportable, and questioned the impulse to build lasting structures for posterity. The inflatables presented an ideal of participatory architecture that adapts to change.

Conceptual art group Art & Language, comprising Terry Atkinson and Michael Baldwin, produced *The Air-Conditioning Show* (1966–67), where the airflow from the gallery's air-conditioning unit is listed as one of the works of art.³² This exhibition reinforces the priority attributed to language to express an idea rather than an object, in this case the pre-existing infrastructure of the gallery and its description in the room sheet. The gallery setting elevates the infrastructure as artworks whilst remaining as inobtrusive as possible.

³¹ Constance Lewallen, *Ant Farm, 1968-1978*, ed. Chip Lord and Steve Seid (Berkeley: Berkeley : University of California Press : Berkeley Art Museum : Pacific Film Archive, 2004).

³² Moon, "From Air to Architecture." 78.



Figure 5. Yves Klein, *Leap into the Void*, 1960, 4 Rue Gentil-Bernard, Fontenay-aux-Roses, France. © Harry Shunk and Janos Kender J. Paul Getty Trust, The Getty Research Institute, Los Angeles (2014) and Estate of Yves Klein.

Air in these contexts is either a substitution for solid objects, walls, chairs, roofs, or a shorthand stand-in for nothingness, emptiness, or the void. Klein's *Leap into the Void* (1960) is a composite photograph that depicts the artist leaping off the roof seemingly into nothing. His 1958 exhibition *La spécialisation de la sensibilité à l'état matière première en sensibilité picturale stabilisée: Le Vide* (*The Specialization of Sensibility in the Raw Material State into Stabilized Pictorial Sensibility: The Void*), commonly known as *The Void*, presented an

entirely empty gallery, a void. Both of these works presuppose a space that is empty of objects to be a void; they are both, however, filled with a dynamic, noisy, rich, complex material: air. In these works, the mission to entirely separate the language and idea from the material is problematised by the presence of the material of air.

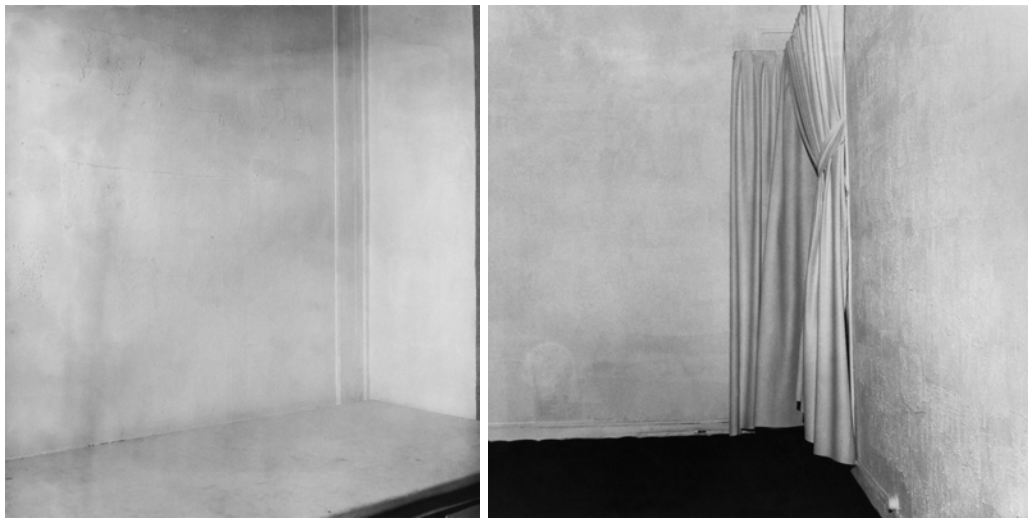


Figure 6. Yves Klein, installation view of *The Void*, 1958, Gallery Iris Clert, Paris.

To a contemporary feminist reader, there is complicated social politics surrounding these works. The artists clustered around this conceit are significantly, if not all, male. The register is of a self-satisfied contrarian with a pinch of smarmy entitled male arrogance, or at best a 'clever tyke,' like a boy who feels he has outsmarted his teacher. Often accompanied by expansive manifestos and essays, these works broke the preceding conventions in art and paved the way for exciting new modes of expression and discourse.

It is noteworthy that Lippard, a self-described feminist art critic, curator, and activist, details an over-representation of white male artists in *Six Years*. The representation of women in the history of the conceptual art movement is not equal to their male counterparts. Whilst this movement is not exclusively male,

it is dominated by white male artists. The 2012 exhibition at the Brooklyn Museum, *Materializing 'Six Years': Lucy R. Lippard and the Emergence of Conceptual Art*, purposely reflects upon the era of conceptual art by reviewing Lippard's original anthology. In the process of reflecting on her work, Lippard acknowledges the disparity of gender representation in the original *Six Years*. Criticism of gender inequality after her original publication in the early seventies compelled Lippard to subsequently create and promote women-only projects.³³

These conceptual artists' objection to 'retinal'-based artworks critically operate as a response to the established artworld's inflated valuing of the art object.³⁴ It challenged prevailing notions of ownership, commercialisation, and collecting, whilst maintaining support from the establishment (museums and collectors).³⁵ The artistic freedom produced by the culture and politics of 1960s and '70s America was still underpinned by capitalist and patriarchal structures. As such, these works are self-reflexive of the art world, and the popular narrative of the celebrated male-genius artist.

Many of the conceptual artists' works are largely inward-looking, reflecting on the rarefied notion of art, but at the same time expanding the forms that art can take, interrogating what art is and what art can be. The legacy left by the conceptual artists is significant, elevating an emphasis on the artistic idea, and the implications of process on meaning.

In contrast, the contemporaneous second-wave feminist movement in society sought to respond to an expanded place in the world, both politically and

³³ Ken Johnson, "Planter of the Seeds of Mind-Expanding Conceptualism " *The New York Times* 2012., <https://www.nytimes.com/2012/10/19/arts/design/lucy-r-lippard-and-conceptual-art-at-brooklyn-museum.html>.

³⁴ Moon, "From Air to Architecture." 79.

³⁵ B. Buchloh and R. Barry, "A Conversation with Robert Barry *," *October*, no. 159 (2017).

environmentally.³⁶ Ecofeminism within the Western canon of art history is born in the confluence of second-wave feminism in the 1960s and 1970s and the growing empirical understanding of the breadth and dimensions of our current climate crisis and its causes.³⁷ In essence, ecofeminist art is a response to feminist and ecological concerns through artistic expression. Artworks such as Judy Chicago's *atmospheres* exemplify this feminist turn to the landscape and the changing environment at large.

³⁶ Craig Owens, "The Discourse of Others: Feminists and Postmodernism," in *The Expanding Discourse : Feminism and Art History*, ed. Norma Broude and Mary D. Garrard (New York: New York : Routledge, Taylor & Francis Group, 2018). 488.

³⁷ Deborah Mathew, "What Is Ecofeminist Art?," *Women & Environments International Magazine*, no. 52/53 (2001).



Figure 7. Judy Chicago, *Immolation*, 1972. Artist Rights Society, New York. Photograph courtesy of the artist and Through The Flower Archives.

Beginning in 1968, Chicago's ephemeral smoke works were performed mostly in the desert, sometimes adorned, with the naked female form painted in supplementary colours, languorous amongst the smoke. The works aspire to "feminise the landscape," to use Chicago's own phrase.³⁸ Again, a contemporary feminist view of these works take issue with the requirement for the female form to be slender and denuded to contrive a female presence. The conflation of femalehood and nature is objectionable.

³⁸ Prudence Peiffer, "Judy Chicago," (New York: Artforum Inc., 2014).

Often the image of mother earth, or the goddess, is invoked.³⁹ So too is the long-held assumption that women are somehow closer to nature than men, portraying nature as female, and women as “not exactly human.”⁴⁰ In this understanding woman is nature, she is as turbulent as the weather and forbearing as the desert, she is intransigent, volatile, and irrational, but also soothing, comforting, healing and mystical. In this role, the female is like nature, a passive resource for the mastering and exploitation by urban progress; by Man. How and why landscape in Chicago’s work is designated masculine, and smoke feminine is cultural I suppose, and the naked female forms amongst the smoke do more to propagate a male gaze than to critique it. It also frames the environment through a human lens. However, woman is not nature, and nature is not female: this conflation denies the complex interrelations of interspecies and earth systems. Feminism and art have both moved on, and anyway, “I would rather be a cyborg than a goddess.”⁴¹

The disregard, or perhaps simply neglect for material is apparent in Chicago’s atmospheres. The effort to “feminise the landscape” dominates it with artificial smoke comprised of colour and potassium powder.⁴² The material reality of the act inflicts copious amounts of artificial aerosols into the atmosphere, where they are forgotten, blown away, but are of course retained in the air. The material is not from the Earth but is an artificial (hu)man-made hyper-material

³⁹ Gloria Feman Orenstein, "The Greening of Gaia: Ecofeminist Artists Revisit the Garden," *Ethics and the Environment* 8, no. 1 (2003). 103–104; Josephine Withers, "Judy Chicago’s Dinner Party: A Personal Vision of Women’s History," in *The Expanding Discourse : Feminism and Art History*, ed. Norma Broude and Mary D. Garrard (New York: New York : Routledge, Taylor & Francis Group, 2018).

⁴⁰ S. Alaimo, *Undomesticated Ground: Recasting Nature as Feminist Space* (Cornell University Press, 2000). 2–3.

⁴¹ Donna Haraway, "A Manifesto for Cyborgs: Science, Technology, and Socialist Feminism in the 1980s," *Australian Feminist Studies* 2, no. 4 (1987). 37.

⁴² FireSense, "Smoke Bomb Bvs," in *Material Safety Data Sheet* ed. Brandax (Norwest, NSW: FireSense, 2019).

that references a similar phenomenon in nature: smoke. This material leaves scorch marks on the ground, plastic waste, and smoke in the air.

The ecofeminists *did* however turn their attention to the scale and urgency of environmental destruction, and the need to reconfigure the patriarchal structures of the art world and the wider society in order to address it.

Conceptual art, ecofeminist art; these terms are loaded historical affixes, reflecting the politic and artistic aesthetics of the day. Neither are appropriate terms for contemporary art in our current climate crisis, where knowledge of the full extent of our environmental catastrophe is at its apogee. However, both the work of the conceptual artists and the ecofeminist artists influence contemporary work and can be observed in both the form and content of the AIR WORKS.

Art-science is an increasingly popular term often deployed to describe works that engage with the findings of scientific studies, or that are developed in a scientific research environment, sometimes in response to or alongside a scientist or in a laboratory. Art-science, and its sisters bio-art and techno-art, is most often ascribed to work that has a didactic quality, uses the materials of the scientific lab, or has a clear underpinning of research in or adjacent to scientific findings or arrived at through the scientific method. The term is also used for work visualising data or rendering findings within the scientific paradigm. Art-science is "a heterogeneous space of overlapping interdisciplinary practices at the intersection of the arts, sciences and technologies," a way to contextualise the findings in science and be able to communicate it to a non-specialist audience via artistic expression.⁴³ Art-science is instructive, comes with a

⁴³ Georgina Born and Andrew Barry, "Art-Science," *Journal of Cultural Economy* 3, no. 1 (2010). 103–4.

mandate to educate its audience, and is often furnished with a scientific aesthetic: test tubes, petri dishes, DIY bioreactors, graphs, electronics, spreadsheets, and so on. At its zenith the promise of art-science's transdisciplinarity benefits both fields in ways that non-collaboration cannot, such that new creative knowledge is generated.⁴⁴

A popular approach to art-science, as evidenced through the many programs offered by art-science organisations within Australia, is to foster relationships between artists and a scientist or research team. Organisations such as ANAT (the Australian Network for Art and Technology), SymbioticA, and Experimenta connect artists with accessible scientific environments. Overwhelmingly, these opportunities support the artist in a scientific lab, paired with a researcher to share perspectives and techniques, rather than supporting a scientist in an art studio. Notable projects that have been developed through this arrangement includes Cat Jones' *Somatic Drifts* (2014). Jones developed a technologically mediated one-to-one performance that uses clinical techniques to ease the residual pain in amputated limbs to explore transhuman and interspecies empathy. Through performance, touch, and illusion, the work tricks the senses into believing that the audience member's extremities are transformed into animal and plant appendages. The art-science collaboration privileges the artistic over the scientific research objectives, the project's goal being to create an intimate performance work that tests the plasticity of human perceptions. Data generated from the artwork developed a set of protocols and procedures for safely bringing a patient into, and out of, the meditative state associated with the project.

⁴⁴ Ibid, 104.



Figure 8. Cat Jones, *Somatic Drifts*, 2014, performance documentation, Adhocracy, Vitalstatistix, Adelaide. Image courtesy of the artist.

Similarly, art-science artworks may be driven by novel or specialised technological apparatus, such as Maria Fernanda Cardoso's *Museum of Copulatory Organs*, presented at the Biennale of Sydney on Cockatoo Island in 2012.



Figure 9. Maria Fernanda Cardoso, *Museum of Copulatory Organs*, 2012, documentation photograph at Cockatoo Island, Biennale of Sydney, 2012. From www.mariafernandacardoso.com/documentaries/animal-art/moco-exhibition.

Amongst other paraphernalia, this work presents 3D-printed replicas of the copulatory organs of insects, enlarged to a human scale. The severed and enlarged insect penises are stored in vitrines and resemble exotic flower heads or coral. Their bleached colour is a quality of the material of the 3D printer. The (then) novel technology facilitates a 3D rendering of the organs rather than a two-dimensional microscopic image.

The title suggests the museological lineage of natural history collections and cabinets of curiosity, designating the work as museum object rather than contemporary artwork. Co-opting the science display aesthetic suggests an authenticating framework for the fine, detailed study of such appendages. The rational scientific gaze moderates the sexual nature of the genitalia. Cardoso says of her work:

In order to better understand the objects of art and science, one needs to understand their contexts; and in order to innovate, one needs to experiment with contexts and frameworks for the effective communication of original ideas that can be expressed through objects and other aesthetic components. The concept and the 'template' of the museum provided me with the first and most fundamental elements of the context I needed.⁴⁵

The tools and apparatus of science and technology used to make Cardoso's *Museum of Copulatory Organs* are utilised to manifest the artist's vision, rather than contribute to science knowledge. This does not necessarily detract from its

⁴⁵ Maria Fernanda Cardoso, "The Aesthetics of Reproductive Morphologies" (University of Sydney, 2012). 29.

validity as an artwork but challenges the promise of art-science as being advantageous to both fields. Cardoso's work references scientific frameworks, history museums, and aesthetics to evaluate and possibly to justify the act of study and looking closely.

Another approach to art-science is the citizen scientist, a participatory practice where non-specialist members of the public collect and contribute data towards a scientific and cultural objective. This could include reporting observational data or collecting/making experiments as a community of citizen scientists, led either by an artist, a research group, or a scientist, or a mixture of all three. Beatriz da Costa's *Pigeon Blog* (2006–2008) uses homing pigeons equipped with GPS trackers and air pollution sensors to track and record localised air pollution.⁴⁶ Described by the artist as a collaboration between artists, scientists, pigeon fanciers, and pigeons, the work tracks air quality in real-time and visualises the data for the public to access. The project mandate explores interspecies cooperation and spreads awareness of air quality and air pollution. Whilst an admirable community engaged project, the art and science claims lack rigour. The data captured is not exhaustive and only records localised data left to the agency of the pigeon. The citizen scientist participant directly engages in forms of pedagogy in order to learn about and reflect on the quality of their shared environment; however, this may more comfortably be described as a workshop than an artwork. Citizen science projects are valid participatory events in their own right that need not require the label of art.

⁴⁶ Anonymous, "Pigeons to Set up Smog Blog," *New Scientist* 189, no. 2537 (2006).



Figure 10. Beatriz da Costa, *Pigeon Blog*, 2006–2008, test flight image from 01 Festival, www.nideffer.net/shaniweb/pigeonblog.php.

The claims of mutually beneficial knowledge generation in art-science projects often risk disingenuous engagement with one of either field, or with both. Researchers in interdisciplinary science, Charlotte Sleigh and Sarah Craske, write that the mandate of the art-science project "sacrifices the specific critical expertise of art, fetishizes tech at the expense of science and selectively ignores institutional problems inherent in funding and power structures."⁴⁷

I resist the use of the term *art-science* in relation to my practice as rarely does the designation benefit either field. Art-science embodies the idea that the science justifies the art to make it palatable to non-art audiences, or that art relaxes the required rigours of the scientific method and peer review. Projects achieved under this paradigm may provoke discourse around controversial scientific discoveries, or may aestheticise scientific findings. Science has a

⁴⁷ Charlotte Sleigh and Sarah Craske, "Art and Science in the UK: A Brief History and Critical Reflection," *Interdisciplinary Science Reviews* 42, no. 4 (2017). 314.

connotation of empiricism, of disinterested neutral objective knowledge creation, of cool, level-headed male discussion in the quest for pure, unbiased answers: that science is sensible and rational rather than oblique or difficult, or has emotional or affective underpinnings that belong to the opaque realm of art. That is not to say that there is no room to make a feminist critique of this through the application of art-science projects. Clearly, the female artists discussed above challenge this male-centred culture via their very presence in the field and the space their works occupy.

Georgia Born and Andrew Barry note in their essay on art-science, "Science is understood as complete, and as needing only to be communicated or applied, while art provides the means through which the public can be assembled and mobilized on behalf of science."⁴⁸ This interpretation of art-science suggests that art's greater capacity to communicate to audiences positions it as a science ally, a way to explode discourses. Even though art does sometimes have this ability, this interpretation of art-science leaves no room for the poetic, the metaphorical, the uncertain, or wonder. It is literal and combative, often made to provoke legal and ethical discussions about the applications of science.

⁴⁸ Born and Barry, "Art-Science." 103–4.



Figure 11. Jalila Essaïdi, *2.6g 329m/s*, 2011–13, also known as *Bulletproof Skin*, produced in collaboration with the Forensic Genomics Consortium, Netherlands. Image from <https://jalilaessaidi.com/2-6g-329ms>.

Artworks such as Jalila Essaïdi's *2.6g 329m/s* (2011–13), also known as *Bulletproof Skin*, that creates reinforced human skin with spider silk generated using genetic hybrid spider-goat's milk,⁴⁹ or self-described transgenic artist Eduardo Kac's glowing synthetic bio-bunny *Alba* (2002), present a living object and a tangible media narrative to stimulate discourses over the ethical, legal, potential applications and future uses of synthetic biology.⁵⁰



Figure 12. Eduardo Kac, *Alba*, 2002. Courtesy Henry Art Gallery. Alba is a transgenic albino rabbit: she contains a jellyfish gene that makes her glow green when illuminated with the correct light. Alba was created by French scientists who injected green fluorescent protein (GFP) from a Pacific Northwest jellyfish into the fertilized egg of an albino rabbit.

⁴⁹ Jalila Essaïdi, *Bulletproof Skin : Exploring Boundaries by Piercing Barriers* (2012)..

⁵⁰ There are many artists and artworks that could illustrate this point. Much of this art resides in the field of bio-art, which is within the art-science paradigm.

Where art-science is helpful is in acknowledging the meaning in the material of artworks. Where the conceptual artists elevated the idea above all physical result of the idea, art-science practitioners reintegrate the material as crucial in meaning-making.

The body of works developed as AIR WORKS integrate the meaning of the material, the actual, as a stepping-off point into wonder, an invitation to expand in thought via the material and the accompanying storytelling. These works respond to and play with the findings of the natural sciences and encompass the politics of the climate crisis. It is influenced by predecessors in conceptual art, ecofeminist art, and art-science; however, there is no term that fully describes this contemporary turn in artistic expression relating to environmental change and the climate crisis. I place my practice outside of the art-science paradigm as my work makes no claim of contributing to scientific knowledge. The AIR WORKS exist as ephemeral installations and performances that respond to and integrate broader discourses within the sciences and politics, distilling the social, political, material, and scientific into direct experiences.

Instead, I propose a new term, embodied climates, which could cover not only artworks, but also community activations, political responses, or experiential sciences. This term incorporates the social and political dimensions of climates, with an emphasis on the condition of lived experience. Embodied climates encompass the material of the audience body, a consideration to the enduring nature of materials that casts conditions on to a future climate.

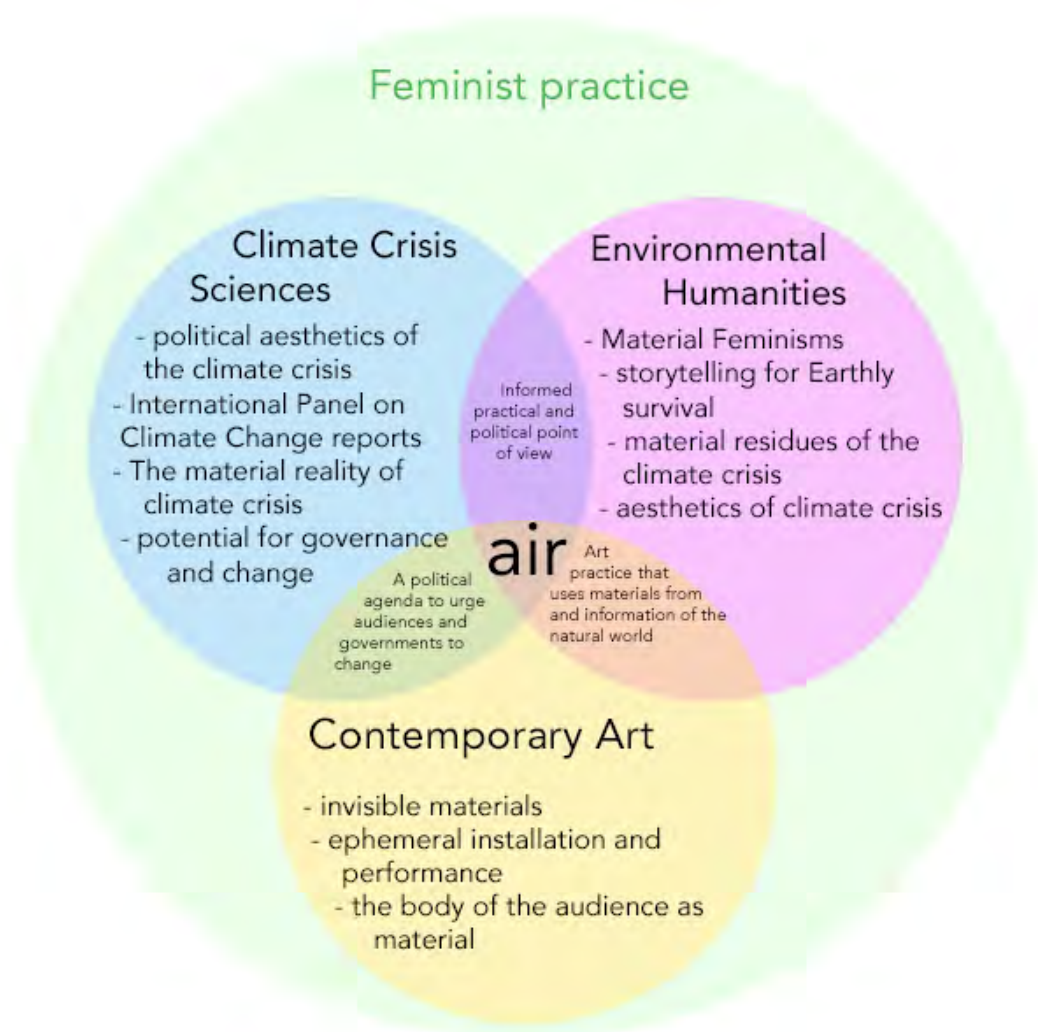
Crucially, whilst having roots in the conceptual art and ecofeminist art of the 1960s and '70s, the style of the AIR WORKS presented here reintegrate the material in both concept and form. The relationship between concept and form

is interrogated in chapter 2 of this dissertation, through the group of theorists in the environmental humanities that consider *material feminisms*. The relationship with material may be ephemeral but may also be enduring and dispersed. What is unique in these works is the consideration of the material as being both literal and notional, and the reliance on the body as a material receiver. Knowledge is acquired through haptic, physiological processes as well as intellectually.

Contemporary artists that practice in a similar aesthetic, expressive mode, and conceptual process include Latai Taumoepeau, Katie Paterson, Olafur Eliasson, and Teresa Margolles. These artists' works are interrogated in more detail throughout the following chapters, but all of these artists consider political and environmental concerns and integrate materials and processes into meaningful installations and performances. The tactile material encounter with the body of the viewer or performer is critical. The idea and material together create the meaning of the works.

1.5.2 Environmental humanities context

The AIR WORKS are developed through a studio practice-based material engagement with a changing climate and air, and its relationship with the body. This is a process of thinking through making, touching, and experiencing. The experience of the climate crisis is multisensory, as well as based in science and humanities research.



The diagram above articulates the finer details of how these fields interrelate and are connected through air and a feminist ideology. The written and practical components of this dissertation reside in this space between feminist environmental humanities, material, and contemporary art performance and installation.

Precedents of the environmental humanities are found in the natural sciences of the 1960s and '70s, which broadened its scope to include the social sciences in relation to environmental studies. As the breadth and depth of the climate crisis unfolded, by the 1990s, questions of ethical practice, humanist responsibility, and ecojustice emerged, expanding the shared concerns across the sciences

and humanities. This nascent expanding field addresses “the crucial tasks of situating the human in geological and ecological terms and other life forms (the ‘more-than-human’) in ethical terms.”⁵¹ The humanist approach to environmental distress problematises the science policy turn to advance solutions to problems, and instead offers alternative perspectives to consider multispecies justice.

Within the environmental humanities is a feminist approach that radically rethinks given norms and structures of the patriarchy, whilst integrating the material reality of the environment and the body. *Material feminisms* brings feminist theory and materials into the forefront of climate environmental discourses.⁵²

Breaking with the postmodern social constructionist model of feminism that elevates the cultural and the linguistic as the shaping forces of oppression, material feminisms decentres the human and takes seriously the perspectives of the non-human other, and the transforming agency of Earth systems.

Feminist science critics illuminate the patriarchal constructions of the laboratory, scientific method, and the allocations of resources to ‘make science.’ Their critical approach requires materiality to be foregrounded while simultaneously acknowledging social constructionist insights. Critics such as Donna Haraway, Bruno Latour, Karen Barad formulate thinking that shows how humans, non-human others, history and technology, and the physical condition

⁵¹ Libby Robin, "Environmental Humanities and Climate Change: Understanding Humans Geologically and Other Life Forms Ethically," *Wiley Interdisciplinary Reviews: Climate Change* 9, no. 1 (2018). 1.

⁵² Susan Hekman and Stacy Alaimo, "Introduction: Emerging Models of Materiality in Feminist Theory," in *Material Feminisms* (Indiana University Press, 2008).

of the Earth as natural agents "jointly construct the parameters of our common world."⁵³

Material feminisms is also a framework for guiding the process of thinking through material engagements, touching, breathing, and for the communication of meaning through the presentation of artworks that bring the audience and the idea into a material relationship. This approach to reconceptualising human, the more-than-human, and the environment through material feminisms is an elegant resolution that retains the centrality of the material whilst simultaneously integrating politics, feminism, deep time, technology, and a response to climate crisis.

The AIR WORKS elucidate how, through artmaking, a material feminisms framework acknowledges the material reality of climate crisis, the non-human other in the environment and galvanises discourses and the role of the human and more-than-human in this confederacy. Again, this could be organised and marshalled under the term *embodied climates*.

The space that exists between the feminist environmental humanities and the practice of art-making self-reflexively considers the boundaries between disciplines. Ruth Benschop, writing about the arts and science and technology studies, states, "Often [...] art has been studied as an extension of questions about science, for instance, its history and shared roots, the role of artists in creating the visual apparatus used by scientists, or science and its imagined future in film and fiction."⁵⁴ Questions and concerns about reality, meaning, and subjectivity are shared by the arts and science, technology, engineering and

⁵³ Ibid. 5.

⁵⁴ Ruth Benschop, "STS on Art and the Art of STS: An Introduction," *Krisis Journal for Contemporary Philosophy*, no. 1 (2009). 1.

mathematics disciplines. As a result, material feminisms is often in dialogue with the environmental humanities, filling the gap by describing this style of art that is not fully or effectively described by the terms ecofeminist art, installation art, or art-science.

The current state of the climate crisis is tracked and monitored by large Western-led science and technology bodies. Statistics are largely compiled by official governmentally endorsed organisations, such as the United Nations International Panel on Climate Change; the Australian government's Bureau of Meteorology; the Department of Industry, Science, Energy and Resources; NASA; the Royal Geographical Society; and so on. These resources are official, top-down Western tech-science departments and organisations that have restricted cultural and geographical reach. Whereas air transcends geographical boundaries, these official organisations reside strictly within national boundaries, and are tied to the politics and culture of their home states. The United Nations stands in for the globally considered perspective, however it too is limited by the unequal allocation of resources and strength of diverse voices, and tracks global trends upon which global governance is largely founded.

Air's untethered nature imposes a global imperative on the notion of governance. This is fully analysed in chapter 3, where air is considered as an infrastructure (Maria Puig de la Bellacasa), a boundary object (Susan Leigh Star and Kate Dunn), a commons (Astrida Neimanis), and as political aesthetic used in the performance of power (Nicholas Mirzoeff, Kathryn Yusoff, Mark Johnson, Sylvia Wynter and Kyla Wazana Tompkins). These terms and their uses with air unreservedly centre the political and physical nature of air, and the changes to air.

The feminist perspective of science and environment studies resolves to challenge the stories told by official data collectors. Feminist critics consider stories and solutions that are not governed by the way society is currently structured under globalised capitalism, the free-market economy, and top-down regulation: "The task of reconceptualizing planetary change for the human imagination calls on a wide range of disciplinary wisdom."⁵⁵ Storytelling and imagination in relation to climate crisis governance is explored as a resilience building tool through the work of Donna Haraway, Kathryn Yusoff and Jennifer Gabrys, Astrida Neimanis, and Ursula Le Guin in chapter 4.

Thinking about deep time in environmental humanities reminds us that the Earth has aged four and half billion years in just the past two hundred years in human reckoning and discovery.⁵⁶ This is evidenced by materials and scientific processes.

1.6 A feminist perspective on the material nature of air

This research brings a feminist perspective to the material nature of our air, how it is changing, and how air is politicised in the context of the climate emergency. Through a series of contemporary performances and installations, the AIR WORKS make a significant contribution to knowledge as they investigate possible pasts and futures using the physical and imagined material of air, and the physiological experience of body of the audience that inhales the air.

⁵⁵ Robin, "Environmental Humanities and Climate Change: Understanding Humans Geologically and Other Life Forms Ethically." 1

⁵⁶ James Hatley, "Aion (Living Lexicon for the Environmental Humanities)," *Environmental Humanities* 6 (2015). Hatley, "The Virtue of Temporal Discernment."

This research addresses a critical gap in knowledge in the field of contemporary art that uses the components of air as an embodied material alongside storytelling to complete idea expression. Previous uses of air in art are nearly exclusively consigned to be a stand-in for something else: architecture, absence, nothingness, the void, and so on. This body of work reassembles the component parts of the air: the ratio of gases, and how they give the air meaning; the complex volatiles that are intercepted in air; and the chemical emissions that humans consciously and unconsciously eject into air. As the materials are invisible, ubiquitous, sometimes non-discernible, they are simultaneously both material and necessarily notional. Material feminisms fills a gap in describing this style of art that is not fully or effectively described by the terms ecofeminist art, installation art, or art-science, as these movements are limited to a specific historical or political mood, or limited in expressive form and/or tactile possibility.

1.7 Outline of chapters

There are four major AIR WORKS developed alongside the dissertation: a performance work, *Different Kinds of Air, a Plant's Diary*; the installation *Things Fall Apart*; a three-channel video work, *Our Fetid Rank (Margaret Thatcher's bottom lip and Bill Clinton's tongue)*; and the installation *Then Let Us Run (the sky is falling)*. Each one is assessed in detail throughout the four chapters. The AIR WORKS all begin with a consideration of air, both materially and conceptually, in order to explore a human relationship with the climate crisis. They use humour, scale, and ephemeral materials to make the climate crisis a tangible encounter with a (maybe inevitable) future. Each chapter, outlined below, makes a deep analysis of one or two of the AIR WORKS.

Chapter 2, "Air as material," considers two major AIR WORKS: *Different Kinds of Air*, *a Plant's Diary*, and *Things Fall Apart*. In rejecting poststructural impulses to use dichotomies, the concept of *material feminisms*, as articulated by Stacy Alaimo and Susan Hekman, insists on the inclusion of material as well as language as co-constituting elements of meaning-making and idea expression.⁵⁷ Air poses a compelling proposition to material feminisms as air requires a physiological encounter as well as conceptual consideration.

Different Kinds of Air, *a Plant's Diary* is a one-to-one performance that offers the audience member the opportunity to breathe the (recreated) air from different eras in the history of life on Earth, and consider the impacts that humans are making on the future of air.

⁵⁷ Stacy Alaimo and Susan Hekman, "Introduction: Emerging Models of Materiality in Feminist Theory," in *Material Feminisms*, ed. Stacy Alaimo and Susan Hekman (Indiana University Press, 2008).



Figure 13. Emily Parsons-Lord, *The Airrairium*, 2015 (second iteration of *Different Kinds of Air, A Plant's Diary*), performance documentation, Underbelly Arts, Cockatoo Island, Sydney Harbour. Image courtesy of Katherine Rooke.

The airs from different periods in the history of life on Earth are chemically distinct. The ratios of oxygen to nitrogen and carbon dioxide shift and change with the activity of life on Earth, and the exhalations of natural Earth systems. This one-to-one performance is an exchange of storytelling and inhalation of the air from another time. The work offers the audience member a physiological engagement with air of a different time and the invitation to try Future Air, a stable, human-synthesised air that will remain in the airescape for around 16 generations. This future air is physically and conceptually heavy and lowers the timbre of the voice. It is also the most potent greenhouse gas that has ever been tested.

Two minimal installations presented at the Museum of Contemporary Art in Sydney, *Our Eyes Were of No Use to Us*, and *The Confounding Leaving*, transform the performance into an audience-activated installation. Two of these

airs from *Different Kinds of Air, a Plant's Diary*, plus an example of air from the Great Dying⁵⁸ and Future Air, are brought into the gallery, offering the audience both passive inhalation and active release of the airs. This format acknowledges the agency of each individual's present behaviour and the possible impact on the future of the air.



Figure 14. Emily Parsons-Lord, *Our Eyes Were of No Use to Us*, 2016 (left) and *The Confounding Leaving*, 2016 (right), installation documentation, *Primavera*, curated by Emily Cormack, Museum of Contemporary Art, Sydney. Images courtesy of the artist.

Things Fall Apart is a large-scale installation. A protrusion into a large circular black void allows the audience to step beneath a column of mist that is infused with methyl jasmonate, a plant distress pheromone.

⁵⁸ Air recreated from the end-Permian extinction event, known colloquially as the Great Dying.



Figure 15. Emily Parsons-Lord, *Things Fall Apart*, 2017, installation documentation, *The Future Leaks Out*, curated by Tulleah Pearce for Liveworks, Carriageworks. Photo by Lucy Parakhina.

Methyl jasmonate is a plant distress pheromone naturally produced by plants when they are in distress. It has no biological role in human beings; we don't speak plant. In the context of climate crisis and environmental catastrophe it seems fitting that we are unable to heed the multiple warnings directly from the environment.

The terms *material* and *materiality* and their significant differences will be discussed. The term *situatedness* will also be extrapolated to acknowledge that the individual exists in confluence with physical, environmental, and social factors. In relation to air, situatedness considers the deep time factors that shape and are shaped by air, and both its planetary and molecular scale.⁵⁹

⁵⁹ Donna Haraway, "Situated Knowledges: The Science Question in Feminism and the Privilege of Partial Perspective," *Feminist Studies* 14, no. 3 (1988); "Symbiogenesis, Sympoiesis, and Art Science Activisms for Staying with the Trouble," in *Arts of Living on a Damaged Planet*, Ghosts and Monsters of the Anthropocene (University of Minnesota Press, 2017).

The materials in the artworks are accompanied by storytelling. In both works, the linguistic and the material are co-constitutive elements required to communicate their meaning. Examples of similar practices include Teresa Margolles' *En el Aire* (2003) and *Aire* (2003), where both works use water in the form of bubbles and mist. The water's previous use was to clean dead bodies in a Mexican morgue. Margolles' work is set in contrast to Ann Veronica Janssens' *Horror Vacui* (1999) and *Blue, Red, and Yellow* (2001), both of which also use mist. The mist in Janssens' work catches coloured light and is effectively a material stand-in for the light itself.

The above artworks establish a locality to engage with both idea and material simultaneously. For air as a material in these artworks, physical encounter and linguistic framing are equally important.

Chapter 3, "Air as politics" discusses *Our Fetid Rank* (Margaret Thatcher's bottom lip and Bill Clinton's tongue) (2015), a three-channel video artwork that depicts politicians making speeches about the nascent climate crisis.

Our Fetid Rank responds to the aesthetics of anthropogenic changes to climate. The work considers how human gas exchange enriches the air in carbon dioxide, and some of that air forms the very words we use to discuss the issues. This video work is used to interrogate the aesthetics of the climate crisis discourse and governance.



Figure 16 Emily Parsons-Lord, *Our Fetid Rank* (Margaret Thatcher's bottom lip and Bill Clinton's tongue), 2015, three-channel video, 10:06 min, installation view, first exhibited at Firstdraft Gallery. Image by Zan Wimberley.

The work begins with Margaret Thatcher, a compelling beginning of the discourse around the climate crisis. The 1980s was a significant decade for climate crisis as both material and as discourse. The cannon of politicians talking about climate unfolds an aesthetic narrative of the climate crisis. The video shows Western politicians talking but redacts their words so that only the air they use to shape them remains. The air in the mouths of these elected officials once had a great potential to produce change. The air in the gallery is a material in the work as the effect of watching the work subconsciously encourages the audience to mimic the breathing pattern and induce hyperventilation.

Air is a political object. To illustrate this, air can be thought of as the *below*: a boundary object, an object that is easily accessed and has qualities that may be applied to different specialisations while maintaining its integrity. Air can also

be thought of as a commons, where the air is used by every human, as well as other species, and non-living geological processes; or as infrastructure that is sunk into other systems and is visible upon breakdown. Air as infrastructure elicits the question and responsibility of maintenance.

Having established that air is a political object, the chapter considers the relationship between air as a political object and the current climate crisis. Like air, the climate crisis requires an embodied, physiological, and tactile exchange to complete a transference of meaning, and hopefully stimulate action. How does this characteristic of air shape an aesthetics of climate crisis?

Nicholas Mirzoeff advances the need to visualise the abstract or invisible in order to understand and make decisions about the subject being visualised.⁶⁰ Al Gore's graph and pie chart aesthetic demonstrates a visualisation of the climate crisis based on learned scientific data. Kathryn Yusoff offers that the polar bear is the central aesthetic of the climate crisis, bridging cross species care, and the tenuousness of the ice caps melting as a result of global heating.⁶¹ Kyla Wazana Tompkins, building on work by Sylvia Wynter, proposes that understanding aesthetics occurs through physical experience within a social and cultural context, where the physical senses meet with social circumstances that have historically and culturally coded meanings within a given group.⁶² Aesthetics in this definition understands air as a substantial entity in the power dynamics of international discourse around the climate crisis.

⁶⁰ Nicholas Mirzoeff, "Visualizing the Anthropocene," *Public Culture* 26, no. 2 (2014).

⁶¹ Kathryn Yusoff, "Biopolitical Economies and the Political Aesthetics of Climate Change," *Theory, Culture & Society* 27, no. 2-3 (2010).

⁶² Sylvia Wynter, "Rethinking "Aesthetics" : Notes Towards a Deciphering Practice," *Ex-iles: essays on Caribbean cinema Ex-iles : essays on Caribbean cinema. Mbye B. Cham (ed.).* (1992). 237–279.



Figure 17. Latai Taumoepeau, *i-Land-x-Isle*, 2013, Campbelltown Arts Centre. Performance documentation by Zan Wimberley.

As with the air in the room of *Our Fetid Rank*, in her work *i-Land x-isle* (2013) Latai Taumoepeau uses her body as a displaced Pacific Nations material amid rising sea levels caused by global heating, and Olafur Eliasson's *Ice Watch* (2014) uses the physically melting icebergs from the disintegrating Greenland icesheet in proximity to the meeting of the Intergovernmental Panel on Climate Change. In a time when the physical materials of our collective world are undergoing extreme changes due to anthropogenic activity, the need for embodied, physiological, and tangible encounters with those materials is necessary in order to understand those changes.



Figure 18. Emily Parsons-Lord, *Then Let Us Run (the sky is falling)*, 2018, installation documentation, work commissioned by Vitalstatistix for *Climate Century*. Image courtesy of Sam Roberts.

Then Let Us Run (the sky is falling), a work that offers an immersive tangible experience with a possible post-geoengineered future sky, is the subject of chapter 4, "Air as storytelling."

A geoengineering solution to halt or reverse global heating is gaining political and scientific attention. Solar radiation management through high stratosphere aerosol dispersal releases a substance (sulphur, or even diamonds!) into the upper atmosphere to deflect solar radiation and reduce temperatures. The aesthetic consequence of this idea is the permanent removal of the blue from the sky. Instead, a murky grey/white/green will take its place. It is cheap, easy to engineer, permanent, and short-sighted.

Then Let Us Run (the sky is falling) realises the colour of the sky were this geoengineering idea to take effect, offering an aesthetic and tactile experience of this sky.

Ursula Le Guin writes about the *Carrier Bag Theory* of fiction standing in opposition to the familiar hero story.⁶³ Carrier bag stories complicate and tangle, replacing the straightforward unfolding cadence of a hero narrative, which portray a hero overcoming an obstacle. These stories allow multiple perspectives and times to be viewed all at once, and to question and reform the very foundations of the status quo. Carrier bag stories are useful to corrupt the prevailing hero narratives of our times, such as capitalism, growth, the climate crisis, and climate crisis solutions.

This chapter interrogates how the climate emergency has been constructed with a hero narrative, and so too have some proposed solutions. The relationship between the imagination and climate governance is explored via the work of Kathryn Yusoff and Jennifer Gabrys.⁶⁴ The role of storytelling in visioning alternative futures is elucidated through the writings of Donna Haraway.⁶⁵ The International Panel on Climate Change in their Fifth Assessment Report review the viability of two proposed geoengineering climate solutions: solar radiation management, and carbon dioxide reduction.⁶⁶ These proposals

⁶³ Ursula K. Le Guin, "The Carrier Bag Theory of Fiction" in *Dancing at the edge of the world : thoughts on words, women, places* (New York: New York : Grove Press, 1989).

⁶⁴ Kathryn Yusoff and Jennifer Gabrys, "Climate Change and the Imagination," *Wiley Interdisciplinary Reviews: Climate Change* 2, no. 4 (2011).

⁶⁵ Donna Haraway, "It Matters What Stories Tell Stories; It Matters Whose Stories Tell Stories," *a/b: Auto/Biography Studies* 34, no. 3 (2019).

⁶⁶ IPCC, "Topic 3: Future Pathways for Adaptation, Mitigation and Sustainable Development," in *Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*, ed. Rajendra K. Pachauri Core Writing Team, Leo Meyer (Geneva, Switzerland: International Panel on Climate Change, 2014).

are considered alongside two carrier bag alternatives: the AIR WORK, *Then Let Us Run (the sky is falling)* (2018), and Katie Paterson's *Future Library* (2014–2114).

1.8 How to read this dissertation

The documentation of the AIR WORKS is designed to facilitate an embodied material encounter. Alongside the photographic documentation presented in the dissertation is a box of four objects that contain the material encounter required to complete each AIR WORK. Each object and its contents directly correspond to one of the four main AIR WORKS and shares the same title as the work it seeks to expand.

I suggest exploring the contents of each box simultaneously with the in-depth analysis of the AIRWORK unpacked in the corresponding chapter. *Different Kinds of Air, a Plant's Diary* is paired with a small glass bubble of air from the Great Dying. Corresponding to *Things Fall Apart* is a spray bottle that contains four drops of methyl jasmonate: just add water and then spray the cry of plant distress. The three-channel video *Our Fetid Rank (Margaret Thatcher's bottom lip and Bill Clinton's tongue)* is contained on the USB drive, and the grey-green void is the colour of a possible future sky, which correlates to the installation *Then Let Us Run (the sky is falling)*.

This dissertation acknowledges that language is powerful in shaping abstract ideas with political overtones and seeks to precisely describe our shared crises by adopting the *Guardian* style guide for language relating the climate crisis.⁶⁷

⁶⁷ A note on climate crisis language: On May 17th, 2019, the *Guardian* released a statement regarding its style guide for language referring to the current climate catastrophe in order to more closely and pointedly reflect the urgency of the political and environmental situation: 'climate change' becomes 'climate crisis,' 'global warming' becomes 'global heating,' 'environmental collapse' changes to 'environmental catastrophe/emergency,' and so on. As *Guardian* editor-in-chief Katharine Viner stated,

“We want to ensure that we are being scientifically precise, while also communicating clearly with readers on this very important issue... The phrase ‘climate change’, for example, sounds rather passive and gentle when what scientists are talking about is a catastrophe for humanity.” Quoted in Damian Carrington, "Why the Guardian Is Changing the Language It Uses About the Environment," *The Guardian* 2019.

Chapter 2: Air as material



A fall of mist floats into a large black pool. There is a pathway for a solitary journey into its centre. Mixed into the mist is methyl jasmonate, a plant distress pheromone.

A door opens and you are invited into a private tasting (breathing) of air from different distinct eras in the history of life on Earth.

2.1 Introduction

Through close analysis of *Different Kinds of Air*, *a Plant's Diary* and *Things Fall Apart*, this chapter shapes a *material feminisms* framework to describe the unique co-constitutive relationship between material (air and body) and ideas (language). Material feminisms is considered through a close reading of Stacy Alaimo and Susan Hekman book of the same title. The AIR WORKS employ a feminist perspective in order to decentre anthropocentric material encounters with air and our (human) bodies, by shifting perspectives of time to centre on Earth's deep time, evolving life, and its interrelations with changing environmental materials.¹ This is explored through what Donna Haraway calls *sympoiesis*, a making-together.² This feminist approach challenges dominant colonial and patriarchal histories and structures that support the growth of capitalism, the effects of which have drastically altered the material composition of contemporary air. Further decentring the human species, this chapter uses Astrida Neimanis' study on figuring porous bodies through the exchange of water, arguing that air connects all respiring species and Earth systems such that we are inseparable from the material reality of the climate crisis.³ It also explores Kathryn Yusoff's analysis of the material political implications of the geologic.⁴

¹ The term *deep time* considers the age of the Earth and its geomorphologies across aeons of time. These stages of the Earth's material evolution influence both the crust and the atmosphere and how they interrelate. Stephen Marshak, *Earth : Portrait of a Planet*, 2nd ed. ed. (New York London: New York London : W. W. Norton, 2005).

² Haraway, "Sympio genesis, Sympio esis, and Art Science Activisms for Staying with the Trouble." 25-50.

³ Astrida Neimanis, "Bodies of Water : Posthuman Feminist Phenomenology," (London : Bloomsbury Academic, an imprint of Bloomsbury Publishing Plc, 2017).

⁴ Kathryn Yusoff, *A Billion Black Anthropocenes or None*, (Minneapolis, MN: Minneapolis, MN : University of Minnesota Press, 2018); "Geologic Life: Prehistory, Climate, Futures in the Anthropocene," *Environment and Planning D: Society and Space* 31, no. 5 (2013); "Queer Coal: Genealogies in/of the Blood," *philoSOPHIA* 5, no. 2 (2015).

The AIR WORKS find meaning in the distinction of the term *material* against the term *materiality*. This differentiation bolsters an emphasis on physical materials on one hand, whilst maintaining the importance of language and storytelling on the other hand, factors that are equally important to advancing the meaning of the AIR WORKS. This chapter also describes the communication of ideas through acts of performance and storytelling.

2.2 Feminism as method

I want to begin by reflecting on how feminism, feminist practice, and feminist ideology function in the writing and studio elements of this body of work.

Feminist art aesthetics and feminist frameworks and methodologies for making and thinking about art are related but distinct. This dissertation unfolds a practice that is underpinned by feminist methodologies, which disrupt patriarchal and capitalist structures.⁵ My creative output compels audiences to question and reconfigure tacit expectations about the environment — expectations that are built on patriarchal systems that cast nature as a store of resources. By disrupting preconceived foundational knowledge about elements of the environment such as the air, the AIRWORKS question the political and cultural norms that implanted those expectations. This impulse to reconsider and question is, I contend, a feminist act.

The AIR WORKS are contemporary installation and performance artworks that are formed through feminist frameworks, rather than conforming to the

⁵ C. Klinger, "The Critique of 'Aesthetic Ideology', from 'Cunt-Art' and 'Ecriture-Feminine' to the Current State of the Discussion in Feminist Aesthetics," *Dtsch. Z. Philos.* 46, no. 5 (1998); Tessa W. Carr and Deanna Shoemaker, "Hauntings: Marking Flesh, Time, Memory," *Text and Performance Quarterly* 37, no. 1 (2017); Marilyn French, *Is There a Feminist Aesthetic?*, ed. Hilde S. Hein and Carolyn Korsmeyer, *Aesthetics in Feminist Perspective* (Bloomington: Indiana University Press, 1993).

aesthetics of feminist art or centring the female or the feminine as subject matter. Briefly touched on in chapter 1 (see part 1.4.1), this artform rejects the conflation of woman with nature, or the requirement for female anatomy to be visible, and takes a contemporary feminist approach to unsettling the status quo by making the familiar unexpected and challenging patriarchal and capitalist structures.

There is a long and rich lineage of feminist art dating from the 1970s. This includes art that explores femininity, the gaze on the female body, and female power and autonomy; art that redresses the invisibility and erasure of women from history; and art that reclaims practice and craftwork that has been designated as women's work throughout history, such as textiles and needlework.⁶

Feminist art aesthetics activate the body, the oozing body, the often-naked female body, the yonic, and the feminine crafts.⁷ Judy Chicago's *The Dinner Party* (1974–79), for example, is a cornerstone feminist work that embodies feminist art practice and feminist art aesthetics of the second wave feminists of the 1970s. A large ceremonial dinner with thirty-nine place settings is laid out on a triangular table. Each dinner setting commemorates a woman of note from history: "it is a transcendental vision of women's history, culture, and aspirations," writes feminist art historian, Josephine Withers.⁸ Chalice, utensils, and plates are uniquely rendered for each woman honoured, yonic and butterfly motifs are common design elements, and materials include fur, embroidery, and porcelain. This work claims famously to redress the invisibility

⁶ Fields Jill, "Frontiers in Feminist Art History," *Frontiers: A Journal of Women Studies* 33, no. 2 (2012).

⁷ Hilary Robinson and Maria Elena Buszek, *A Companion to Feminist Art* (Hoboken, NJ: Hoboken, NJ : John Wiley and Sons, Incorporated, 2019). 157-180.

⁸ Withers, "Judy Chicago's Dinner Party: A Personal Vision of Women's History." 451.

and/or erasure of women from history; here they are invited to the table, to the conversation, and celebrated for their accomplishments as well as their vulvas.⁹

I include this work by Judy Chicago because it is an influential feminist artwork that activates feminist art aesthetics as well as feminist frameworks for shaping content. The impact of *The Dinner Party* has been widely cited amongst feminist artists. This was examined in the UCLA show *Sexual Politics: Judy Chicago's Dinner Party in Feminist Art History* in 1996, which mapped the extent of the work's influence over aesthetics, politics, and feminist practice.¹⁰



Figure 19. Judy Chicago, *The Dinner Party*, 1974-79, installation view (left) and detail of Anne Hutchinson place setting (right), ceramics, porcelain, textile, Brooklyn Museum. Gift of the Elizabeth A. Sackler Foundation, 2002. Image by Donald Woodman.

The Dinner Party is a pivotal work for second wave feminism in the 1970s, however, a contemporary feminist might criticise the predominantly white histories and mythologies that are amplified, the materials and yonic motifs that are foregrounded, and the apparent conflation of genitalia and gender identity.

⁹ Judy Chicago, "The Dinner Party," *Scholastic Art* 29, no. 6 (1999).

¹⁰ Curated by Amelia Jones, *Sexual Politics: Judy Chicago's Dinner Party in Feminist Art History*, 1996. UCLA This show was accompanied by an extensive catalogue, published by the University of California Press.

I chose Chicago's practice because it also encompasses conceptual art, which resonates with my practice. The qualities of Chicago's chosen materials are in sympathy with mine, often existing as temporary ephemeral activations; these include the use of coloured smoke in her *Atmospheres* between 1968 and 1974, her *Dry Ice Environments* from the late 1960s, and *A Butterfly for Oakland* (1974), made out of fireworks. Chicago's fleeting, wafting, drifting works critically reflect on the relationship between the political and the environmental. However, our works differ in feminist aesthetic. Chicago's works are often preoccupied with the female form. This sometimes manifests as painted naked women idle amongst the smoke in her *Atmospheres*, or as the yonic motifs in *The Dinner Party*. The female form for Chicago shortcuts to feminist discourse and activates feminist art aesthetics.



Figure 20. Judy Chicago, *Smoke Bodies*, 1972, fireworks, California desert. Photo courtesy of Through the Flower archives.



Figure 21. Judy Chicago, *Smoke Goddess/Woman with Orange Flares*, 1972, fireworks, Los Angeles. Photo courtesy of Through the Flower archives.

Chicago's work enacts both feminism as methods and feminist art aesthetics. Feminism as method for Chicago includes obtaining her pyrotechnicians license in an all-male industry, and dominating the environment in her art practice, in an equally male-centred artworld.

My work considers the body of the audience in relation to the materials of the environment through the inhalation of air, smoke, and chemical volatiles, rather than the lived experience of womanhood. In *Things Fall Apart*, a plant distress pheromone, methyl jasmonate, is dissolved into a 12-metre-high fall of mist. The audience member encounters the sensation of mist of their skin whilst inhaling the plant cry of distress, which goes 'unheard' by human bodies.



Figure 22. Emily Parsons-Lord, *Things Fall Apart*, 2017, as part of *The Future Leaks Out*, curated by Tulleah Pearce for Liveworks, Carriageworks, Sydney. Photo by Lucy Parakhina.

Rather than activating a feminist art aesthetic, or explicitly emphasising feminist content, *Things Fall Apart* elevates the perspective of non-human others — in this case, the plant kingdom — and relating it to the human body (we are all implicated). Feminist methodology here, as in Chicago's practice, includes the use of large-scale installation, the attainment of pyrotechnical licensing, preferred reference to other female and non-binary artists, thinkers and researchers.



Figure 23. Emily Parsons-Lord, *A raging event of continual noise (the Sun)*, 2018, performance, *Equal Area*, curated by Mikala Tai and Michael Do, 4A Centre for Contemporary Asian Art, Sydney. Photo by Document Photography.

Similarly, my work *A raging event of continual noise (the Sun)* (2018) is one in a series of performances that considers the colonial impulse to name things (stars, plants, objects, etc.). The work recreates the unique colour signatures of stars that have been named in the International Star Registry in potassium powder and pigment, which is then burnt so that the audience can stargaze at the smoke. Some of the star names include "I'm So, So, So, So, So Sorry, Katherine," and "The only lie I ever told, I never loved you." As the 'stars' burn, the smoke fills the gallery and encourages the movement of audience members to fresher air. While the elemental sympathy with Chicago here is clear, feminist methodology is prioritised over feminist art aesthetics and explicit feminist subject matter. Creating bold large-scale works that invade the body of the audience member as well as institutional spaces are part of my feminist

methodology. Inserting my own queer-female personhood into research areas, discourses, and galleries that are dominated by men is the bedrock of my feminist methodology.



Figure 30.. Emily Parsons-Lord, *A raging event of continual noise (the Sun)*, 2018, performance, *Equal Area*, curated by Mikala Tai and Michael Do, 4A Centre for Contemporary Asian Art, Sydney. Photo by Document Photography.

In contrast to feminist expression through feminist art aesthetics, Donna Haraway (who is contemporaneous with Chicago, and also influential in feminist discourse) reconsiders the body through a feminist, post-human framework. Haraway's background in biology and social science places her feminist frameworks at the intersections of science and technology, and feminist theory. Haraway resists feminist art aesthetics in her literary imagery, employing the image of the cyborg over that of the goddess or the vulva. Haraway challenges the category of 'female' as being too big and cumbersome to be useful and

instead imagines a genderless world where technology interfaces with biology to create new categories.¹¹

Haraway's 1991 collection of essays, *Simians, Cyborgs, and Women: The Reinvention of Nature*, complicates traditional gender identity politics and reconsiders the material meanings of bodies that grow in cultural, interspecies, and technological contexts. Instead of bodies gendered by their social context, Haraway deconstructs the boundaries between human, animal, and machine. In doing so she reformulates the female body as organic with technologically micro-augmented encryptions; a monster that can assert her political agency outside of traditional Western myths, such as the Garden of Eden, which placed women within an idyllic, intuitive nature. Breaking the boundary between animal and human, and between human and human, blurs identity relating to an individual self, gender, and other otherings in order to build *cyborgs*, a synthesised amalgam of creatures, cultures, and technology. Haraway proposes that a cyborg identity furthers "the utopian dream of the hope for a monstrous world without gender."¹² The cyborg poses the greatest opposition to a nature-culture dualism in Haraway's thesis. This reintegration of the material of the (human) body into identity is exemplary in the manifestation of the cyborg, supplanting the second wave feminist aesthetics of the goddess and the vulva as demonstrated in Chicago's feminist aesthetic.

Both Haraway and the AIR WORKS share an approach that enacts feminist frameworks and methodologies more so than the feminist art aesthetics of the 1970s and '80s. Haraway's cyborg is a feminist framework that formulates new

¹¹ Donna Haraway, "A Cyborg Manifesto: Science, Technology, and Socialist-Feminism in the Late Twentieth Century," in *Simians, Cyborgs and Women: The Reinvention of Nature* (New York: Routledge, 1991).

¹² *Simians, Cyborgs, and Women : The Reinvention of Nature* (London: Free Association Books, 1991). 181.

imagery for the feminist to consider the female body, or indeed all human bodies. Perhaps the contemporary feminist body is a breathing cyborg, a techno-monster in constant material relationship with the technologically mediated chemistry of air. The air catches and holds the effluence of capitalism, residual colonial industries, and the natural systems of the planet and the biology of the species must co-evolve. Interrogating the material of air in this way is a feminist enterprise.

Rather than addressing gender identity politics through representational aesthetics, the AIR WORKS and dissertation challenge, disrupt, and reconfigure the patriarchal oppressions of industry and capitalism as they are made manifest in the material realities of our contemporary environment as the climate crisis.

Feminism as method in this dissertation includes utilising feminist frameworks, amplifying the voices, artworks, and theories of women and non-binary people, and identifying the complex oppressions of the patriarchy and capitalism as they manifest in the air we breathe.

2.3 Material and materiality

The term *material* is essential in relation to air and is widely used in this dissertation, it is hence important to expand on exactly what it means. Material is crucially distinct from *materiality* in both meaning and aesthetic, two factors that are central to the analysis of air as material in the body of works presented in this thesis.

Material refers to the physical or chemical composition of an object or substance.¹³ In the case of air this includes physical properties such as the gaseous composition, air pressure, temperature, and velocity, and visual properties such as light, pollution, colour, and invisibility.

Materiality is more culturally nuanced and interpretive. The materiality of an object or form relies on the perceptions of its material composition and their various characteristics. A simple example is given by Kate Dunn, where a desk that looks as though it is comprised of wood may actually be a facsimile of the aesthetic of wood made of Laminex, a plastic laminate. Its material is Laminex, but its materiality is wood.¹⁴ Materiality includes all of the expectations of tactility, cultural associations, and apprehension of the provenance of the materials (age, location, texture, etc), in this case wood, that may hoodwink the observer upon closer inspection. Therefore, materiality is the ideas that we project on to the object, and the tangled web of connotations and expectations of tactility and substance of the object. Materiality may communicate cultural, historical or economic value, status, and a host of other identifiers. To continue with the example of the office desk, the material of the desk betrays an economic rationalism in the workplace, a need to accommodate current technology through the cable holes, an implicit acknowledgement that the object references wood.

Anthropologist Tim Ingold articulates another example: "boiling fish bones yields an adhesive material, a glue, not a fishy kind of materiality in the things

¹³ Kate Dunn, "Boundary Objects – Theoretical Framework for Modes of Collaboration" (University of New South Wales, 2016).

¹⁴ Ibid.

glued together."¹⁵ Hence, the materiality of things is not necessarily exclusive to the materials of which they are comprised.

The question of material against materiality spans across academic fields, such as archaeology, architecture, design, and contemporary art. In the field of archaeology, Ingold argues for a greater emphasis and consideration for the materials, manufacture, and craft over the loftier considerations of materiality.¹⁶ Materials show how humans are emergent within a physical material environment, and can trace a history of experimentation and material transformation. Materials also reveals process, such as the limestone mixed with bullock's blood, cow dung and hog hair to make stucco:

I propose that we lift the carpet, to reveal beneath its surface a tangled web of meandrine complexity, in which — among a myriad other things — oaken wasp galls get caught up with old iron, acacia sap, goose feathers and calf-skins, and the residue from heated limestone mixes with emissions from pigs, cattle, hens and bees.¹⁷

In the fields of design and architecture, David Pye writes that all materials have properties that may either be enhanced or suppressed, for example, working with wood grain instead of against it, to bring out our notions of 'woodiness':

The properties of materials are objective and measurable. They are out there. The qualities on the other hand are subjective: they are in here: in our heads. They are ideas of

¹⁵ Tim Ingold, "Materials against Materiality," *Arch. Dial.* 14, no. 1 (2007). 9.

¹⁶ *Ibid.*

¹⁷ *Ibid.*

ours. They are part of that private view of the world which artists each have within them.¹⁸

Contemporary art understands the interplay between material, process, and materiality. The artist may cleverly weave the narratives of material, process, aesthetic, materiality, space, time, and politics together to inform and inflect a work. An artwork may play with the expectations of materiality or material in order to surprise, challenge or corrupt the audience. For the AIR WORKS included in this thesis, the invisible nature of the material of air and its constituents present opportunities to disrupt the expectations of the unconscious activity of breathing, focusing attention on the innate.

2.3.1 Air as material in relation to the body as material

Air presents an urgent case for the body as a material. Not merely life sustaining, the air is experienced physiologically and prelinguistically.¹⁹ A haptic knowledge of air can bypass language cognition and expression and be experienced by the body via the limbic system, influencing physical sensation, memory formation, and emotional states.²⁰ Changes to the composition of air or air pressure can disrupt brain functioning, such as breathing under high or low pressure with either oxygen or nitrogen, causing altitude sickness or decompression sickness, and altering consciousness.²¹ The low level of oxygen,

¹⁸ David Pye, "The Nature and Art of Workmanship," (London: London, Cambridge U.P., 1968). 47.

¹⁹ Anonymous, "Neuroscience: Brain Breathing," *Nature* 466, no. 7305 (2010); Jose L. Herrero et al., "Breathing above the Brain Stem: Volitional Control and Attentional Modulation in Humans," *Journal of neurophysiology* 119, no. 1 (2018).

²⁰ Marco Catani, Flavio Dell'Acqua, and Michel Thiebaut de Schotten, "A Revised Limbic System Model for Memory, Emotion and Behaviour," *Neuroscience and biobehavioral reviews* 37, no. 8 (2013); Anjali A. Sarkar, "Functional Correlation between Breathing and Emotional States," *MedCrave MOJ Anatomy & Physiology* 3, no. 5 (2017).

²¹ David Doolette and Simon Mitchell, "The Physiological Kinetics of Nitrogen and the Prevention of Decompression Sickness," *Clinical Pharmacokinetics* 40, no. 1 (2001); R. Arieli, "Observed Bubble Dynamics in Oxygen or Heliox Breathing and Altitude Decompression Sickness," *Journal of Applied Physiology* 103, no. 3 (2007); John B. West, "High Life : A History of High-Altitude Physiology and

and high rates of carbon dioxide in the air of the Great Dying, as experienced in *Different Kinds of Air, a Plant's Diary*, are palpable to the breather, the physiological effects of dyspnoea, or shortness of breath, can encourage a panicked emotional state.²²

The physiological requirement of air for normal body and cognitive functioning draws them into a material relationship with thought and language. In the field of cognitive linguistics, Mark Johnson and George Lakoff make the case for any cognitive activity as requiring a body and environment as well as neurological pathways to produce thought:

Thus, to understand reason we must understand the details of our visual system, our motor system, and the general mechanisms of neural binding. In summary, reason is not, in any way, a transcendent feature of the universe or of disembodied mind. Instead, *it is shaped crucially by the peculiarities of our human bodies*, by the remarkable details of the neural structure of our brains, and by the specifics of our everyday functioning in the world.²³

[emphasis added]

Therefore, our bodies are the physical apparatus that decodes messages from the environment. This embodied information is what we use to navigate the environments around us. Human consciousness is shaped by physical learning

Medicine," (New York: New York : Published for the American Physiological Society by Oxford University Press, 1998).

²² See the chapter "Breathing," in I. Z Khazan, "Breathing," in *The Clinical Handbook of Biofeedback*, ed. I. Z Khazan (2013).

²³ George & Johnson Lakoff, Mark, *Philosophy in the Flesh : The Embodied Mind and Its Challenge to Western Thought*, ed. Mark Johnson (New York: New York : Basic Books, 1999). 4–5.

through the sensory organs: "human concepts are not just reflections of an external reality, but that they are crucially shaped by our bodies and brains, especially by our sensorimotor system."²⁴

Air is required for normal body functioning, connecting the body with the environment through breathing. This delivers oxygen to the brain to sustain executive function. In humans, air exists at the intersection of material, thought, and language, rendering them co-constitutive.

The artworks explored in this chapter, *Different Kinds of Air, a Plant's Diary* and *Things Fall Apart*, cannot be fully comprehended via documentation. As well as the affective quality of experiencing these works as embodied installations, they both require the body of the viewer to inhale the materials, the compositions of gases that comprise air in *Different Kinds of Air, a Plant's Diary*, and to intermingle with the plant distress pheromone in *Things Fall Apart*.

The boxes that act as supporting documentation of these works each contain the invisible materials used in the AIR WORKS to complete the physiological encounter that elucidates the ideas of air in the artworks.

2.3.2 Air materiality

Air poses a thorny proposition to materiality, laying beyond the threshold of visibility as well as being ubiquitous to aerobic Earthbound creatures. The visible evidence of the presence of air are its associated signifiers, such as trees moving in the wind, oxidised tin, iron banding in the geological record, a misted breath in the cold, the blue signifying distance in a landscape painting,²⁵

²⁴ Ibid. 22.

²⁵ Rebecca Solnit, *A Field Guide to Getting Lost* (New York : Viking, 2005., 2005).

or the heaving chest of someone panting. The ubiquity of air becomes so familiar it is difficult to distinguish alterity, for example, changes in the pressure that air exerts on our bodies at all times, which varies depending on altitude. How could one visually code the experience of air pressure? To experience a different atmospheric pressure could potentially be achieved by displacing air for water and submerging into the ocean and examining the variation of pressure on the body, or imagining the sensation of being in the vacuum of space.

Perhaps an airy materiality may be in the ambience evoked by an open style of architecture, or the consideration of the bending of sunlight in the blue sky, beautifully articulated by Rebecca Solnit as the "blue of distance."²⁶ In realist landscape painting in the Western tradition, distance is indicated by a bluer palette in farther depths of the landscape, and sometimes by a misty fade to white in eastern conventions of depth in perspective.²⁷ The difference in codifying distance is exemplified in figure 20. The detail from Da Vinci's *Ginevra de'Benci* (1474) and Rafael's *An Allegory* (1504) both clearly show the bluer hues that indicate distance in the background of the paintings, whereas Wang Hui and other unacknowledged artisans' *Kangxi Southern Inspection Tour* (1692–1695) locates the background higher in the visual plane and dissolves the edges into white or blankness.

²⁶ Ibid.

²⁷ Mark Sullivan, "The Gift of Distance: Chinese Landscape Painting as a Source of Inspiration," *Southwest Review* 92, no. 3 (2007); P. G. Lovell, T. Troscianko, and Ca Parraga, "Distance Judgments Based on Rayleigh Scattering: The Detection of Colour Changes with Distance in Blue-Yellow Opponent Channels," *Perception* 34, no. 2 (2005); Rebecca Solnit, "Yves Klein and the Blue of Distance," *New England Review* 26, no. 2 (2005). Anita Chung, *Drawing Boundaries : Architectural Images in Qing China* (Honolulu: Honolulu : University of Hawaii Press, 2004). 93.

The materiality of air is often described visually and linguistically in a considerably un-airy manner, often seeming fixed or static, with no sensation of airiness or dynamism.

Western Convention:



Eastern Convention:



Figure 24. (top left) Leonardo Da Vinci, detail of *Genevra d'Benici*, 1474, oil on canvass. (top right) Raphael, *An Allegory*, 1504, oil on canvass. (bottom) Wang Hui, *Kangxi Southern Inspection tour*, Scroll 9, 1692–1695, detail of handscroll showing view of Shaoxing, ink and colour on silk, Palace Museum, Beijing. Reproduced in Anita Cheung, *Drawing Boundaries: Architectural Images in Qing China*, 2004.

What renders this air significant from the air around it? Air is ubiquitous and requires a barrier, or separation in order for the examination of a specific portion. The container, or divider supplants the materiality of air, such as in Robert Barry's *Inert Gas Series*. In 1969, Barry performed a series of release events of noble gases: helium, neon, argon, krypton, and xenon. A single documentation image of the cylinder in the landscape records each performance. The heavy steel cylinder stands in for the gas itself, imaged in contrast to an expansive landscape (exemplifying the blue of distance) illuminating the surrounding air. The image of the cylinder, the container of the gas, supplants the gaseous reality of the helium, neon, argon, krypton, xenon released.



Figure 25. Robert Barry, *Inert Gas Series/Helium, Neon, Argon, Krypton, Xenon/From a Measured Volume to Indefinite Expansion*, 1969, Museum of Modern Art Collection, New York.

In *Different Kinds of Air, a Plant's Diary*, for example, the ubiquity of the air in the room and around the planet is separated by the clear plastic bag in the hands of the audience member. The bag recalls the gas cylinder of Barry's *Inert Gas Series*. However, the air in *Different Kinds of Air, a Plant's Diary* is unable to intermingle with the room air. The bag is in close proximity to their body and offers an intimacy through the action of breathing through the steel straw,

lending it a sense of ritual action. As the audience member's lungs inflate, the bag correspondingly contracts, a direct visual analogue for the movement of air from the local to the ubiquitous. The sensation links the locality of the bag of air to the temporality of air through time. The container — in this case, the bag — places a different value on the air inside the clear barrier.



Figure 26. Emily Parsons-Lord, *The Airrairium*, 2015 (second iteration of *Different Kinds of Air, A Plant's Diary*), performance documentation, Underbelly Arts, Cockatoo Island, Sydney Harbour. Image courtesy of Katherine Rooke.

The body must encounter the sensations of air to establish the referent against which all aberrating experiences of air may be indexed. In effect, this constructs an amalgam of corporeal sensations from which a catalogue of associations to the visible signifiers of the presence (or absence) of air can be constructed. The materiality of air requires the prior sensorial experience in the viewer/audience member to connect to the visible signifiers, such as 'I feel the wind on my face, the same wind rustles the leaves of a tree; I see the leaves rustling on a tree and

remember the sensation of the wind on my face.’ Hence, in the case of air, materiality is inferred by the visible signs of air.

The AIR WORKS hold the material of the air, and the material of the body of the breather, in primary position so as to engage with the artwork content in collaboration with language and imagination. To comprehend the materiality of air in *Different Kinds of Air, a Plant’s Diary*, for example, the body must experience regular air as life-sustaining oxygen delivered through breathing, in order to be able to distinguish air of a different composition.

Just as with Barry’s *Inert Gas Series*, the materiality of the AIR WORKS shifts between the physical material of air and the imagined visualisation of air in the absence of a tangible object to anchor materiality. The shifting, whirling and ever-present ephemerality of air requires remembered and imagined landscapes, skiescapes, and perception from the other senses. The conceptual artists of the 1960s, such as Robert Barry, approach material and materiality with a playfulness that is also expressed in the AIR WORKS.

2.4 Material feminisms

The AIR WORKS integrate critical environmental studies and uses a material feminisms framework to analyse and describe the AIR WORKS, their relationship with materials, and the messages they activate.

Material feminisms encompasses feminism, materials, politics, and environmental concerns by reintegrating the material into linguistic discourse. This feminist approach reconsiders the materials of bodies and natures,

breaking with a postmodern contention of meaning being primarily, or even exclusively, derived from language.²⁸

In the introduction to their book, *Material Feminisms*, Stacy Alaimo and Susan Hekman challenge that "most contemporary feminisms require that one distance oneself as much as possible from the tainted realm of materiality by taking refuge within culture, discourse, and language."²⁹

Social constructionist feminists posit that notions of the feminine and femalehood are constituted by language; similarly, the real or material can only be understood through the application of language and ideas, and the cultural and social lenses that interpret it. For the feminist social constructionist, ideas of the female are an invention of language and culture.³⁰

Rejecting the Western social constructionist impulse to use dichotomies —or as Donna Haraway terms them "antagonistic dualisms,"³¹— such as nature/culture, female/male, mind/body, or subject/object, postmodern feminism casts off the dichotomy as a device and contests the categories themselves; except, as Alaimo and Hekman contend, the language/reality dichotomy, which has remained inviolable: "Although postmoderns claim to reject all dichotomies, there is one dichotomy that they appear to embrace almost without question: language/reality. [...] postmoderns are very uncomfortable with the concept of the real or the material."³²

²⁸ Stacy Alaimo, "Introduction: Emerging Models of Materiality in Feminist Theory."

²⁹ *Ibid.*, 1.

³⁰ *Ibid.*, 2.

³¹ Haraway, "A Cyborg Manifesto: Science, Technology, and Socialist-Feminism in the Late Twentieth Century." 180.

³² Alaimo and Hekman, "Introduction
Emerging Models of Materiality in Feminist Theory." 20.

Material feminism's mandate is to reintegrate the very stuff of material reality into meaning creation and idea expression. Contemporary discourses designate disproportionate weight the postmodern, post-structuralist linguistic lens of social construction, neglecting the matter of reality and its physical and chemical expressions across all bodies.

Both *Different Kinds of Air*, *a Plant's Diary*, and *Things Fall Apart* illustrate the requisite linguistic and physical material elements to jointly construct the meaning of the works. Both works are installations and performances that begin with the air. Air, being ephemeral and invisible, is also an actual physical material comprising invisible molecules of gases, microscopic biota and dust, complex compound molecules, and waveforms of light, sound, and radio. The body of the audience member is required to breathe the air and register a different physiological sensation alongside the corresponding story. Language operates as storytelling in the AIR WORKS. It may be as simple as the title, or integrated into the performance as conversation, or exist as a wall text or didactic. These elements demonstrate the fundamental and concomitant nature of language with these materials. Through the use of performance storytelling as well as physical encounter, *Different Kinds of Air*, *a Plant's Diary* articulates how language and material operate together.

2.5 *Different Kinds of Air, a Plant's Diary*



Figure 27. Emily Parsons-Lord, *Different Kinds of Air, a Plant's Diary*, 2014, performance documentation. Image courtesy of Peter Cheng and Proximity Festival.

Different Kinds of Air, a Plant's Diary is a one-to-one performance. The single audience member enters a room with a bar and a bartender (the artist) and is asked to describe their favourite qualities of air. It is a moody non-time, the materiality of a local bar, familiar apart from the appearance of transparent inflated plastic bags suspended on chains in the space where drinks usually reside. In each clear bag is a different air that recreates the gaseous composition of air from a specific period in the deep history of life on Earth.

Through conversation, an air is selected, and the audience member is invited to breathe the air through a stainless-steel straw via a glass stopcock valve.



Figure 28 Documentation of glass stopcock valve mechanism and stainless-steel straw, Emily Parsons-Lord, *The Airrairium*, 2015 (second iteration of *Different Kinds of Air, A Plant's Diary*), Underbelly Arts, Cockatoo Island, Sydney Harbour. Image courtesy of Katherine Rooke.

While the audience member inhales the air and lets the internal physiological effects take hold, the bartender relates the story of why the air was different at that time. The language and material are ingested simultaneously by the participant, with each constituent supporting the other. The worlds that are built through the story and the sensation of breathing different air compel the audience member into a state of wonder; to cohabit with other bodies, bodies that evolved with this air (or who became extinct because of it).

The different airs amalgamate geologic, biological, and cosmic research gathered from a range of scientific disciplines, from atmospheric chemists to geologists.³³ The synthesis of this technologically mediated research is

³³ The following are largely scientific studies that map and model the deep time history of the Earth's atmosphere are broadly form the 'recipes' of the airs. Hatley, "The Virtue of Temporal Discernment Rethinking the Extent and Coherence of the Good in a Time of Mass Species Extinction."; Bekker et al., "Dating the Rise of Atmospheric Oxygen."; Berner and Canfield, "A New Model for Atmospheric Oxygen over Phanerozoic Time."; Pearson and Palmer, "Atmospheric Carbon Dioxide Concentrations over the Past 60 Millions Years."; Solomon et al., "Irreversible Climate Change Due to Carbon Dioxide Emissions."; D.L. Hartmann et al., "Observations: Atmosphere and Surface," in *Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*, ed. T.F. Stocker, et al. (Cambridge, United Kingdom and New York, NY, USA: Cambridge University Press, 2013); Crutzen and Ramanathan, "The Ascent of Atmospheric Sciences."; M. Collins et al., "Long-Term Climate Change: Projections, Commitments and Irreversibility," in *Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*, ed. T.F. Stocker, et al. (Cambridge, United Kingdom and New York, NY, USA: Cambridge University Press, 2013); Cloud, "Atmospheric and Hydrospheric Evolution on the Primitive Earth. Both Secular Accretion and Biological and Geochemical Processes Have Affected Earth's Volatile Envelope."; Claire, "Clues to Atmospheric Evolution in Earth's Ancient Sediments."; Burrows, "Bacteria in the Global Atmosphere - Part 1: Review and Synthesis of Literature Data for Different Ecosystems."

constituted in the material composition of gases that recreate the air of a given period, the effects of which include heightened energy, shortness of breath, light-headedness, and increased or decreased heartrate, depending on the air of the period selected. The materiality of the breathing apparatus — glass stopcock and stainless-steel straw — suggests some ritualised ingestion, perhaps an experience similar to smoking, or preparing a special alcoholic drink.

The performative device of breathing the material — the air — offers embodied learning that supports the harder science in the research methodology. This action is accompanied by the analogous story explaining the how and why of the air (for an example, see section 2.7.1). Together, these elements — the material of air inside the lungs of the participant and the conversational discourse —communicate the meaning of the air.

This contemporary installation practice promotes a space for an interplay between material and a framing through language, both visual (or invisible) and linguistic. Air is in constant relationship with the body through breath as well as persistent sensory presence through air pressure, air velocity, temperature and other factors. Being creatures that have co-evolved in this air, the human body (and all non-human other species) are particularly attuned to subtle changes in its chemistry.

The body as material is of particular importance in feminist discourse and politics, reflecting how women navigate health, science, and public presence in positive and productive ways. However, the body operates differently in this work — it is required as a sensory organ to feel the difference of the air. The time scales activated in *Different Kinds of Air, a Plant's Diary* decentre the

primacy of human perspectives, placing the human body against air that supported differently evolved critters from past possible realities, speculative pasts, and different material environments.

Material feminisms describes this co-constituting relationship of material and language. *Different Kinds of Air, a Plant's Diary* presents a locality to encounter language and material mutually and simultaneously. In the experience of the installation or performance — a material presence — the actuality of the viewers' bodies, as well as an explanation of the material, are crucial to understanding the meaning of the artwork.

2.6 The linguistic: storytelling

Language interacts with the AIR WORKS through storytelling. Chapter 4 is dedicated to the potent aspect of storytelling, however it is important here to introduce how storytelling completes the works.

Storytelling supports the work through performance, conversation, wall didactic, or simply through the title. Some element of storytelling is essential to each work; it may act as a conceptual jumping off point, to enact collaborative imagining, or to understand the invisible medium of air that is sometimes physically palpable (*Different Kinds of Air, a Plant's Diary*) and sometimes not (*Things Fall Apart*). The materials of and in the air may be of significant derivation, or differ from our familiar composition, the story of which enriches the physiological sensation of breathing it. It is essential to acknowledge that language forms an inextricable element in the crafting of meaning in these works. Language is a material, as much as the air is a material.

Similarly, with Robert Barry's *Inert Gas series*, the work is contingent on its title: its subtitle, *From a Measured Volume to Indefinite Expansion*, identifies not only the point of departure of gas from the cylinder but also the shift from imagined containment into imagined planetary expansion. As soon as the gas vacates the cylinder, it immediately becomes a fantastical substance expanding indefinitely to the edges of the planet. *From a Measured Volume to Indefinite Expansion* stimulates the imagery of the gas as particles forming a vast, continuously shifting network expanding from the site of release until eventually encircling the planet. In our imaginations it expands indefinitely, is battered by the movement of wind, air pressure, and weather, and constantly reforms and reconfigures itself with other atoms of the air. Barry plays with scale in this way, swelling the work from the atomic to the planetary, while the material itself is imperceptible — the title evokes this imaginary performance for the audience. In this way, Barry's *Inert Gas Series* embodies the material feminisms framework. Understanding the artwork requires the material as well as the language (through the title) together.

Just as the title functions in Barry's *Inert Gas Series*, the performance conversation in *Different Kinds of Air, a Plant's Diary* reveals the composition of the air and integrates it with the physiological sensation of breathing it. It delivers a narrative of a world that explains why and how this air is different, and what life it supported.

Spoken language is an ideal demonstration of the material feminisms framework. Oral storytelling in its crudest identity is air and vibration, or tiny ripples in air pressure that are received by the ear of the listener and decoded

as sound into meanings.³⁴ The material (small fluctuations in air pressure) and the meaning (the spoken words) are the same thing. The following figure from Fernando Espinoza's physics textbook *Wave Motion as Inquiry* shows how sound is the stretching and contracting of the density of the air itself.

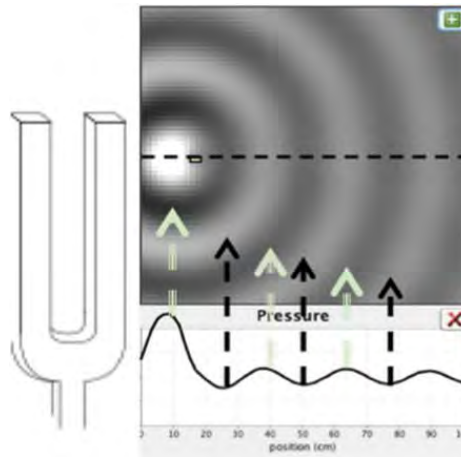


Figure 29. Diagram of sound waves, from "The figure is a representation of a longitudinal wave resulting from the motion of a tuning fork. Once struck, its vibrations set the surrounding air in motion and there are regions where the air is compressed (the dark bands), as well as regions where the air expands (the bright bands in between). The sine curve underneath represents the alternative progression of the movements, indicating that as the vibrations spread out they lose energy."

Meaning communicated via speaking is not chaperoned by air but is air itself. This is a pertinent demonstration that in the instance of spoken language, and spoken storytelling, the linguistic and the material are co-constitutive parts of the same gesture. What meanings can we give air that is both material and transporter of language?³⁵

³⁴ Fernando Espinoza, "General Characteristics of Waves," in *Wave Motion as Inquiry : The Physics and Applications of Light and Sound* (Cham: Cham : Springer International Publishing, 2017). 45–48.

³⁵ There are of course other experiences of sound/communication. Radio, microwaves, and other forms of electromagnetic radiation are used to convey messages around the planet. This part of the invisible material of air is outside the scope of this thesis, however, extensive and eloquent consideration of various waves and earth-cosmic sounds can be read about in Douglas Kahn's *Earth Sound Earth Signal*. This book integrates technological history, physical history and art history, with an emphasis on electronic and experimental sound and music. Douglas Kahn, *Earth Sound Earth Signal : Energies and Earth Magnitude in the Arts*, 1 [edition]. ed. (Berkeley: Berkeley : University of California Press, 2013).

Language exists of course in written and gestural forms (amongst others), and we can expand from the literal language-air relationship to understand how language as idea and material are linked. For example, language in *Things Fall Apart* alerts the audience to the knowledge that all is not what it seems in the installation. Whilst the sensation of the falling mist delivers an airy materiality, the reality of the distress cry of the methyl jasmonate is not perceived physiologically but linguistically through the wall didactic, or the spoken language of the invigilator. The language allows the audience member to hold the idea of the distress pheromone in their head at the same time as they are physically breathing it.

Materiality in spoken language can evoke other encounters with storytelling, such as a fireside tale, a knowledgeable sommelier, or scientific report.

2.6.1 *Different Kinds of Air, a Plant's Diary*: some stories of the airs

As storytelling is foundational to this work, I include below some of the stories in the language of the performance that were presented alongside the accompanying airs.



Figure 30. Emily Parsons-Lord, *Different Kinds of Air, a Plant's Diary*, 2014, performance documentation. Image courtesy of Peter Cheng and Proximity Festival.

Included on the menu is air from the greatest extinction event in the history of life on Earth, the Great Dying, or the End-Permian extinction event. The Great Dying occurred 252.5 million years ago and saw 90–97% of all species die out on land, along with around 80–85% of all ocean dwellers. It coincides with a dramatic spike in carbon dioxide and methane outgassing that corresponds with a rapid heating of the planet by 8 to 10 degrees. Oxygen levels plummeted below half what is usual today, while carbon dioxide levels were concentrated because of the acidification of the oceans, transforming the aerobic conditions for life on Earth. These changes occurred within a rapid geologic period of 10,000–100,000 years, which is a geological blink of an eye.³⁶ This is a pertinent period to breathe as the rates of change in the atmosphere in

³⁶ See Shaw, *Earth's Early Atmosphere and Oceans, and the Origin of Life*. Hatley, "The Virtue of Temporal Discernment Rethinking the Extent and Coherence of the Good in a Time of Mass Species Extinction."; Geoffrey S. Tyndall et al., *Atmospheric Chemistry and Global Change* (New York: New York : Oxford University Press, 1999); Berner and Canfield, "A New Model for Atmospheric Oxygen over Phanerozoic Time."

the Great Dying are similar to the rates of carbon dioxide and methane emissions since the beginning of the Industrial Revolution, and our current condition of being in the sixth great extinction.



Figure 31. Emily Parsons-Lord, *Different Kinds of Air, a Plant's Diary*, 2014, performance documentation. Image courtesy of Peter Cheng and Proximity Festival.

Another story accompanies Carboniferous Air, selected from a time when trees invented their own trunks around 300–350 million years ago. This air coincides with the evolution of lignin, the plant cells that form stable, rigid trunks that encourage the outpouring of oxygen from large trees.³⁷ Whilst the trees had a creative advancement, the bacteria that eats dead trees lagged behind evolutionarily, so fallen trees from this period did not decompose, but instead were compressed into coal seams. The outpouring of oxygen during this time enriched oxygen levels to nearly double our current global air ratio, creating a higher air pressure. The chemical and climatic conditions co-evolved the time of the giant insects. The high oxygen level and higher air pressure allowed the

³⁷ Jing-Ke Weng and Clint Chapple, "The Origin and Evolution of Lignin Biosynthesis," *New Phytologist* 187, no. 2 (2010).

giant dragonflies or meganeura with a 71 cm wingspan to evolve, as the high air pressure generated sufficient air resistance to support its flight.³⁸

The performance reaches a crescendo with the invitation to try Future Air. Future Air in this setting is not a speculative fabulation or a formation of gaseous ratios based on a projection of the future, but rather a characteristic of the gas offered. Sulphur hexafluoride is an air that is human synthesised in a laboratory for application in different industrial settings, as a non-conductive heavy gas.³⁹ It is about six times heavier than our current air, and when it is breathed it lowers the timbre and pitch of the voice, an effect opposite to talking after inhaling helium. After its sensual qualities are shared, it is also revealed that the air is the most potent greenhouse gas that has ever been tested, with a warming potential of 24,000 times that of carbon dioxide and a stability of up to 14 generations.⁴⁰ This air is literally part of the airscape of the future. The same molecules inhaled and exhaled by the visitor roam and drift for centuries, gaining and retaining heat from the ultraviolet rays of the Sun's light. But Future Air is also funny. Those that choose to try breathing this air will sound very deep, a sonorous Barry White type of voice that may surprise the audience member. Clearly, choosing to try this future air is effectively allowing it to dilute into the surrounding air. The air is heavy and will drop from the mouth.

³⁸ See Bekker et al., "Dating the Rise of Atmospheric Oxygen."; Claire, "Clues to Atmospheric Evolution in Earth's Ancient Sediments."; Berner and Canfield, "A New Model for Atmospheric Oxygen over Phanerozoic Time."; Sara Pratt, "Giant Prehistoric Insects Couldn't Compete with Birds," (Alexandria2012).

³⁹ See Quan Zhuang et al., "Decomposition of the Most Potent Greenhouse Gas (G Hg) Sulphur Hexafluoride (S F 6) Using a Dielectric Barrier Discharge (D Bd) Plasma," *Canadian Journal of Chemical Engineering* 92, no. 1 (2014).

⁴⁰ X. Y. Yu et al., "Evaluation of Nitrous Oxide as a Substitute for Sulfur Hexafluoride to Reduce Global Warming Impacts of Ansi/Hps N13.1 Gaseous Uniformity Testing," *Atmospheric Environment* 176 (2018); Zhou Sheng, Teng Fei, and Tong Qing, "Mitigating Sulfur Hexafluoride (Sf6) Emission from Electrical Equipment in China," *Sustainability* 10, no. 7 (2018); H. Specht and H. F. Brubach, "Inhalation of Sulfur Hexafluoride," *Science* 114, no. 2973 (1951). Zhuang et al., "Decomposition of the Most Potent Greenhouse Gas (G Hg) Sulphur Hexafluoride (S F 6) Using a Dielectric Barrier Discharge (D Bd) Plasma."

The offer is made that to prevent it from diluting into the atmosphere, we could catch the words that are spoken in a plastic bag and heat-seal it shut; a feeble plastic heirloom (air-loom) that carries the weight of time in the material. The work presents an echo when the participant returns home with a plastic bag of their words that requires 14 generations before the gas molecules are broken down. Where to store it?

Breathing air from the Great Dying feels different, similar to the sensation of breathing into a paper bag for a few minutes. It is different, but not so extreme as to cause a fit of coughing or to lose consciousness, yet this air contributed to the greatest extinction in the history of life on Earth and could slowly kill all contemporary aerobic life over sustained breathing. Our current human and non-human kin evolved within the air over time in an inextricable partnership.





Figure 32. Emily Parsons-Lord, *Different Kinds of Air, a Plant's Diary*, documentation of bags retained by anonymous participants of the performance.

This work brings the air around the performer and the audience member into sharp relief. The intimate physical relationship with the deep past through its air focuses attention on the delicate balance of our current air, arrived at through sympoiesis.

These stories are examples of evolutionary sympoiesis, epochal moments from a cycle that demonstrates how the activities of life influences the air, and the composition of the air influences how life can evolve.

Neither the story nor the air alone communicates the meaning of the work. One may read about the differences to the air chemistry or engage in animated conversation about the effects it had on the evolution of life, the oceans, and extinction, but feeling the air in your lungs completes the interaction. To try to describe the sensation of breathing this air would be an exercise in metaphor

and simile, linguistic gymnastics predicated on an assumption of previous physical experiences. Both the material and the linguistic are equally important. The sensation of the air in the lungs, and how it influences brain and body function must be practiced, active. The exchange in this work demonstrates the inexorable requirement for both language and material to contribute to idea expression. In this instance, neither side of the language-material, discursive-reality dichotomy creates meaning without the other.

Material and language are both paramount.

2.7 Decentring the human: materials in deep time and planetary scales

2.7.1 Donna Haraway: sympoiesis and naturecultures

Donna Haraway describes the productive process of lives co-evolving in collaboration with one another and with material Earth systems (as expressed above) as *sympoiesis*: a making together.⁴¹ Sympoiesis acknowledges that all things coexist in confluence with human, more-than-human, and non-human agents — we co-construct and co-constitute the parameters of bodies and knowledges together. In this way air jointly co-constitutes with not only the human, geologic, and non-human others in our contemporary context, but also through the full history of life on Earth. Humans exist in our current evolutionary morphology through aggregated chains of inheritance from our evolutionary kin, kin that became-with different kinds of air in a continual symbiotic cycle of change.

Sympoiesis is exemplified in the different compositions of air in *Different Kinds of Air, a Plant's Diary*, where the air is the result of complex gas exchange between different forms of life and Earth systems across deep time. The

⁴¹ Haraway, "Symbiogenesis, Sympoiesis, and Art Science Activisms for Staying with the Trouble." 27.

prehistorical moments chosen to be reproduced in *Different Kinds of Air*, a *Plant's Diary* are examples of times when the air has radically influenced how life has evolved (or become extinct), or where life has radically influenced the composition of the air.

As with *Different Kinds of Air*, a *Plant's Diary*, sympoiesis disrupts prevailing Western narratives of humanity as being distinct from nature, or the domination of the human species over other species and non-living elements of the material world. Sympoiesis transforms the notion of nature from an inert background upon which humanity plays out stories, into an active participant that influences and is influenced by life and Earth systems. It is a process that negotiates simultaneous boundaries of bodies. This concern with material in the storytelling of life on Earth is a material feminist approach to the life sciences and evolutionary history.

Neither artwork nor material can be severed from the context from which it is generated. Material environments are the result of complex and compound environmental, cosmic, sociopolitical, and cultural factors, what Donna Haraway calls the "material-semiotic knot."⁴² This approach to environment decentres human solipsism in acknowledging the inextricable relationship with the elements of the environment, gas exchange, and chemical signalling over time. For Haraway, the materials of natures and bodies, and the discursive realms of language, sociality, and history are knotted and tangled into one fabric, *naturecultures*.⁴³ There are no predetermined categories or unified actors whose boundaries are not blurred by chemistry, biology, history, and sociality

⁴² Donna Jeanne Haraway, "The Companion Species Manifesto : Dogs, People, and Significant Otherness," (Chicago, Ill.: Chicago, Ill. : Prickly Paradigm, 2003). 16.

⁴³ Ibid., 6–8.

— ‘nature’ and ‘culture’ are not distinguishable categories, nor opposite sides of a binary dualism; it is all naturecultures.

Breathing the air in *Different Kinds of Air, a Plant’s Diary* points to how life co-evolves with air chemistry, a coalition of gas exchanges, a becoming-with air, like the giant dragonfly became-with rising oxygen levels, or the extinction event of the Great Dying. Breathing air from different times is an invitation to become-with an alternative present, a different possible body, an evolutionary path not taken into alternative physiological actuality.

For respiring critters, breathing is synonymous with living. Reviving these airs from the past and contextualising them through artistic experience is an active, living way to consider deep time. The deep past is often materialised through geology — heavy, inert objects, in rocks and fossils. The conceit of the artwork to resurrect the material of past into a living, talking, breathing performance positions the audience member in relation to an immediate, vital, and urgent encounter with life and death, with flourishing and extinction. The act of breathing the air of an extinction event confronts the audience member with their own mortality, and by extension, with the mortality of the many humans and non-human-other species in our current era, a time of accelerating change. Breathing is living and dying with air. The AIR WORKS necessarily require these kinds of direct material encounter, the haptic sensation of a different air, and a different background.

2.7.2 Astrida Neimanis: water and bodies

Astrida Neimanis is a writer sympathetic to the feminist pull of material, examining interconnecting ideas through water. In her book *Bodies of Water*, Neimanis states, “we live at the site of exponential material meaning where

embodiment meets water."⁴⁴ Taking water as her central concern, Neimanis places material reality at the centre of the current planetary crisis, and extrapolates the myriad interconnected crises that water crosses: droughts, floods, contaminations, carbon sinking, and beyond. Material meanings are wrapped in cultures that face urgent environmental crises, and posit a question of cross species survival. Neimanis recasts embodiment as something that leaks and blurs its boundaries, and therefore challenges the legal and political case for both the individual and for ecosystems. The body is awash in environmental porosity and exchange, a process of making and being made with the environment. As the materials of the environment change due to the decisions made by humans in industry, agriculture, and other forms of land use, the contemporary human body is inseparable from the politics of the climate crisis.

Similarly, air crosses physical, cultural, political, and even species boundaries in its untethered movement. All planetary species are entangled with air, through gas exchange, air pressure, warmth, and UV protection. Air is shared across species through bodily exchanges; air nourishes and transforms life, marks geology, and is the material from which plants and trees are made. Neimanis's feminist politics may be applied to air to consider use, regulation, maintenance and care; an act of responsibility towards our other Earth-bound kin, and to all future critters.

Water, for Neimanis, demonstrates the interconnectedness of bodies with bodies; bodies of water with bodies of critters, all entangled in a symbiotic hydrological dance. This remapping of bodies and relationships challenges

⁴⁴ Astrida Neimanis, "Introduction: Figuring Bodies of Water," in *Bodies of Water : Posthuman Feminist Phenomenology* (London : Bloomsbury Academic, an imprint of Bloomsbury Publishing Plc, 2017)..

patriarchal axioms, such as the idea of discreet individuals, or distinct environments. Water is the material that highlights this:

Our watery bodies' challenge to individualism is thus also a challenge to phallogocentrism, the masculinist logic of sharp-edged self-sufficiency [...] a forgetting of the bodies that have gestated our own, and facilitated their becoming... Watery embodiment thus presents a challenge to three related humanist understandings of corporeality: discrete individualism, anthropocentrism, and phallogocentrism.⁴⁵

Working in an elemental register sympathetic to Neimanis, I argue that air, too, disturbs the trope of patriarchal rationalism, the supremacy of the mind over nature. Material feminisms acknowledges and celebrates the blurring of body/mind human/nature distinctions as a feminist act. Air that is contaminated by industrial effluence is held within all respiring bodies. Haraway's cyborgs teach us that individuals are made and sustained in concert with other species and technologies on a micro as well as a macro scale.⁴⁶ Neimanis' multispecies consideration of bodies of water further decentres the human species by interweaving the material on a planetary scale.

Neimanis introduces "proxy stories" that decentre human perspectives of time and scale.⁴⁷ Proxy stories are not substitutes for embodied experiences; instead

⁴⁵ Ibid., 3.

⁴⁶ Haraway, "A Cyborg Manifesto: Science, Technology, and Socialist-Feminism in the Late Twentieth Century." 150-151.

⁴⁷ Astrida Neimanis, "Embodying Water," in *Bodies of Water : Posthuman Feminist Phenomenology* (London : Bloomsbury Academic, an imprint of Bloomsbury Publishing Plc, 2017). 55.

they are, in Neimanis' words, "amplifiers" and "sensitizers."⁴⁸ Both art and science stories can amplify embodied sensory experiences, and render the audience member more sensitive to their encounter. This is particularly evident in *Things Fall Apart*, where, armed with the knowledge of the presence of the plant distress pheromone, the audience member focuses their sensory organs to detect any sensation. Although the plant distress signal is not decoded as distress by humans, an attentive audience member may identify a mild fragrance.



Figure 33. Emily Parsons-Lord, *Things Fall Apart*, 2017, *The Future Leaks Out*, curated by Tulleah Pearce for Liveworks, Carriageworks, Sydney. Photo by Lucy Parakhina.

The science story proxy is one mode in an assemblage of knowledges that amplifies the bubbling, gurgling ablutions of lived experience; of embodiment. Science stories, for Neimanis, cannot exist independently from subjectivity. The scientific empiricist statements on the nature of experiences are not congruent with living with watery bodies. Stories of the sciences — just as in encounters

⁴⁸ Ibid., 55.

with art — can shape, amplify and make the audience more sensitive to embodied learning.

2.7.3 Kathryn Yusoff: coal and racial mattering

In her book *A Billion Black Anthropocenes or None*, Kathryn Yusoff describes the effects of human activity on geology, and on the geologic record: a confrontation between differing time scales, the techno-human and the geological. Yusoff considers how geology is at the centre of the colonial practices of extractive industries that power forms of racist, capitalist oppression.⁴⁹ This perspective considers the deep-time geologic processes of oil and coal creation (from the time trees invented their trunks) — a simultaneous collapse and expansion of time through a powerful solid (or liquid) geologic object. These objects have potent material and symbolic potential to activate discourse, reflection, and political change.

Yusoff articulates how the alluvial is intensely political. The avaricious plight to unearth geological energy has powered globalised capital production that feeds the colonial impulse, and the development of fossil fuel industries that feeds manufacture and travel. The subsequent emissions from unearthing these materials releases carbon that has been sequestered in the ground for millions of years. Air captures the emissions of the geologic through natural earth systems, and sometimes through machines and human-devised technological apparatuses of the first world: cars, planes, power grids, and so on.

The results of human decision making in regards to Earth's geology confront the present with compounding histories. Without an object to hold and consider geo-bio-politics over time, the air must be translated, mediated

⁴⁹ Yusoff, *A Billion Black Anthropocenes or None*. 3–4.

through technology. Although air contains similar trace recordings over time, the invisibility and material sense of lightness, of nothingness, necessitates a spoken or written translation, or companion to the object. This could be the analysis of the air trapped in a core sample, for example.⁵⁰

Air's relationship with geology is composed of the complex amalgamated effect of organic life over time, the movement of geologic forces that result in outgassing, and other cosmic and Earth-bound events that relate to air, such as fires, human consumption of fossil fuels, and solar radiation.⁵¹ Air is one store for information, layered and structured differently than the geologic record, but equally contains evidence of industrialisation, dispossession of peoples, and the unequal exchange of value.

Through the work of Haraway, Neimanis, and Yusoff we can see that the materials of the natural environment and biological history are pieced together through a conglomerate of technological, natural and political histories, materials, and scales of time. The emphasis on the *materials* of these narratives demonstrates the material mattering of the natural environment and their political and cultural implications for the climate crisis. Our current crisis is the amalgam of these histories, which may be read through the air as much as in contentious geological objects.

The AIR WORKS are both implicitly and explicitly critical of the visible and invisible traces in the air that is carved by human action.⁵² The actions that elicit

⁵⁰ See Petit et al., "Climate and Atmospheric History of the Past 420,000 Years from the Vostok Ice Core, Antarctica."; Pongratz et al., "Coupled Climate–Carbon Simulations Indicate Minor Global Effects of Wars and Epidemics on Atmospheric CO₂ between AD 800 and 1850."

⁵¹ Cloud, "Atmospheric and Hydrospheric Evolution on the Primitive Earth. Both Secular Accretion and Biological and Geochemical Processes Have Affected Earth's Volatile Envelope." 729.

⁵² IPCC, *Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* (Cambridge, United Kingdom and New York, NY, USA: Cambridge University Press, 2013).

this residue is similarly built on foundations of the patriarchal endeavours of colonialism, capitalism, technology, and a free-market principle of progress.⁵³ The air is an integral element in the discourse of the climate emergency. This political character of air is a major figure in chapter 3, however, it is important to acknowledge the contentious space that air occupies in our current governance.

2.8 Things Fall Apart



Figure 34. Emily Parsons-Lord, *Things Fall Apart*, 2017, *The Future Leaks Out*, curated by Tulleah Pearce for Liveworks, Carriageworks, Sydney. Photo by Lucy Parakhina.

A 12 metre high fall of mist cascades into a large circular black pool. The audience is invited to view the work from the centre of this black pool and stand

⁵³ Yusoff, *A Billion Black Anthropocenes or None*. 4.

beneath the fall of mist in the centre. Diluted into the mist is a plant distress pheromone called methyl jasmonate.

Methyl jasmonate is a pheromone naturally produced by plants when they are in distress, either from physical injury, or environmental instability.⁵⁴ It acts as a signal to their neighbours, a cry of distress and a warning flare to the surrounding environment ("we are under attack!").⁵⁵ It is a chemical signal that humans have not co-evolved to receive. We are unable to heed the multiple warnings directly from the environment. The audience member bathes quietly in the sublime mist ignoring the warning whilst simultaneously inhaling its disaster. *Things Fall Apart* considers our human-centred relationship to our changing environment, and meditates on environmental futures as we walk blindly and deafly onward into this human-constructed catastrophe without placing value on our other Earth-bound kin. This work acknowledges an interspecies blindness, a denial of interspecies symposium.

⁵⁴ Ian T. Baldwin, "Volatile Signaling in Plant-Plant Interactions: "Talking Trees" in the Genomics Era," *Science* 311 (2006).

⁵⁵ Richard Karban, "Plant Behaviour and Communication," *Ecology Letters* 11 (2008); Monica Gagliano, "Seeing Green: The Re-Discovery of Plants and Nature's Wisdom," *Societies* 3, no. 1 (2013); Tyndall et al., *Atmospheric Chemistry and Global Change*.



Figure 35. Emily Parsons-Lord, *Things Fall Apart*, 2017, *The Future Leaks Out*, curated by Tulleah Pearce for Liveworks, Carriageworks, Sydney. Photo by Lucy Parakhina.

The air is the conduit for chemical signals, a complement to a multitude of invisible aerial inhabitants and signals. As part of the fabric of the air, these materials inhabit our bodies as much as the air, linking humans and all living

and non-living inhabitants of the air in a complex interconnectedness.⁵⁶ As Monica Bakke writes:

Air developed as the most ancient means of communication, long before the appearance of humans into the earth's ecosystems, serving as a vast pool jammed with chemical signals which only recently started gaining scientific recognition. Messages expressing desires, warnings and survival instructions are constantly sent via air by plants and animals. Plants, therefore, cannot be considered passive air users, as they are capable of complex signalling, some of which travels into the air and through the air.⁵⁷

The audience's solitary journey onto the platform and out to the centre of the dark pool to bask under the mist delivers a sense of the sublime; the terror and beauty of nature. The slow continuous fall of soft mist isolates the viewer, simultaneously private and public, the audience becoming performer and completing the artwork.

⁵⁶ Monica Gagliano et al., "Out of Sight but Not out of Mind: Alternative Means of Communication in Plants," *PLOS ONE* 7, no. 5 (2012); Gagliano, "Seeing Green: The Re-Discovery of Plants and Nature's Wisdom."; "Green Symphonies: A Call for Studies on Acoustic Communication in Plants," *Behavioral Ecology* 24, no. 4 (2013).

⁵⁷ Monika Bakke, *The Life of Air, Dwelling, Communicating, Manipulating*, ed. Monika Bakke (Open Humanities Press, 2011). 1.



Figure 36. Emily Parsons-Lord, *Things Fall Apart*, 2017, *The Future Leaks Out*, curated by Tulleah Pearce for Liveworks, Carriageworks, Sydney. Photo by Lucy Parakhina.

The pleasant sensation of standing under the mist is familiar, the materiality suggesting waterfall spray, sea spray, rainforest fog or mist, or changing weather. It is a calm that contradicts the cry of distress of the methyl jasmonate, and an overwhelming sense of the scale of the current disaster of natural world.

The invisible materials in these AIR WORKS are not stand-ins for other objects. They are not representational or figurative, not surrogates for theory or historical narratives, but literal. Contained within the material itself is the accumulation of histories and matter, lives of both human and non-human, decisions of resource usage, and the results of shifting geology. Where and how were these molecules made, and how do they come to be in a given location at a particular time?



Figure 37. Emily Parsons-Lord, *Things Fall Apart*, 2017, *The Future Leaks Out*, curated by Tulleah Pearce for Liveworks, Carriageworks, Sydney. Photo by Lucy Parakhina.

Similar to *Different Kinds of Air*, *a Plant's Diary*, *Things Fall Apart* uses an invisible material, in this case, methyl jasmonate. It is perceived as a faint smell, as blurry and indistinct as any memories it might elicit. Physiologically, it has no function for humans who have not co-evolved to intercept and decipher the pheromonal communications of plants. In opposition to *Different Kinds of Air*, *a Plant's Diary*, which is a guided performance, storytelling in this work is via either a didactic wall text or conversation with an invigilator. It is, however, possible for some viewers to encounter the work without an awareness of the presence of the pheromone, chemically deaf to the distress. The viewer becomes performer, an apposite demonstration of myopic anthropocentric experience of the environment, a blind and deaf march forward into deepening climate crisis. The disregard for plant communication is not ill-intentioned; the work is in fact structured around humans being ill-informed, ignorant of this distress call. It is also poignant that the methyl jasmonate used in the

installation is human extracted, purified and packaged, and purchased online from a site claiming it can cure cancer. The very nature of the tree communication signal is translated through techno-capitalism (and also, in its realisation, though a varyingly reliable state-funded arts festival, *Liveworks*.)

The relationship to material in *Things Fall Apart* may catch the audience member off guard. It evokes artists such as Teresa Margolles and her works *En el Aire* (2003) and *Aire* (2004), whereby Margolles connects the audience member viscerally and conceptually to death by using water that had previously been used to clean dead bodies in a Mexico City morgue.

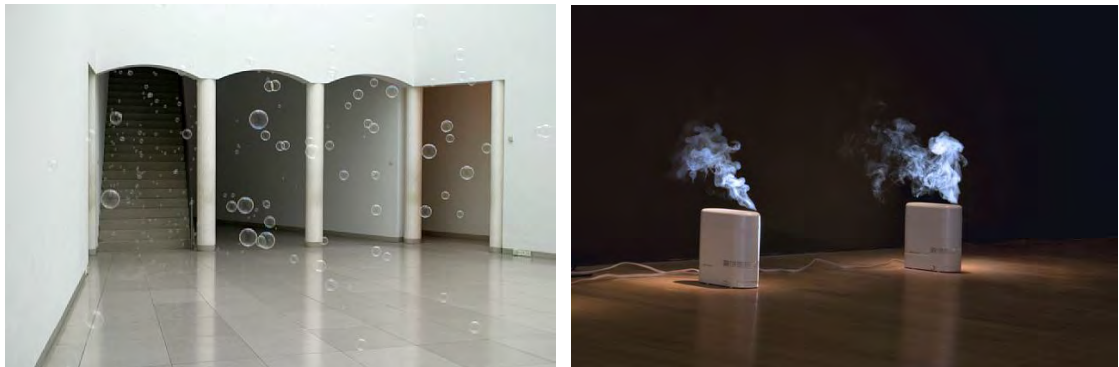


Figure 38. (left) Teresa Margolles, *En el Aire*, 2003, installation view of soap bubbles made from water from the morgue, Art Basel Unlimited, Basel, Switzerland, curated by Samuel Keller. (right) *Aire*, 2004, exhibition at Frankfurt's Museum für Moderne Kunst, *Muerte sin fin* (Death without End). Image courtesy of the artist.

Post-mortem water is used to make multitudes of sparkling bubbles that float tantalisingly and innocuously from the ceiling, falling and popping on the audience and the surface of the walls and floor, the materiality suggesting a children's party, a festival, or extraordinary magical weather event. Only after encountering the material does the audience member learn of its provenance. In another version of the work the water is transformed into vapour rising from domestic humidifying appliances, evaporating into the air and filling the lungs

of the audience. This is an intimate physicality between material and idea, material and language.

En el Aire and *Aire* respond to the many bodies that are the victims of violence, or drug abuse in conditions of poverty, many of whom are unclaimed.⁵⁸

Margolles' subject matter considers the intimacy of mortality in contemporary life for the people in poorer parts of Mexico. Life extinguishes as the fragile bubbles burst upon contact. However, the materials transform, mutate and begin the next stage of their hydrological cycle.

For Margolles, the reliance on a storytelling element is essential to the work. Only after breathing the humid air or playing in the bubbles does the audience find out the derivation of the water used. These works invite a physical sensation as well as a contemplative stepping-off point, a site for the mind to wonder and consider the invisible traces humans and other living beings leave and are marked by.

Similarly, methyl jasmonate is commonly present in the air all the time. It is part of the messy noise of volatile communication carried in air. In *Things Fall Apart* the human synthesised version declares its presence in the site of the artwork, drawing attention to the invisible.

The body of the viewer is a material that completes the work in cooperation with the air. The physical sensation of the work is accompanied by storytelling or a didactic in some way that together act as a gateway to the content. They illustrate the indivisible co-constituting requirement of material and language to act as one.

⁵⁸ Amanda Coulson, "Teresa Margolles," *Frieze*, no. 85 (2004).

As the key materials in these works are invisible, ubiquitous, sometimes non-discernible, they are simultaneously both material and necessarily notional. To breathe air is to breathe the idea of air, or to breathe methyl jasmonate is to breathe the idea of distress, just as to touch the water in Margolles' works is to come into contact with mortality. The works are completed when both the material and the idea is ingested by the viewer, drawn into the lungs and experienced corporeally. The inhalation excites a focus on bodily sensation whilst expanding a sense of wonder via the accompanying storytelling, written didactic, or performance conversation with the artist.

The air is all around us, filling vacuums, and submerging all forms. Its tangible sensations are so innate and familiar as to render them unconscious. Air that we breathe and air that we move through is forgotten, automatic, apparent; only upon breakdown, that is an aberration to the expected, does it stand its ground and peer back. These artworks return attention to that which has become unconscious, to re-examine the material and find it alien. Through the art encounter an attention to the immediate is explicit, the immediate and proximate air transforms the notional to the specific — encountering *this particular air, here*, rather than the idea of air being generic and all pervasive.

2.9 Decentring the human: a look to the future

Implicit and explicit in these AIR WORKS are questions about the future. What does a continued sympoiesis look like in an air that is drastically changing as a result of anthropogenic activity? How is life and extinction on Earth currently affecting the air and what are the repercussions for how life may evolve? What happens when humans have the technology and the will to consciously

intervene in and compose the materials and aesthetic of our environment? What becomes of our non-human Earth-bound kin? The question of air as political object that has implications for the future is the subject for the following chapter, however, these questions are foundational to the AIR WORKS explored in this chapter.

The presence of Future Air in *Different Kinds of Air, a Plant's Diary* epitomises the sense of responsibility and culpability of the individual audience member. The decision to try Future Air has long, resounding material effects on the airtape into the future. Future Air exists; it is a synthesised compound molecule, made by humans in our current age and with a particular technological capability, that was selected to be in the artwork by the artist. Enduring consequences of individual decisions on the environment is the responsibility of all humans, not just the audience member.

Things Fall Apart connects with the condition of being an emotional human being in a social and political world. The tumult of internal landscapes dance upon the viewer as much as the inhalation of the plant cry of distress and warning. The affective experience within the work is one of solitary contemplation and quietness, like the sensation of watching the ocean or the weather. The title is taken from Pema Chödrön's book *When Things Fall Apart: Heart Advice for Difficult Times*,⁵⁹ and acknowledges the emotional human condition in relationship with climate crisis. Things fall apart for us as human individuals as well as a collective. For Chödrön, things fall apart, but afterwards they are rebuilt, reconfigured, different from before their collapse, but now able to endure and persevere. A deep time perspective recognises that even after

⁵⁹ Pema Chödrön, *When Things Fall Apart: Heart Advice for Difficult Times* (Boston: Shambhala, 1997).

five planetary extinction events, life in some form is preserved. Even after heartbreak, the individual recovers.

Things Fall Apart acknowledges disruption between earthly kin, and highlights the narrow focus by humans on human systems, knowledges and naturecultures. The 'now' of *Things Fall Apart* is emblematic of our current situation, a narrow weaving together of the fibres and tendrils of the narratives of our climate crisis in order to image a future.

2.10 Conclusion

This chapter began by establishing a distinction between feminist art aesthetics and feminist frameworks and methodologies, via the work of Judy Chicago and the AIR WORKS. The AIR WORKS were created using feminist frameworks and feminist methodologies that amplify anthropogenic changes to materials of the climate crisis. As materials are key to the AIR WORKS, it was important to establish the differences between material and materiality, using examples from Kate Dunn and Tim Ingold; materials being physical, whilst materiality reflecting the viewers expectations about what the object is made from.

Material feminisms was used as a framework to understand two AIR WORKS: *Different Kinds of Air, a Plant's Diary* and *Things Fall Apart*. Through a close reading of Stacy Alaimo and Susan Hekman, the co-constitutive nature of material and language was used to consider the materials of the climate crisis. In both AIR WORKS the material of the air, the material of the body of the audience member and the linguistic element of storytelling is essential. Similarity was established between the AIR WORKS and Robert Barry's *Inert*

Gas Series/Helium, Neon, Argon, Krypton, Xenon/From a Measured Volume to Indefinite Expansion.

Storytelling in both *Different Kinds of Air*, *a Plant's Diary* and *Things Fall Apart* is deployed to describe the meaning of Earth's materials, and their transformations through deep time. Storytelling in the AIRWORKS activates Donna Haraway's term *sympoiesis*, the narrative of co-evolving, of jointly creating the parameters of the world together to form naturecultures.

Air derives meaning through scientific, cultural, and physiological interplay between the body and language. The material requires a physical encounter, and the accompanying linguistic explanation are equally and fundamentally important.

The AIR WORKS bring the audience into a physical encounter with air of different times. They are examples of where life and air have co-evolved into alternate realities that sustain unfamiliar life forms. This physical encounter with the air within the performance renders the familiar unfamiliar; not just the air, but also the environment that produced the air originally.

Air is not static. Air is in a continuous state of transformation, in ongoing sympoiesis with earth-bound life, and geologic and cosmic forces. This is explored using Astrida Neimanis' thinking with water, and Kathryn Yusoff's thinking in relation to coal, to elevate embodiment as a mode of learning and communicating, and connecting with all critters that rely on Earth-systems.

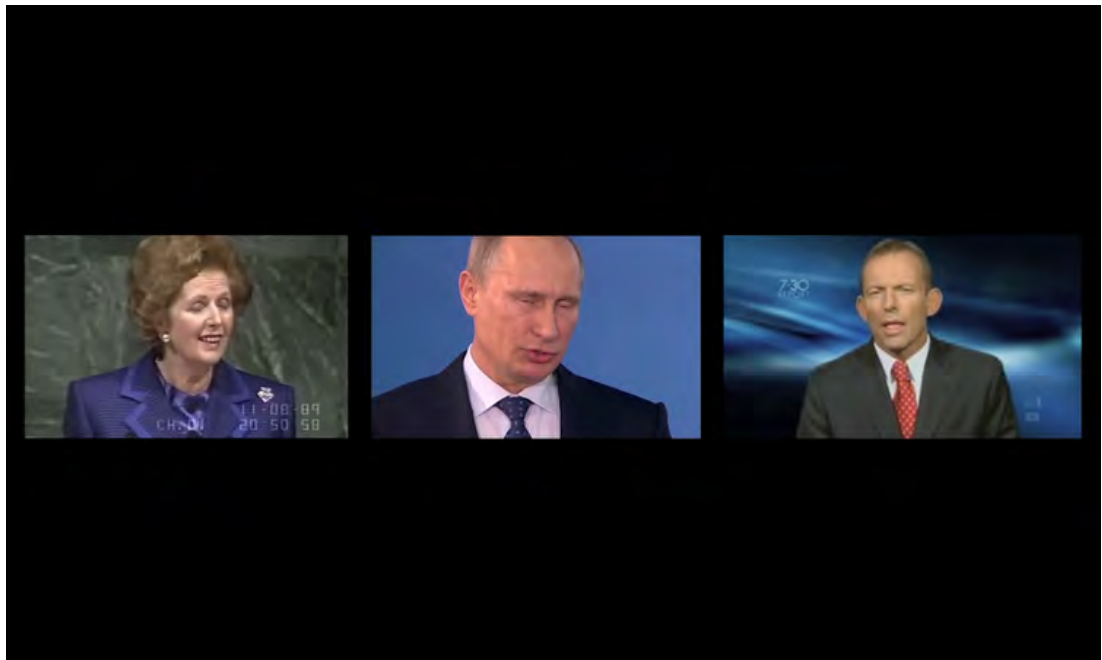
The direct physiological encounter with these works highlights how something familiar can be rendered unexpected. They encourage wonder, and a critical

reflection on the status quo, and the structures underlying accepted ways of being.

Changes to the air through anthropogenic activity puts humanity in a situation where our emissions are being returned to us, made evident through heating, pollution, and carbon emissions. The results of industrialisation, internal combustion, and greenhouse gases, have become the prevailing narrative of the air during this environmental collapse. This implicitly asserts a question over the future of air and by extension, the future of life on Earth. What happens when a fundamental requirement to sustain life breaks down? It is impossible to stand outside of air to look at it, but through these artworks the audience can find the unconscious unfathomably alien.

These concerns come into sharp focus in the following chapter, that takes the political dimension of the changing air seriously, interrogating how air can be an aesthetic of the climate crisis.

Chapter 3: Air as politics



Three screens show politicians at podiums, a familiar aesthetic of climate crisis discourse. Their words are erased, leaving only the air used to form their fervent promises and policies, a claustrophobic hyperventilation. Opposite the videos are large hanging bergs of dry ice that describe our elected rank's time in office, a lost potential.

The air of each exhaled word from a politician talking about the climate crisis is 100 times richer in carbon dioxide.

Roughly twenty-one shallow breaths a minute — depending on the politician — over 100 minutes uses about 5,250 litres of air.

Our Fetid Rank responds to the aesthetics of anthropogenic changes to climate. Alongside the tropes of retreating glaciers, melting icebergs, and precipitous x-y graphs is always a podium and a politician talking.

The screens capture the air used to physically shape the words that constitute cyclical discourses, futile dialogues and fervent denials of climate crisis. They reveal publicly canvassed, suspended private moments of cognition and reflection, glimpses of emotion, unconscious ticks, and dubious authenticity.

Dank, humid, moist. Foul, fetid, rank.

The unconscious tendency to mirror breathing patterns has physiological effects on the viewer, inducing a hyperventilated claustrophobia and involuntary proximity to the mouths of our elected rank.

3.1 Introduction

Chapter two employed a material feminisms framework to argue that air is co-constituents with language in meaning making in art. However, my practice functions differently in this chapter; here my work queries the limits to an aesthetics of the climate emergency using air as a case study, and stands alongside other artists and theorists. *Our Fetid Rank (Margaret Thatcher's bottom lip and Bill Clinton's tongue)* catalogues and configures politicians' climate crisis speeches in a three-channel video work. The video emphasises the use of air in the history of climate crisis utterance, and the political dimensions of the climate emergency.

This chapter explores the boundary object as a device that constitutes air as a political object via the work of Susan Leigh Star, and Kate Dunn. It investigates air as infrastructure, again through Susan Leigh Star, and also the work of Maria Puig de la Bellacasa; and an aerial-commons drawing from Astrida Neimanis' consideration of bodies of water. Air is a potent political material in artmaking in conjunction with climate discourses. I establish the *artwork* as a boundary object that synthesises climate science and politics, and reconsider didacticism in climate crisis art as a feminist act in dialogue with Martha Kenney. Amy Balkin's *Public Smog* is assessed as a cross-modal boundary object/art object.

Having established its political dimension, I propose air as a new aesthetic of the climate crisis. I interrogate a different understanding of aesthetics that surpasses notions of aesthetics as beauty or the visual, with reference to Nicholas Mirzoeff, Al Gore, and Kathryn Yusoff, and advocate for aesthetics as embodied material experience in dialogue with Mark Johnson. Expanding the notion of the aesthetic even further, Kyla Wazana Tompkins and Sylvia Wynter posit that aesthetics is performed in an experiential power dynamic supported

by sociopolitical contexts. I argue that air is a new aesthetic of power dynamics distributed asymmetrically between users (breathers and protesters), carbon contributors (polluters) and those of our elected rank (policymakers).

A climate crisis aesthetic incorporates embodiment and power relations through climate materials, specifically in this case, with air. This aesthetic is explored through the artworks *Our Fetid Rank (Margaret Thatcher's bottom lip and Bill Clinton's tongue)*, Latai Taumoepeau's *Repatriate I*, and *i-Land X-isle*, Amy Balkin's *Public Smog*, and Olafur Eliasson's *Ice Watch*.

I am writing this thesis during the apex of Australia's catastrophic bushfires in 2019–2020, the smoke from which chokes Sydney, Canberra, Melbourne, and even New Zealand. This chapter concludes with a reflection on the political nature of air, and how power relationships and political aesthetics play out in real time alongside the disaster.

Politics relates to governance and decision making around the climate crisis as well as the political discourse around those decisions. Here I borrow Kathryn Yusoff and Jennifer Gabrys' definition of politics in *Arts, Sciences and Climate Change: Practices and Politics at the Threshold*:

While politics might be understood as anything from the machinations of government to the forms of assembly and contest that produce public engagement or policy documents, here we suggest a definition of politics that encompasses the material and sensible practices that

enable and are continuous with political possibility and experimentation.¹

This definition includes the forms of governance, political discourse, and the material reality of the crisis that is both under acute scientific scrutiny as well as daily quotidian material encounters, such a normal respiration. I chose Yusoff and Gabrys' definition because it activates the creative and experimental potential for change.

3.2 *Our Fetid Rank (Margaret Thatcher's bottom lip and Bill Clinton's Tongue)*



Figure 39 Emily Parsons-Lord, *Our Fetid Rank (Margaret Thatcher's bottom lip and Bill Clinton's tongue)*, 2015, video still, three-channel video, 10:06 min, video still image, first exhibited at Firstdraft Gallery. Courtesy of the artist.

Margaret Thatcher approaches the United Nations General Assembly podium. She is cool and confident, commanding the room with the full heft of her

¹ Jennifer Gabrys and Kathryn Yusoff, "Arts, Sciences and Climate Change: Practices and Politics at the Threshold," *Science as Culture* 21, no. 1 (2012). 4.

dominance in global politics in the late 1980s. The speech she is about to deliver is one of the first of its kind, recognising anthropogenic changes to climate on a global stage and emphasising the need for collective action. It is sprinkled with contradiction and euphemism, foreshadowing a tacit allegiance to the 'green' of free market economic growth rather than a 'green' of environmental activism and climate justice. This brand of environmental politics is confused; it extolls the virtues of globalised capitalism and trade as restorative peace assemblages, and demonstrates an emphatic faith in the self-correcting nature of the free-market economy that will ultimately be the saviour of our environment, as balance-it-must, being the source of all economic produce. Techno-fixes to be lauded whilst lamenting the threat to the global environment:

We must resist the simplistic tendency to blame modern multi-national industry for the damage that is being done to the environment. Far from being the villains, it is upon them that we rely to do the research and find the solution... It is industry which will develop safe alternative chemicals for refrigerators and air-conditioning. It is industry which will devise bio-degradable plastics. It is industry which will find the means to treat pollutants and make nuclear waste safe — and many companies as you know already have massive research programmes.²

The 1980s is a significant decade in the development of the material of the climate crisis, and in the history of understanding of the scope, causes,

² Margaret Thatcher, "Speech to United Nations General Assembly (Global Environment)," in *United Nations General Assembly* (New York: Margaret Thatcher Foundation, 1989). accessed 30 December 2020, <https://www.margaretthatcher.org/document/107817>.

conditions, and potential of the current environmental crisis.³ The decade saw the unfolding narrative of scientific research that confirmed the proposition of the greenhouse effect caused by burning fossil fuels, which brought clarity as to its global effect on temperatures and climate.⁴ The 1980s also saw battles, blocks, agendas of translating research and knowledge in to policy on local, national, and international levels. Thatcher's address to the United Nations comes at a critical moment, speculates Nathaniel Rich in his essay "Losing Earth: The Decade We Almost Stopped Climate Change: A Tragedy in Two Acts," when an agreement was almost made to restrict carbon emissions before they reached tipping-point levels at an international summit in the Netherlands.⁵ Acting at this point in 1989 would have addressed many pollution-related problems before most of the structures that currently support and perpetuate burning fossil fuels were in place.

³ Nathaniel Rich, "Losing Earth: The Decade We Almost Stopped Climate Change. A Tragedy in Two Acts," *New York Times Magazine* (2018).

⁴ Anonymous, "A Matter of (Half) Degrees," *Nature* 562, no. 7726 (2018); P. N. Pearson and M. R. Palmer, "Atmospheric Carbon Dioxide Concentrations over the Past 60 Millions Years," *ibid.* 406, no. 6797 (2000); T.M.L. Wigley, "The Paris Warming Targets: Emissions Requirements and Sea Level Consequences," *Climatic Change* 147, no. 1 (2018); Solomon et al., "Irreversible Climate Change Due to Carbon Dioxide Emissions."; Information, "State of the Climate: Global Climate Report for Annual 2019."

⁵ Rich, "Losing Earth: The Decade We Almost Stopped Climate Change. A Tragedy in Two Acts."



Figure 40. Emily Parsons-Lord, *Our Fetid Rank (Margaret Thatcher's bottom lip and Bill Clinton's tongue)*, 2015, three-channel video, 10:06 min, installation view, first exhibited at Firstdraft Gallery. Image by Zan Wimberley.

Watching Thatcher gulp the air that shapes her words focuses audience attention on her manner and also her visibility as a historical figure. It is impossible not to think of striking miners, and equally hard not to think of that same visage frail, diminished, and suffering dementia, the inevitable demonstration of the scales of time at play in climate crisis discourse. In the three-channel video work *Our Fetid Rank (Margaret Thatcher's bottom lip and Bill Clinton's tongue)*, Thatcher's words are erased, edited out, leaving only her breathy gas exchange, her innate biological ability to process oxygen and expel carbon dioxide. As a matter of habit, an unconscious tick, her tongue wets her bottom lip relentlessly, and her thinking-breathing-pausing expression curls with arrogance and self-assuredness. Thatcher is both an inheritor and perpetrator of colonialism, geopolitical warfare, and economic and industrial expansion, the foundational structures that buttress and compel late capitalism, intensifying production and waste; structures that prop up the crisis and

prevents meaningful change from being instituted by way of laws and regulation.

Upon entering the exhibition space, viewers encounter a small shelf of chewing gum next to the room sheet. Each piece of gum is individually wrapped in a portrait of a politician (our elected rank) with the word RANK or FETID stamped across it. Enter the space masticating, sharing moist hot breath the smell of spearmint, or leave the space and wash your mouth out.



Figure 41. Emily Parsons-Lord, *Our Fetid Rank* (Margaret Thatcher's bottom lip and Bill Clinton's tongue), 2015, documentation of chewing gum.

One by one, politicians familiar from white Western news broadcasts take their place at podiums to exhaust their breath, exhaling sentences about the climate crisis, breathy and moist like someone panting too close to your ear. Their words are redacted, leaving only their sharp or deep inhalations (depending on the politician and emotional peaks and troughs of their speech). Everyone consumes oxygen and expels carbon dioxide, but the breath in some people's bodies carries the weight of democratic election (and sometimes not) to make decisions over policy that effects the many and builds a legacy for all future inheritors.



Figure 42. Emily Parsons-Lord, *Our Fetid Rank* (Margaret Thatcher's bottom lip and Bill Clinton's tongue), 2015, video still, three-channel video, 10:06 min, video still image, first exhibited at Firstdraft Gallery. Courtesy of the artist.

Each politician is a story and a symbol, their faces being the image of their leadership that represents a narrative of the values they exalt, like a building block along the separation wall of climate crisis between rational human economic growth and environmental disaster.⁶ This is a screen that rationalises inaction; a wall built on discrediting scientific consensus and excuses in order to prioritise the benefits of extraction and burning fossil fuels. It is built by politicians such as Bush, Blair, and Howard. There is also the opponents, the deniers, the too-busy-fighting-terrorists-to-notice, the bleeding hearts, the sympathisers and organisers; those that want to act to make change, those that wish to appear so, and some who enjoy contrarianism. The volume of air that constitutes this discourse elucidates how ineffective rhetoric is in the face of

⁶ Barack Obama, "President Obama Speaks on Climate Change" (Georgetown University, 2013); Thatcher, "Speech to United Nations General Assembly (Global Environment)."; Joshua P. Howe, *Making Climate Change History : Primary Sources from Global Warming's Past*, Making Climate Change History : Documents from Global Warming's Past (Seattle: Seattle : University of Washington Press, 2017); Bert Bolin, *A History of the Science and Politics of Climate Change : The Role of the Intergovernmental Panel on Climate Change* (New York : Cambridge University Press, 2007). Rebecca Willis, "Taming the Climate? Corpus Analysis of Politicians' Speech on Climate Change," *Environmental Politics* 26, no. 2 (2017).

convenience consumerism. We need meaningful structural change; you give us plastic straws.

3.2.2 Audience experience of the work

Watching from within a small, tightly packed gallery space in Sydney, the continued inhalation of political figures on the screen subconsciously compels the audience to mirror their breathing patterns and induce hyperventilation, or the opposite, holding one's breath, a breath abated waiting for relief and fresh air. Both hypo- and hyperventilation have a physiological effect on the body and emotional landscape of the viewer: a growing sensation of panic, a nervous energy in the chest, a tightening of the stomach, a dizzying of the senses. As the canon of politicians talking about the climate emergency marches past, there is a sense of impending, a sense of time wasted. Dread. Alarm. Urgency. The body of the audience, the air in the room, the smacking sounds of mouths of our elected rank, and those fellow chewing gum-smacking viewers comprise the materials of the three-channel video work.

Visitors to Firstdraft, the gallery showing the first iteration of *Our Fetid Rank*, reported the physiological effects of the work. The gum, the chewing, the breathing, the increasingly oxygen-poor air, the cringing, the heat in the tiny room crammed with artists, and the involuntary proximity to breathing apparatus of politicians conveys a sickening anxiety. Part business-card-convenience, part after-dinner mint, the chewing gum concentrates focus on the mouth, the moist, of the audience as well as the mouths of the politicians. It's disgusting.

Chewing gum is a synthetic, non-biodegradable plastic rubber substitute that is literally chewed up and spat out into the environment, your shoes, or public

infrastructure. Ubiquitous in urban environments, it is emblematic of repulsive consumer waste, but is also a transitory deposit of genetic information, a physical trace or marker of human movement through space, and a modifier of urban landscapes.⁷

Breathing-with our human kin, the inescapability of our shared crisis is materially and urgently emphasised through air. We share this air not only with our associates in the exhibition, but also all of those humans and more-than-humans that have come before, and those that are geophysically or ideologically disparate. The air that we share transcends the boundaries of the nation state that are represented by their elected or appointed officials and their breaths. The air we share transcends the boundaries of species and taxonomic ranges. This air marks the landscape, rusts our structures, spreads bacteria, viruses, dust, insects, becomes plant, and absorbs and dilutes the gases that are trapped in permafrost and that leak from beneath the Earth's crust. In her book, *The Life of Air*, Monica Bakke states that "we have finally come to realize that air is messy, being neither an empty space nor a void, but a space where species meet."⁸ Bakke refers to an aerobiologist's microscopic view of any cubic metre of air, which reveals hundreds of thousands of individual microbial cells that could represent hundreds of unique taxa.⁹ Air is noisy with life, with multiple species, challenging any idea of air as void or empty.

⁷ Ibrahim Palabiyik et al., "Development of a Natural Chewing Gum from Plant Based Polymer," *formerly: Journal of Environmental Polymer Degradation* 26, no. 5 (2018); Maite Zubiaurre, "Litter and the Urban Imaginary: On Chewing Gum and Street Art," in *The Routledge Companion to Urban Imaginaries*, ed. Christoph Lindner, Meissner, Miriam (London: Routledge, 2018).

⁸ Bakke, *The Life of Air, Dwelling, Communicating, Manipulating*.online.

⁹ Womack, Bohannon, and Green, "Biodiversity and Biogeography of the Atmosphere." 3645.

In the context of an anthropogenically induced climate crisis, the politicians in the video represent the collective potential for change; for a collective decision-making that ripples outward from conversations with specialists, scientists, and advisors to systemically impose changes to industry and the individual and create cleaner futures. However, the compound effect of figureheads making no inroads to intervention in the climate crisis is something we know from hindsight, looking back at the 1980s. But as the narrative continues, the influence we may afford our elected rank becomes more and more impotent.

Messages about the changes to climate are politicised, and amplified with distinctly non-physical notions such as progress, growth, access, free movement, and so on, concepts that are conceptually distinct from climate crises, but are materially embedded. As will be demonstrated below, air's plurality of functions, variability, longevity, as well as its pervasiveness (on Earth) render it an object of political significance.

3.3 A politics of air

3.3.1 Containment of air as political object



"Pure Holy Land Air" in Jewish Judaica tin box, 1950. For sale on ebay, July 2014.
<http://www.ebay.com/itm/Jewish-Judaica-tin-box-pure-holy-land-air-1950-60s-/380250353333>

Figure 43. "Pure Holy Land Air," eBay sale item, July 2014, www.ebay.com/item/jewish-judica-tin-box-pure-holy-land-air-1950s-60s/380250353333. Accessed 5 July 2014.

For just USD \$99.00 on eBay, plus shipping (variable), you can purchase a small tin of "Pure Holy Land Air" from the 1950s. Packaged like a tin of sardines, loud red text announces the warning: "DO NOT PUNCTURE — CONTENTS IRREPLACEABLE!"

Completely sealed, this air is intended not to be used, that is, to be released or inhaled, but to be stored, like a talisman, a keep safe, a physical link to holiness itself, where instead of breathing it, the idea of filling your lungs with holiness fills the soul with holy contemplation.

This slice of holy air derives meaning from not only the place of its collection, but also in the distance in time between its collection and now. Sealed in the 1950s, this air was trapped before the 1967 Six Days War, before the 1988 Declaration of Independence of the Palestinian State, other wars, treaties, ceasefires and bombs (although after the first deployment of nuclear weapons, which would otherwise render carbon dating impracticable and unreliable). This air is a highly contested political object.

However, the air in the tin is not fixed. Instead, it resides in a dynamic space, subject to changes in temperature, cosmic rays, decay of the tin barrier, and changes in air pressure as it passes around the world from hand to hand. Yet, should a puncture occur, the object is null and void. Similarly, without the written record on the container, signifying its contents and place of origin, the purchaser would not assign it any more value than it would an empty container. The tin is both a physical and ontological barrier separating the pure, the

valued, from the ubiquitous. It is a tiny archive: the air and its semiotic container can only have meaning when they exist together.

3.3.2 Air as boundary object

Air crosses technological, scientific, political, biological, and sociocultural discourses and fields of specialised research. A dancer's relationship with air as a primary material for movement will differ from an atmospheric chemist's positioning of the chemical changes to air as a central concern. Different again is a hot air balloon pilot's consideration of temperature and wind direction, or an infectious disease specialist's assessment of air as a habitat or medium for contagion. Everyone has an urgent, specialised and personal claim over air. In this way, air functions as a boundary object.

Boundary objects are objects, concepts, or sets of collated information that function across disciplines and for multiple applications. While the site of the information — the boundary object itself — remains unchanged, the translation or use of that information is extrapolated and applied to certain specialist areas, such that the same source of information may be used by multiple groups, each with specialist interests. A map, for example, may be used to identify natural features in a landscape, but it may also be used to navigate a system of roads, or to remap a coastline after sea level rise, to calculate shifting tectonics, or seek buried treasure, depending on who is using the information contained within the object.

Susan Leigh Star and James Griesemer proposed the boundary object in 1989, using the Museum of Vertebrate Zoology at the University of California, Berkeley as a case study to show how different systems and processes provide specialist information to multiple stakeholders, including amateur naturalists,

scientific researchers from across different disciplines, historians, artists, and administrators. These sites for information and processes retain their integrity across time periods and plural localities, and requires neutrality, standardisation, access, and useful collaboration between multiple members: "Boundary objects are objects which are both plastic enough to adapt to local needs and the constraints of the several parties employing them, yet robust enough to maintain a common identity across sites."¹⁰

In their case study Star and Griesemer identify four types of boundary object at play: The first are repositories, sites to house collected objects, such as a museum or library. The second is ideal type, a standard or type from which variation may be measured; for example, the concept of a species is a standard that no one specimen perfectly relates to, but to which all specimens refer. The third, coincident boundaries, are objects that may lend themselves as an idea around which to focus collection and engagement, such as the creation of the state of California for the museum collection. Research and contributions may be made using this framing boundary object. Lastly, standardised forms; these could include the record documents that collect information about the characteristics of a specimen and the time, place and conditions of its collection, which may be used by zoologists, conservationists, evolutionary scientists, birdwatchers, illustrators, among others.¹¹

Air is a boundary object, a material archive of information, chemical, biological, physical, sensory. It is a repository, as different information is stored there in the material itself that alters in different layers of the atmosphere and different

¹⁰ Susan Leigh Star and James R. Griesemer, "Institutional Ecology, 'Translations' and Boundary Objects: Amateurs and Professionals in Berkeley's Museum of Vertebrate Zoology, 1907-39," *Social Studies of Science* 19, no. 3 (1989). 393.

¹¹ *Ibid.*, 410–411.

latitudes and wind cycles. Air is a coincident boundary object, an idea and material around which to organise studies, analyses and abstract thinking, just like the Pure Holy Land Air described above.

Air is also an ideal type. A local engagement with air will vary from the concept of air, or the 'ideal' official chemical makeup of air as determined by multiple sensors and trackers that shift depending on the time of year, local conditions, wind speed and other factors.

In *Our Fetid Rank* the air physically forms the discourse of the politicians' propaganda/engagement/position, as well as the subject matter derived from the research of atmospheric scientists into the changing conditions in the air as a result of fossil fuel burning. This air is weaponised in the form of rhetoric, at the same time as oxidising the blood of the speaker. It acts as a catch-all of anthropogenic expulsions only to reflect them back through the technology that is used to track the accumulation of carbon dioxide and other greenhouse gases in the air. The information the air holds is morphed by specialists and interested groups, accessing local engagement but perhaps blind to the plurality of uses, stories, and interpretations it simultaneously contains.

Our Fetid Rank and the other AIR WORKS simultaneously reflect the plural meanings derived from the material at the same time, collapsing multiple conclusions and findings into a single tangible encounter: the artwork. These works try to hold in your head at once the multiple meanings, knowledges, and conclusions about air whilst also breathing it, feeling it, touching it. The AIR WORKS demonstrate these parallel knowledges acting together as a boundary object, given that "boundary objects are not useful at just any level of scale or

without full consideration of the entire model."¹² The AIR WORKS invite the viewer to attempt to hold the multiple facets of the boundary object together in space and time. They attempt to understand at the same time that the air gives us energy, prevents our insides from exploding outwards, warms the planet, dilutes our excretions, carries chemical, radio, and digital signals, as well as providing a habitat for insects, birds, and bacteria.

By looking at this versatile and ungraspable boundary object, the artist also acts as interpreter of its information, synthesising the conclusions that other specialist users of the information have determined. By reflecting back into the audience these simultaneous meanings through a creative encounter (an artwork or performance), the artwork too, is a boundary object, this is expanded on in the following section.

3.3.3 Art as boundary object

Kate Dunn expands and further complicates the boundary object to include artworks and creative collaborations between the sciences and creative practitioners. Dunn specifically considers artworks that engage with the natural sciences and politics in relation to climate crisis. These works function as boundary objects supported by three groups: the scientist whose research is used; the artist who interprets and creates an expression; and the audience, who bring their own personal contexts and specialist knowledges to receiving and decoding the semiotics and visual or tactile messaging within the artwork.¹³ A three-way boundary object occurs when the same boundary object that is used to facilitate communication and collaboration between a creative

¹² Susan Leigh Star, "This Is Not a Boundary Object: Reflections on the Origin of a Concept," *Science, Technology, & Human Values* 35, no. 5 (2010). 601.

¹³ Dunn, "Boundary Objects – Theoretical Framework for Modes of Collaboration." 3.

practitioner and a scientist, is also used to communicate ideas and information to an audience.”¹⁴

Methodologies, mediums, and aesthetic conventions in art are different from those in the sciences, using lateral, oblique, or rhizomic problem-solving strategies, and a consideration of visual history, semiotics, and the language of contemporary art to communicate, problematise, or expand the ideas uncovered by scientific research. Artworks offer an experience and have the potential to move, transform, or motivate a viewer. The affective quality an artwork may excite in the viewer is unaccounted for in the dataset alone.

This interpretation of research sharing differs from the practices of art-science. Instead of an insistence on collaborations yielding new insights or methods in both disciplines, it focuses on communicating new ideas to expanded audiences.

An artwork as a boundary object can offer an audience a new perspective on scientific research and political discourse. It may also speak to the scientists who performed the original research, who may perceive their findings in a new light. However, the influence and importance of aesthetics, and the potential for transformation, are not addressed in the original development of the boundary object by Star and Griesemer, which considered the museum context rather than a fine art context. An artwork draws on the visual literacy and associations with both visual history, literature, art history, and architecture, and has an embedded political and social position. Artworks are not passive nor nonpartisan, and operate differently to a museum archive.

¹⁴ Ibid., 3.

To address these omissions, Dunn developed three subcategories of artworks as boundary objects that acknowledge their aesthetic importance and potential to transform. A *didactic boundary object* is a translation of information from one field of knowledge to another without it being altered, for example, using a scientific publication as a source for art making, or using a museum display of taxidermy in an installation. The second category are *creative boundary objects*, where the artist creatively interprets the scientific research without necessarily collaborating with the scientist. Here the artist interprets the information. The objective in the context of climate crisis science is to draw attention to the findings and to frame the messaging. The science research doesn't have to be of specific provenance in the prevailing artwork. Lastly, the *reciprocal boundary object* is an ongoing collaborative relationship between artist and scientist where each is responsive to the input of the other. Each party and their respective fields are beneficiaries of the collaborative work.¹⁵

The AIR WORKS are creative boundary objects, engaging with the research of multiple disciplines. They benefit from research produced within the atmospheric sciences, the natural sciences, politics, chemistry, and multiple subset categories within contemporary art, conceptual art, ephemeral art, environmental art, and performance. They synthesise a breadth of research and re-present it to both audience and scientist/politician. *Different Kinds of Air, a Plant's Diary*, discussed in the previous chapter, is an excellent example of a multidimensional and transdisciplinary research synthesis, configured as a multisensory interactive performance. Research from many different fields are integrated such as atmospheric geology, respiration, and biology.

¹⁵ Ibid.

The boundary object is a useful device to frame these artworks as didactic in politics, science, and cultural discourse. This assignation is for me more fitting than art-science. Shared encounters with art and science contributes to new understandings of the climate crisis, impresses the urgent nature of the discourse, populates new sites of shared concern through surprising material engagement, and may laterally influence policymakers and decision-makers now and into the future. Martha Kenney, in response to feminist scholarship on chemical ecologies of late industrialisation, calls these manifestations of research “fables of response-ability, stories that teach us to attend and respond within our more-than-human world.”¹⁶ The AIR WORKS stimulate discourse as well as share research with a wider society through the art encounter and auxiliary media, such as interviews, articles and reviews.

In their essay *Art, Science, and Climate Change: Practices and Politics at the Threshold*, Jennifer Gabrys and Kathryn Yusoff argue that the cross-disciplinarity of art and science shift the boundary demarcating art and science and produce novel sites of shared political encounter, where novelty, imagination, and experimentation may be mobilised for climate adaptation and creative practice in science, art, and policy, where “creative practice and climate science may be discussed not through essential definitions, but through material and political encounters and sites of possibility.”¹⁷

The act of intersecting disparate disciplines for a common goal inevitably requires negotiating numerous slippery definitions and practices of politics. In the area of changing environment, politics is a potent element that can influence research, governance, and public opinion. For Gabrys and Yusoff,

¹⁶ Martha Kenney, *Fables of Response-Ability: Feminist Science Studies as Didactic Literature*, vol. 5 (2019). 1.

¹⁷ Gabrys and Yusoff, "Arts, Sciences and Climate Change: Practices and Politics at the Threshold." 6.

politics is “a definition [...] that encompasses the *material and sensible practices* that enable and are continuous with political possibility and experimentation”¹⁸ (emphasis in original). Here the materials of the environment are embedded in scientific and artistic research and together may form experimentation in forms of prudent politics (governance, public opinion, forms of assembly, contest and protest).

In the body of work presented in this thesis, air is the primary site of encounter of political and artistic communication with audiences. Multiple knowledge sets are retained and communicated simultaneously through material encounters that are underscored by political engagement with the climate crisis. To contain all of these things in the idea of the boundary object promotes all without privileging any particular one. The artwork as boundary object gives the artist a voice, position, and imagined pathway towards transformation in the political landscape of climate crisis.

3.3.4 Air-commons

“We live at the site of exponential material meanings,”¹⁹ states Astrida Neimanis in her book, *Bodies of Water*. For Neimanis, water is a case study for intergovernmental and interspecies material consideration. Like water, the pervasiveness of air also intimately inhabits bodies, and transcends human constructed boundaries and requires a concerted will across nations to maintain and repair.

In her essay “Bodies of Water, Human Rights and the Hydrocommons,” Neimanis outlines how bodies of water include humans and non-human others,

¹⁸ Ibid., 4.

¹⁹ Astrida Neimanis, “Bodies of Water, Human Rights and the Hydrocommons,” *Topia* 21 (2009), doi: 10.3138/topia.21.161, 1.

connected materially and amniotically in an ongoing, permeable hydrological cycle of ingesting and expelling. This porous and inter-body use of water (and air) submits a challenge to the dominant Western paradigm of the hierarchy that places the human species above others, and of human bodies as discrete sovereign individuals, as closed systems. The closed system understanding of the human invests the individual with rights and agency within a legal, economic, social, and political framework in Western cultures, that privileges the human above all others. Conversely, "a more-than-human hydrocommons thus present a challenge to anthropocentrism, and the privileging of the human as the sole or primary site of embodiment."²⁰

Water, like air, is bigger than national boundaries, and also smaller than the breath when talking about parts per million. It is materially negotiable through action, all life contributing, as well as taking; it is a constantly morphing blanket surrounding the planet that is malleable by use from life, and sites of geological contact and exchange. Such as with *Different Kinds of Air, a Plant's Diary*, the compound effect of millions of local interactions with air form an aggregate that can be planetary in scale. Humans are intimately implicated with all other bodies that interact with air, bacterial, non-human, human, even politician. Air is also not controlled entirely by the living but is a cosmically and geologically created phenomena. Air is at once local and global and defies ownership and commodification.

As a planetary resource, Neimanis posits an "active form of non-ownership," a stewardship of resources that advocates for conservation, and responsible use; a commons belongs equally and is shared by all users.

²⁰ Neimanis, Neimanis, "Introduction: Figuring Bodies of Water."; *Bodies of Water, Human Rights and the Hydrocommons*, vol. 0 (2009). 2.

In a commons, attention extends beyond the human, and beyond the present. Users are not owners but custodians, and not of an individual instance or expression of water, but of its very right to flow: to gestate, to differentiate, to repeat and connect.²¹

An aerial-commons approach to air decentres the human as the primary recipient and user of air. Instead, it acknowledges air as a right belonging to all living organisms, and extends consideration of air beyond living generations into a farther future, a legacy. In a commons-organised global economic and political context, governments would have to manage local air and their contribution to carbon emissions more equitably and with greater foresight, and collaborate globally to preserve and enact practices of care and reconstitution for the air.

Since 2004, Amy Balkin has been purchasing emissions offsets to create conceptual, as well as material, public spaces or 'parks' in the air, for her series *Public Smog*. Purchasing offsets retires the allowable emissions that may be otherwise used by polluters. The park expands and contracts conceptually to align with the emissions that are able to be purchased and the period for which they apply.²² Purchasing allowable emissions for the common good explicates how the shared natural store of air is commodified and subject to misuse by polluters (for the right price).

²¹ Neimanis, *Bodies of Water : Posthuman Feminist Phenomenology*, 176.

²² Amy Balkin, "Public Smog," in *Art in the Anthropocene Encounters among Aesthetics, Politics, Environments and Epistemologies*, ed. Heather; Turpin Davis, Etienne (London, England : Open Humanities Press, 2015).

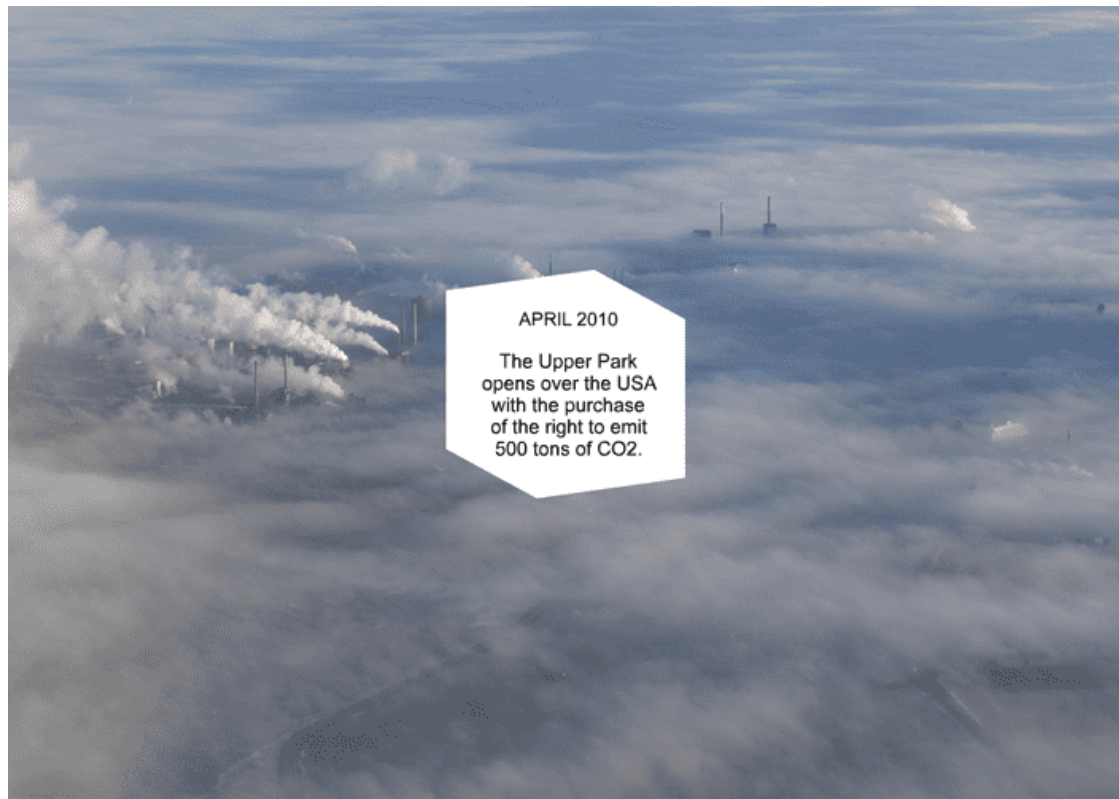


Figure 44. Amy Balkin, *Public Smog*, 2004–2008. The Upper Park opened in the stratosphere over the European Union from the fall of 2006 through 2007, with the purchase of 51 tons of carbon dioxide (CO₂) emission allowances from the European Union Emissions Trading Scheme. The park remained open to the public until the expiration of the offsets at the end of 2007. The Upper Park opened again from April to August 2010 over the United States with the purchase of the right to emit 500 tons of CO₂ (Chicago Climate Exchange Carbon Financial Instruments). Image from http://www.publicsmog.org/?page_id=19.

Similarly, Kathryn Yusoff writes about the geologic commons.²³ Yusoff situates extraction as a colonial project that institutes the dispossession of Indigenous peoples, and the large-scale movement of people and animals fuelled the industrial revolution. All the avaricious clutches of production and capitalism originate beneath our feet in geology: “geology is a mode of accumulation on one hand, and dispossession, on the other.”²⁴

²³ Kathryn Yusoff, “Geology, Race, and Matter,” in *A Billion Black Anthropocenes or None* (Minneapolis, MN: University of Minnesota Press, 2018). 4–5.

²⁴ *Ibid.*, 3.

The prevailing ideology that underscore the upheaval of materials from underground, as resources fit for exploitation, is capitalism. Although geology has a slower morphology than water or air, the geologic commons uncovers a deep history of slavery, extraction, movement of peoples, monocultures, and the destruction of ecologies. The extractive impulse for the commons of geology neglects the value of the assets at the surface, the multispecies ecologies, water management, and air management.

Public Smog seeks to bring to central focus these spaces and materials as common resources, as shared spaces with shared responsibility. Management, ownership and access to the geo-commons is politically contested between groups, and whilst the borders may comply more easily with human ideas of nationhood, the ground is always shifting. Holding aerial space over land in an effort to protect material that circumnavigates the Earth poses a challenge to border restrictions as well as resource restrictions. The elemental connection between the air, water, and geology blurs the boundaries. Outgassing, run-off, and the burning of fossil fuels from beneath the ground clearly indicate the material interrelationship between the commons. Air is a useful material connection between the Earth and the bodies of all breathing beings and trees. The mishandling of geo-resources is returned and visible in the air expressed as emissions.

Air can help us to rethink the relationship between the individual and our ecopolitical paradigms on a global scale. Balkin's *Public Smog* challenges individual choices as well as those of national governments. Considering the air as a commons that is shared across species and generations requires commensurate responsibilities and mandates for care and maintenance to be mobilised both by the individual and the collective scales of government.

Enacting cross-species practices of care over the commons (watery, geologic, and aerial) challenges systemic structures of postcolonial hetero-capitalism. Neimanis' vision for an "active form of non-ownership" implicates all air users to contribute to common resources.

3.3.5 Air as Infrastructure

Air is a physical material that supports the functioning of nearly all life on Earth. The air's physical properties such as air pressure stabilises our body density and the density of water, filters the UV from the Sun's light, supports sound and heat retention as well as the flight of critters, animals, and aircraft.²⁵ Here I consider air as a fundamental infrastructure and the implications for maintenance and regulation.

Susan Leigh Star and Karen Ruhleder describe infrastructure not as a supporting substrate that tacitly backgrounds activity, but as a project that connects people and things through active participation; a relational property of connection.²⁶ As a relational property, the key is in asking *when*, not *what*, is an infrastructure, when multiple parties organise their practice around it and adapt the infrastructure in a local setting, such as using a braille keypad to access the internet. To use their example, a plumber regards the water system as the target of investigation and creation, not a background service; for a chef, it is a contingent service to the act of cooking. To be infrastructure it must be utilised, used and interacted with: "An infrastructure occurs when the tension

²⁵ Jean-Pierre Maury, *The Atmosphere : Five Billion Million Tons of Air* (New York: New York : Barron's Educational Series, 1989). This booklet explains the plural functions of our atmosphere and their delicate interrelations.

²⁶ Susan Star and Karen Ruhleder, "Steps toward an Ecology of Infrastructure: Design and Access for Large Information Spaces," *Information Systems Research* 7, no. 1 (1996). 112–113.

between local and global is resolved."²⁷ This resolution of local and global usage standardises the infrastructure.

Star and Ruhleder note that there are many criteria upon which to judge *what* is an infrastructure. These include embeddedness, or being 'sunk' into other structures be it social, or technological; transparency, such as being intuitive to use; scope, in that it transcends multiple events over time or space; learned through membership, where outsiders learn upon first encounter; linked with conventions of practice, such as learning the QWERTY keyboard; the embodiment of standards, such as train tracks being equal dimensions across state lines; and perhaps the most pertinent when considering air, *visible upon breakdown*.²⁸ Visible upon breakdown highlights the tacitly backgrounded function of embedded infrastructures.

Maria Puig de la Bellacasa takes this conceptualisation of infrastructure into her reconsideration of soil as infrastructure. Puig de la Bellacasa argues that the current breakdown in soil health brings the backgrounded infrastructure under acute scrutiny.²⁹ Soil supports most growing plant species and subsequent life forms through food chains, water filtration, and plant-based gas exchange to produce oxygen. The depletion of soil nutrients and biodiversity constitutes a condition of having passed "peak-soil," a looming reality of resource collapse.³⁰ Replenishment and repair are unable to keep pace with declining soil health. Technoscientific intervention in soil neglects key aspects of ecological complexity that requires a rejection, or at least a reconfiguring, of avaricious

²⁷ Ibid., 114.

²⁸ Ibid., 112–113.

²⁹ Maria Puig de la Bellacasa, "Making Time for Soil: Technoscientific Futurity and the Pace of Care," *Social Studies of Science* 45, no. 5 (2015).

³⁰ Maria Puig de la Bellacasa, "Ecological Thinking, Material Spirituality, and the Poetics of Infrastructure," in *Boundary Objects and Beyond : Working with Leigh Star*, ed. Geoffrey C. Bowker, et al. (Cambridge, Massachusetts: Cambridge, Massachusetts : The MIT Press, 2015). 54.

capitalist production.³¹ As a result, Puig de la Bellacasa proposes that care for soil is an anti-capitalist practice.

Inverting Puig de la Bellacasa's assertion of soil ecology as infrastructure, such that attention is directed outwards from the body, vertical from the Earth, air too can be understood as an essential infrastructure. Air is embedded in all structures, "'sunk' into, inside of, other structures, social arrangements and technologies."³² In its most fundamental way, air physically creates the pressure that prevents our insides from expelling outwards. The air pressure yokes us together as physical beings. Air in place of the vacuum of space pushes against the outward pressure of human and more than human bodies, as well as sustaining cognitive function through gas exchange.

Air protects from harmful UV and solar radiation, as well as maintains a moderate temperature that is conducive to sustaining life. Air is also embedded in the social matrix as a medium that physically transports communication through sound, which is tiny shifts in air pressure, and the nature of the ionosphere that bounces radio waves around the globe.³³ The physical characteristics, which are both literally and conceptually invisible, morph through the participation of structures and 'users.'

Air as infrastructure is "learned through membership,"³⁴ and being a user of air crosses national and species boundaries. It has reach beyond single events, as

³¹ Puig de la Bellacasa, "Making Time for Soil: Technoscientific Futurity and the Pace of Care." 692-3.

³² Star and Ruhleder, "Steps toward an Ecology of Infrastructure: Design and Access for Large Information Spaces." 113.

³³ K. G. Budden, *Radio Waves in the Ionosphere : The Mathematical Theory of the Reflection of Radio Waves from Stratified Ionised Layers* (Cambridge [Eng.]: Cambridge Eng. : University Press, 1961).

³⁴ Star and Griesemer, "Institutional Ecology, 'Translations' and Boundary Objects: Amateurs and Professionals in Berkeley's Museum of Vertebrate Zoology, 1907-39."; Leigh Star, "This Is Not a Boundary Object: Reflections on the Origin of a Concept." 611.

air shifts and morphs over time reflecting the activities of users and structures. Membership with air is created via breathing, air pressure, and familiarity with other physical sensations, such as breeze on the skin, and heat. For the user there is always a local encounter with air that is both physical and physiological.

According to Star and Ruhleder, the final criterion of infrastructure is that “becomes visible on breakdown,” where the usually functioning invisible structure breaks down, rendering the infrastructure evident.³⁵ In relation to air, this is the slow breakdown due to environmental collapse; a slow asphyxiation. As the air becomes richer in carbon dioxide and methane, it retains more heat, leading other structures and infrastructures to break down, such as the melting ice caps and rising sea levels, and also other geophysical features of the planet, such as the release of methane by melting permafrost.³⁶ Breakdown can be evidenced not only through the parts per million count of carbon dioxide and other greenhouse gasses that cause global heating, but also in the visible signs of pollution, smoke, or human-built geoengineering projects (which will be explored further in chapter 4).

Breakdown is evidenced in emergency catastrophic levels of air pollution in large cities, and the rising conditions for drought and catastrophic bushfires. On the 3rd and 4th of November, 2019, Delhi measured record levels of toxic smog triggering a public health emergency, and visibility poor enough to divert planes.³⁷ Here the breakdown that supports other infrastructures has knock-on effects on civic organisation and public health. The visible breakdown of clean

³⁵ Star and Ruhleder, "Steps toward an Ecology of Infrastructure: Design and Access for Large Information Spaces." 113.

³⁶ Natalia Shakhova et al., "The East Siberian Arctic Shelf: Towards Further Assessment of Permafrost-Related Methane Fluxes and Role of Sea Ice," *Philosophical transactions. Series A, Mathematical, physical, and engineering sciences* 373, no. 2052 (2015).

³⁷ Hannah Ellis-Petersen, "Flights Diverted in Delhi as Toxic Smog Hits Worst Levels of 2019," *The Guardian* November 3, 2019.

air accompanies the news story of women who immersed themselves in the polluted waters of the Yamuna River for the Hindu festival of Chhath Puja.³⁸



Figure 45. *The Guardian*, November 4, 2019, Hindu women had to immerse themselves into the polluted waters of the Yamuna River. Photograph by Adnan Abidi for Reuters.

The catastrophic bushfires over the Australian summer of 2019–2020 make visible the compounding years of drought that result from global heating. The bushfires disrupt the oxygen-carbon cycle, pouring millennia of carbon captured in trees into the air. This was noticeable both visibly, as burnt orange skies and amber light, and physiologically, inducing nausea, illness, coughing, and sore throats, eyes, and noses.

³⁸ Hannah Ellis-Petersen, "Delhi Residents Engulfed in Pollution Blame Authorities for Inaction," *The Guardian* 2019.



Figure 46. Image of the Sydney city skyline from corner of Cleveland St and Regent St, 10th December, 2019. Image courtesy of the artist.



Figure 47. Image of artist's studio during the bushfires, 6th Dec, 2019. Image courtesy of the artist.

3.3.6 Responsibility for maintenance

Considering air an infrastructure foregrounds a material that is normally backgrounded. Similarly, focusing on the air used for high political climate discourse in *Our Fetid Rank* (*Margaret Thatcher's bottom lip and Bill Clinton's tongue*) instead of the content of the politicians' utterance, centres the material actuality of breathing and polluting.

Air bridges naturecultures, human relations, and the physicality of our possible reality on Earth. Using the nomenclature of civil and technological development aligns air comfortably with a discourse of government, of possible change, regulation, and maintenance; with the domain of the politician, our elected officials. The designation of infrastructure presents a possibility to track, control, limit and regulate the contributions humans are making collectively. As a metaphor it encourages us to recognise that air is made and not a static backdrop or infinite resource, reflecting the contributors that are human, more-than-human, botanical, geological, and physical, all pulling and morphing our thin blue line. Planting trees, factory farming, practices of production, acts of prevention — all human action has a large ability to shape the configuration of this infrastructure.

Conceptualising air as infrastructure brings its materiality into central concern rather than background. It elicits the question of maintenance: how and by whom is maintenance enacted, and how and by whom is air monitored, tracked, and observed? To borrow Puig de la Bellacasa's consideration of soil, to imagine practices of care for the air encourages community, togetherness, and collaboration with microbial species.

Air becomes a boundary object, commons, and infrastructure, and is therefore a political object vulnerable to the instability of the political collective. The idea of collective international political decision-making regarding climate is embodied by the United Nations, that international body politic susceptible to internal politics and organisational dysfunction.

How do we talk about the invisible impending doom embodied by the climate crisis (through air)? Popular media turns to graphics to illustrate the invisible.

3.4 The condition of the current climate crisis

Having established that air is a political object, in this section I consider the relationship between air as a political object and the current climate crisis.

Stable, systematic observation and measurement of air, water, and temperature since the 1970s has revealed that rising levels of greenhouse gases, mostly carbon dioxide and methane, correlate to mean rising temperatures.³⁹ The full implications of the effects of rising temperatures are a matter for future modelling and speculation. Theorists and scientists are collating and amalgamating this ongoing enterprise of climate emergency, notably the scientists working with the United Nations, the National Academy of Sciences climate research groups, and myriad other university research groups.⁴⁰

³⁹ IPCC, "Climate Change 2007: Synthesis Report. Contribution of Working Groups I, II and III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change," in *Climate Change 2007: Synthesis Report*, ed. R.K. and Reisinger Pachauri, A. (Geneva, Switzerland: IPCC, 2007).

⁴⁰ Ibid. Sandra van der Hel, Iina Hellsten, and Gerard Steen, "Tipping Points and Climate Change: Metaphor between Science and the Media," *Environmental Communication* 12, no. 5 (2018); Will Steffen et al., "Trajectories of the Earth System in the Anthropocene," *Proceedings of the National Academy of Sciences* 115, no. 33 (2018). Australian Government Department of Industry, "Estimating Greenhouse Gas Emissions from Bushfires in Australia's Temperate Forests: Focus on 2019-20."; Meteorology, "Annual Climate Statement 2019."; Information, "State of the Climate: Global Climate Report for Annual 2019."

For the purposes of this thesis, it is important to acknowledge the relationship between knowledge, regulation, and governance, which is most readily exemplified through the United Nations Intergovernmental Panel on Climate Change (henceforth IPCC). The special report, "Global Warming of 1.5 °C," from the 47th session of the IPCC in Paris, in October, 2018, assesses the global environmental effects of global heating above pre-industrial levels.⁴¹ At the projected increase of 1.5 °C the effects are catastrophic, however, the more likely figure is 2 °C or above,⁴² where the results are both more dramatic and difficult to predict. The knock-on effects of temperature rise are astounding:

The Arctic Ocean is projected to be completely free of ice once per century with a 1.5 °C rise, or once per decade at 2 °C. Sea levels are set to continue rising well beyond 2100. Many of today's ecosystems will shift or disappear: literature covering 105,000 species suggests that 6% of insects, 8% of plants and 4% of vertebrates could lose half of their territory with even 1.5 degrees of warming; those numbers increase by two or three times in the case of 2 degrees. The situation may be even worse in the oceans. At 1.5 °C, the world could lose 70-90% of its coral reefs. They pretty much disappear entirely at 2 °C - a threshold beyond which the risk of irreversible loss of marine ecosystems increases dramatically.⁴³

⁴¹ V. Masson-Delmotte, "IPCC Report 2018."

⁴² Anonymous, "A Matter of (Half) Degrees." 163.

⁴³ Ibid. 163.

The retention of greenhouse gases in the air is predominantly the cause of increases in temperature, which is causally linked to wider environmental phenomena, such as melting ice caps and sea level rising.⁴⁴ The shifting material composition of air renders it a significant material and site for regulation and intergovernmental decision-making.

The air plays a central role in the unfolding climate crisis.

3.5 Didacticism as feminist act

As is made clear above, the discourse around the climate crisis crosses the disciplines of science, policy, environment, amongst others. Artists working at these intersections engage with discourse by learning, synthesising, and sometimes collaborating with practitioners in the various fields of climate crisis research. *Different Kinds of Air*, *a Plant's Diary*, *Things Fall Apart*, and *Then Let Us Run (the sky is falling)* all use research and findings from the sciences. To this research, artists assemble an interpretive position, emotional register, and material examination as means for communicating.

Martha Kenney examines the both the use of the term *didactic* and also the role of didacticism in art and literature. Kenney finds that it is usually used as a pejorative term when describing an artwork, implying the artist's self-assessment of moral or scholastic superiority.⁴⁵ Art that is described as didactic is trying too hard to teach, is infused with dogma, or fails on aesthetic and affective accounts. Kenney suggests that the role of teaching is both gendered and devalued:

⁴⁴ V. Masson-Delmotte, "IPCC Report 2018."

⁴⁵ Kenney, *Fables of Response-Ability: Feminist Science Studies as Didactic Literature*, 5.

This attitude will be familiar to any teacher who has heard the awful phrase (often spoken directly to one's face), "Those who can't do, teach." Seen as feminine reproductive labor, rather than masculine productive labor, teaching is undervalued.⁴⁶

Kenney submits the case for a revision of the term *didactic* as a quality in art, such that "by virtue of the aesthetic qualities, it is able to teach," and suggests it is a feminist act to teach.

This definition of didacticism in art expands the notions of learning and makes room for those teaching-learning encounters to be embodied and material. It opens up a space for didacticism to include emotional responses, haptic experiences, or unexpected connections to be made between ideas and subjects. As Kenney writes: "a feminist reimagining of this genre recognizes that the effects of reading are always situated and contextual and cannot be determined in advance."⁴⁷

The vast wealth of scientific literature on the climate crisis acts as a boundary object (see section 3.3.2) that an artist may access to synthesise, interpret, recontextualise, and reimagine. The role of the artist is to engage with the information and translate it into a locality as an artwork. This provides the opportunity to create material engagement within a framework of scientific research and perform a didacticism that is physical, physiological and embodied, as well as linguistic. The teaching or didactic element in these

⁴⁶ Ibid., 2.

⁴⁷ Ibid., 3.

artworks includes the tactile, haptic, and physiological learning that must be experienced materially alongside the linguistic, such as the breathing of the air in *Different Kinds of Air*, *a Plant's Diary*, and the sensation of the mist that carries the plant distress pheromone in *Things Fall Apart* (see sections 2.5 and 2.8).

Like air, the climate crisis requires an embodied, physiological, and tactile exchange to complete a transference of meaning, and opens the potential to stimulate political action. The politicians in *Our Fetid Rank* represent how ineffectual policy and climate discourse has been at mobilising change. The sensation of the depleting oxygen in the air of the gallery space while simultaneously mirroring the inhalation styles of the politicians gives the audience members' bodies the sensation of the slow asphyxiation we all experience in climate crisis. The induced panic triggered by the politicians' breathing is physiological as well as psychologically triggered.

Below I consider how the embodied characteristic of air shapes an aesthetics of climate crisis.

3.6 What does *aesthetics* mean in the climate crisis?

This era of climate crisis has a clear political dimension that has palpable real-world consequences. The forces at work — emissions, heat, gases — may be invisible, complex, or difficult to conceptualise and quantify, yet the climate crisis has a particular character and aesthetic. When the idea of climate crisis is floated, what imagery comes to mind, and how does it help us understand the climate crisis? Also, what are the gaps in this understanding? The remaining part of this chapter considers what an aesthetic of climate crisis means, through

the work of Mirzoeff, Gore, and Yusoff, what is missing from this understanding before positing an understanding of the aesthetic of climate crisis that is embodied, performative, and tactile, through the work of Mark Johnson, Kyla Wazana Tompkins, and Sylvia Wynter. These qualities drive artworks that have political and didactic facets, such as Latai Taumoepeau's *Repatriate I* and *i-Land x-isle* and Olafur Eliasson's *Ice Watch*.

In his essay, "Visualising the Anthropocene," Nicholas Mirzoeff argues that the practice of visualising establishes a framework for conceptualising an abstract or invisible notion, rendering it possible to consider and make informed and responsive decisions about. Visualisation produces seemingly authoritative notions that can be difficult to contravene or defy. The authority of the free market economy in Western liberal democracies, for example, is rarely meaningfully challenged, being buttressed by supporting notions such as 'growth.'⁴⁸

Mirzoeff considers some principles of social and economic organisation, such as democracy, consumerism, and monarchy, which are not visible in their entirety as a single image or object. Visualising these notions by compiling symbols and emblems of associated visual objects creates a representation upon which to hang the power of authority, which may then be integrated into a social and individual worldview.⁴⁹ The idea of democracy, for example, may be visualised through, polling stations, politicians, ballots, political parties, parliament, and so on. These supporting paratexts, objects and associations compel the individual to draw upon their own experiences and relationships with these objects and by extension the notion they represent. The first-hand palpable experience with

⁴⁸ Mirzoeff, "Visualizing the Anthropocene." 216.

⁴⁹ Ibid., 216–17.

'democracy' in this case lends authority to a more all-encompassing notion of democracy in general.

Visualising concepts and assigning them authority allows the rhetorician to conflate them with moral or political positions, such as ideas of 'progress' or 'growth' and use it in political discourse.

Commenting on the until-now poor visualising of the Anthropocene, Mirzoeff says:

The neoliberalism that has dominated governance since the 1970s has insisted that there are things such as "market forces" and that they must at all costs be obeyed. So we should now add to this list of visualities an Anthropocene visibility, albeit one that operates in a distinctive fashion. For if the Anthropocene cannot visualize itself, no more can the market or empire, and yet the "authority" of both can be felt across the world. Imperial authority allowed thousands to rule millions. Market authority is what is known as "confidence," in whose name entire populations are subjugated by austerity. Anthropocene visibility allows us to move on, to see nothing and keep circulating commodities, despite the destruction of the biosphere.⁵⁰

Our current climate crisis is plural, pervasive, simultaneous, and often invisible. It exists in situated local instances as well as on a planetary scale

⁵⁰ Ibid., 217.

simultaneously. Visualising or considering the aesthetic codes of the science in the climate crisis make it useful in political discourse and decision making on individual and collective levels.

Our current climate crisis evokes many coded visual tropes, with melting ice and retreating glaciers being pervasive. How can a material engagement further complicate this aesthetic?⁵¹ To engage with the discourses of the climate crisis is to engage with modes of speculative imagination. The role of storytelling will be elaborated on in chapter 4 of this dissertation, but below is an assessment of the current aesthetic of the climate crisis, and a consideration of how material engagements with air may interrupt, corrupt, and further complicate this.

3.6.1 Graphs, diagrams, analogies

Al Gore's presentation in his 2006 documentary, *An Inconvenient Truth*, is exemplar of the types of images that are often used in news reporting, documentaries, and in documents on the climate crisis. These include various forms of information visualisation, including graphs, charts, time-lapse satellite footage, animated projections, and other images of complex interconnecting data rendered in the authoritative aesthetic of the diagram.

The backbone of *An Inconvenient Truth* is Gore's PowerPoint presentation in front of a live audience. Gore is famous for using visual information aesthetics to communicate the science of the climate crisis, and along with his charismatic presentation and storytelling, he overcomes the alienating potential of overwhelming scientific data. Gore physically interacts with the information graphics in humorous ways (for example, using a cherry picker to reach the top

⁵¹ Gabrys and Yusoff, "Arts, Sciences and Climate Change: Practices and Politics at the Threshold." 2.

of off the chart data). The diagrams, graphs, and time-lapse satellite footage synthesise and interpret the multiple scientific technological data available across different modes of collection (temperature, rainfall, emissions, etc.) to map changes in climate from the deep past into the near and imaginable future.

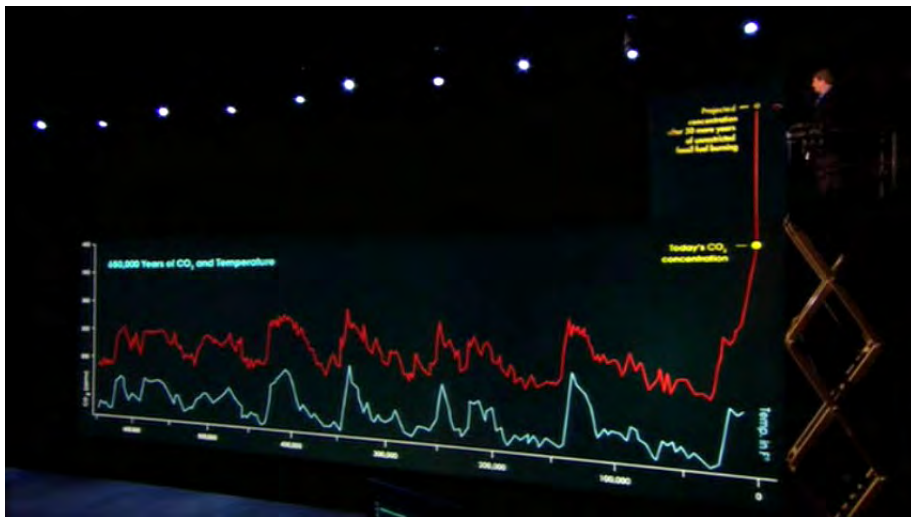


Figure 48. Al Gore in *An Inconvenient Truth*, 2006, directed by Davis Guggenheim, Paramount Films, film stills.

This is the form of the didactic Kenney is resisting by suggesting a feminist recasting of didacticism. The diagram lends itself to a cool authority of rational science, a distancing from any perception of emotional manipulation, or

moralising. The diagram — or indeed any form of information visualisation — may be easily manipulated.⁵² Its claims may be used to either discredit or validate scientific research, or proposed effects of regulation or governance. Diagrams are sometimes one dimensional, misleading, or neglect contextual information and complex interconnecting causal relationships.

Although outside of the scope of this thesis, in more recent times, which have seen the politicisation and proliferation of so-called 'fake news' and questionably spurious reportage, the veracity of such reporting may be questioned by the general populous. This visual language may be co-opted to subvert the authority of the diagram by representing false claims, or to visualise false data. In the instance of *An Inconvenient Truth* and the subsequent *An Inconvenient Sequel*, Al Gore donates his persona, his position as a former vice president and one-time presidential candidate, to elevate the authority of his presentation.⁵³

Donna Haraway proposes that impartiality is compromised by the expectation of "a view from above" neutrality which is actually a white, male, heterosexual construct.⁵⁴ Haraway describes this position as the "god trick," the fallacy of denying that any personal, political, or social identity is embedded in methods of research.⁵⁵ Allowing for the god trick, and acknowledging the socio-historical contexts of the individual researchers, the aesthetic of visual representation through diagrams is one of abstraction, producing a visual metaphor for the

⁵² Heather Houser, "The Aesthetics of Environmental Visualizations: More Than Information Ecstasy?," *Public Culture* 26, no. 2 (2014).

⁵³ Jens Kjeldsen and E. Kjeldsen, "Strategies of Visual Argumentation in Slideshow Presentations: The Role of the Visuals in an Al Gore Presentation on Climate Change," *An International Journal on Reasoning* 27, no. 4 (2013).

⁵⁴ Haraway, "Situated Knowledges: The Science Question in Feminism and the Privilege of Partial Perspective." 575-6.

⁵⁵ *Ibid.* 576.

data that has been collected over time. A diagram or chart requires a level of abstract thinking to apply the insight gained materially to the interactions with the immediate environment.⁵⁶ A direct material and physiological connection with current changes or predicted changes is lacking, but may be addressed through artworks such as Latai Taumoepeau's *Repatriate I* and *I-Land X-Isle*, Olafur Eliasson's *Ice Watch*, and the works in this thesis.

3.6.2 Yusoff and the polar bear

The symbolic power of visual tropes to communicate changes to climate are prevalent in an ongoing aesthetic of the climate crisis. These symbols include melting ice, the P2 face mask, and the struggling polar bear. Kathryn Yusoff considers the polar bear to be the central figure through which to trace an aesthetics of climate crisis and to join human and non-human others in the shared experience of environment on the brink of catastrophe. She describes the polar bear as being "a mythic and biophysical storyteller, figuring the complexities of changing climates and habitat loss, and conjoining the biophysical and emotional worlds of humans and animals."⁵⁷

For Yusoff, the demise of the polar bears' retreating icy home and the decline in food sources is a narrative that entangles human and companion species and speaks to the wider cross species violence of human action, and the breadth of knock-on effects of climate collapse.⁵⁸

As companions in the experience of abrupt environmental
change, polar bears have become a space in which to

⁵⁶ Timothy W. Luke, "The Climate Change Imaginary," *Current Sociology* 63, no. 2 (2015). 282.

⁵⁷ Yusoff, "Biopolitical Economies and the Political Aesthetics of Climate Change." 74.

⁵⁸ The term *companion species* is borrowed from Donna Haraway's *The Companion Species Manifesto: Dogs, People, and Significant Otherness*, which describes how species are made by each other, using the human-dog relationship as the driving example.

project, negotiate and comprehend a shared fate. More discreetly, polar bears have become a prosthetic emotional device for testing the water of loss. This coupling reassembles a concept of animals not as something in need of protection (outside of the human) but as collaborators and companions, albeit in a rather negative possibility.⁵⁹

The loss of immediate habitat for polar bears is the adjunct to the habitat loss/transformation for the whole planet. The emotional response the polar bear provokes can activate a political movement.

For Yusoff, the symbolic power of the polar bear activates the impulse for multispecies care practices. The aesthetic of the polar bear may open up spaces to configure a more full and multispecies-inclusive politics in this time of crisis. The violence and suffering evidenced by the plight of the polar bear has the potential to move people into activism. Extinction of the species also means an extinction of their aesthetic in our own lives, and the erasure of the polar bear from our understanding of the environment.

The aesthetic language of symbols like the polar bear in the climate crisis speaks to the shared emotional experience of staying with the trouble.⁶⁰ This ability to communicate allegorically through the symbol of the plight of the polar bear has the affective ability to move people on an emotional level (the polar bear being just one example). This aesthetic places images of nature on the brink into and alongside the abstract didacticism of diagrams and graphs.

⁵⁹ Yusoff, "Biopolitical Economies and the Political Aesthetics of Climate Change." 75–76.

⁶⁰ 'Staying with the trouble' is taken from Donna Haraway's Donna Haraway, *Staying with the Trouble : Making Kin in the Chthulucene* (Durham : Duke University Press, 2016).

However, what is missing is a felt sensation of direct connection to climate crisis. Most people have only seen polar bears via a screen or page proxy, and so do not have a direct tactile connection or shared space with them. The connection is allegorical.

Gabrys and Yusoff mention the role of art and materials in the development of scientific knowledge and how they can influence political possibility:

Political possibility is entangled with aesthetic-material conditions and practices, and how recognition of these interrelations might enable 'collective experimentation' within both creative practices and climate sciences.⁶¹

The interrelations between air and the multispecies body is in continual material interplay. Air is part of the very fabric of the climate crisis, of an earthly reality that is infused by the results of human action via carbon emissions, radioactive decay, chemical run-off, and so on. These materials form the environment of all species, including the polar bear.

The aesthetic of the crisis can include both empathic learning through the figure of the polar bear, as well as embodied learning through the artistic experimentation of the air of the climate crisis, such as the air in both *Different Kinds of Air*, *a Plant's Diary*, and *Things Fall Apart*. The polar bear as aesthetic risks apportioning unbalanced attention onto specialised issues rather than the multifarious facets of the climate crisis. As elaborated below, the plural and interconnecting interactions of the air in the climate crisis encompasses

⁶¹ Gabrys and Yusoff, "Arts, Sciences and Climate Change: Practices and Politics at the Threshold." 1–2.

multiple and simultaneous aesthetics of the cataclysm, including embodied experience and political power dynamics.

3.7 Another aesthetics of climate crisis, meaning more than beauty

3.7.1 Johnson and embodied aesthetics

Aesthetics as an academic pursuit in art and philosophy of the twentieth century has been mostly limited to definitions of beauty in nature and in fine art practices, and attempts to explain how an aesthetic experience differs from other forms of experience.⁶² Philosopher Mark Johnson's approach to aesthetics seeks to integrate an embodied material embeddedness: "Once the 'aesthetic' gets compartmentalized and reduced to a unique feeling-based type of experience, its pervasive operations in all the goings-on of our daily lives come to be almost completely overlooked."⁶³

Johnson posits that often theories of aesthetics omit an embodied experiential process, such as a tactile encounter with texture, patterns, emotions, or mood. The visceral, embodied aesthetic acknowledges the affective potential of materials and the intrinsic human connection to them:

We human beings are animals — highly complex,
inescapably embodied, intrinsically social, and sometimes
even intelligent, animals — who live, move, and have our
being via our ongoing relations with our environments. As

⁶² Edmund Burke, "A Philosophical Enquiry into the Origin of Our Ideas of the Sublime and Beautiful," ed. James T. Boulton (London: Routledge and Kegan Paul, 1958). Mark Johnson, "Introduction: The Aesthetics of Embodied Life," in *The Aesthetics of Meaning and Thought : The Bodily Roots of Philosophy, Science, Morality, and Art* (Chicago: The University of Chicago Press, 2018). 1–2.

⁶³ Ibid., 2.

such, we have a deep visceral, emotional, and qualitative relation to our world. As a result of our embodied nature, meaning comes to us via patterns, images, concepts, qualities, emotions, and feelings that constitute the basis of our experience, thought, and language. This visceral engagement with meaning, I will argue, is the proper purview of aesthetics. Consequently, aesthetic dimensions shape the very core of our human being.⁶⁴

Embodied aesthetics incorporates the physical and cultural-historical experience of objects and other phenomena. This concern is central to the AIR WORKS, which acknowledge the chemical, physical, and emotional interrelations of the body with invisible materials.

The AIR WORKS are part of an emerging aesthetic in collaboration with the climate crisis that can be characterised by its engagement with the real/physical, environmental finitude via climate crisis, a blur from specificity to ubiquity that brings the literal ephemeral material into the centre of idea expression. The aesthetic provokes wonder, and a sense of the sublime in relation to scale, time, and the environment. As well as its material concern, this aesthetic must include an element of transformation, ephemera, or a sense of time passing; time as a transitive verb, where there is a 'before' that cannot be regained or recovered.

In this time of climate crisis, it is necessary to turn from the traditional idea of the principle of aesthetics as exploring nature and beauty, what might be seen to trigger an emotional response, to one that is embodied, felt, absorbed and

⁶⁴ Johnson, "Introduction: The Aesthetics of Embodied Life.", 1.

devoured. Our constant participation in the material nature of the climate crisis through air, water, food, and so on, permeates every quotidian aspect of living, embodied and embedded in infrastructure. In his embodied aesthetics, Johnson connects cognitive science, the body, language, and meaning:

From this embodied cognition perspective, it becomes possible to see the aesthetic aspects of experience as giving rise to mind, meaning, and thought. The view of meaning that emerges highlights the body-based, affective, and imaginative dimensions of our interactions with our environments as they shape the ways we make sense of, and reason about, our world.⁶⁵

An embodied cognition integrates and celebrates environmental, material, kinaesthetic, and linguistic strategies in meaning-making, which are performed as we make sense of the world. These are, for Johnson, aesthetic experiences.

3.7.2 Wynter via Tompkins: aesthetics is a performance of power

Sylvia Wynter goes further than Johnson in order to wrestle with and extend the inquiry of aesthetics into sociopolitical fields. Although Wynter focuses on the aesthetic of Caribbean cinema, she reworks the nature of aesthetics itself to be a phenomenon that is practiced, something that is absorbed through the senses and supported by learning tempered by culture.

Kyla Wazana Tompkins takes up Wynter's revised definition of aesthetics as sociopolitical inquiry in her own work around food, race, and biopolitics.⁶⁶

⁶⁵ Johnson, "Introduction: The Aesthetics of Embodied Life." 2.

⁶⁶ K. W. Tompkins, "Sweetness, Capacity, Energy," *American Quarterly* 71, no. 3 (2019).

Tompkins extrapolates on the transformation of aesthetics; instead of just being the study of beauty or how things look, it can also be performed and experienced physically as "dense transfer points of power," where the physical senses meet with social circumstances that have historically and culturally coded meanings within a given group.⁶⁷ In this understanding, the human senses are made comprehensible through socially mediated frameworks on every level of sensory experience. For example, to understand the sensation of wind on the skin may also include knowledge of storm patterns, local cultural explanations for the origin of wind, or a geo-orientating breeze that can be used to navigate.

For Wynter, an aesthetic is not simply a category of expression; it is a mode, it is a way, or a manner that is also formally congruent — isomorphic or homologous to — a human being or form of life. Being, then, is here a verb in the sense that theorists sometimes use the term becoming. A human is "being" in the sense that aesthetics is modal: a processual doing in time, in space, in a field of sensory possibility, a modality taking effect, causing effects, being/doing its effects.⁶⁸

In the context of complex social interrelations, aesthetics may be understood as a verb, a performance of power relations between entities within a group — a knowledge and power transference on all levels of sensory engagement as bodies build up a catalogue of experiences to understand both their physical and social environment. Here I come to see aesthetics as a performance of

⁶⁷ Wynter, "Rethinking 'Aesthetics' : Notes Towards a Deciphering Practice." 245.

⁶⁸ Tompkins, "Sweetness, Capacity, Energy." 852.

power relations, and an embodied experiential, sensory project of living in a human body on a planet that relies on air, water, food, and so on.

Aesthetics understood in this way casts air as a substantial entity within the power dynamics of international discourse around the climate crisis. Projects such as Balkin's *Public Smog* illustrate the regulatory, economic, and public health power aesthetics. The work appropriates the language of economic rationalism used to negotiate climate action within late capitalist society. Polluting is the value resource, the privilege of the wealthy, and the need of the manufacturer. The current state of the air in the midst of climate crisis discourse transforms ideas of the air as being infinite into one of finitude. A finite resource that is not being justly distributed.

Aesthetics, where it is performed through relationships, provokes the question of how air forms part of this power dynamic. All respiring critters enact changes to the air in local encounters through gas exchange. The power dynamic shifts when change is enacted on the air asymmetrically by large polluters. This altered air is then forced back upon local users disproportionately, and across borders (outside of the zone of governance of those effected). The politicians represented in *Our Fetid Rank* hold positions of power, moulding and shaping aesthetics via national and global power relations. This is further complicated when the effects of air quality surpass simple (life sustaining) breathing to include global heating and its subsequent effects to fresh water supply, snowfall, temperature, ocean temperature, and sea levels. The power asymmetry of air usage is overwhelmingly dominant in the aesthetic of the climate crisis and can be embodied in our elected officials taking up space speaking and not acting. The responding action of climate protest, people power, and imagery of breathers in visibly polluted air such as the women in the

river in Delhi, has been disproportionately impotent in enacting climate policy change (so far — I'm an optimist). This is a political asphyxiation as much as a physical asphyxiation.

This asymmetrical power dynamic that is part of the embodied aesthetics of the climate crisis can be powerfully enacted in situations of artistic creation. Below are explorations of two artworks that play with embodied aesthetics that make explicit reference to the sites of tense politics of climate crisis decision making: Latai Taumoepeau's *Repatriate I* and *i-Land-x-isle*, and Olafur Eliasson's *Ice Watch*. I describe each artwork below before demonstrating how they persist as boundary objects and conform to the aesthetics of power relations of the climate crisis.

3.8 Examples of artworks as climate politics, an analogue with water

3.8.1 Latai Taumoepeau: body as material

Australian-Tongan artist Latai Taumoepeau engages with the discourses around the climate crisis materially, using her Pacific Islander body as her primary material. Her name positions her practice beautifully as a body in dialogue with the environment, as Latai means 'to reminisce' and Tau-moe-peau means 'to battle with waves.'⁶⁹ 'To battle with waves' is a Tongan title conferred on her ancestor, a celestial navigator and seafarer. Taumoepeau's connection to her ancestors links her to a deep history of people and places that are confronting precipitous changes in our current crisis.

⁶⁹ This part of the exhibition catalogue for the exhibition *Climate Century for Vitalstatistix*, Port Adelaide, curated by Emma Webb, 2018. Latai Taumoepeau, "War Dance of the Final Frontier, a Reflection," 1.

Taumoepeau is a *punake*. *Punake* is a Tongan word that describes one whose living practice is of poetry, song, dance, gesture, physical task, social organising, a broad and powerful appellative that may be translated into English loosely to mean a body-centred artist. *Punake* is derived from *puna* meaning 'to fly' and *hake* meaning 'on high.' As a body-centred artist, Taumoepeau expresses *faiva*, the performance of the body, whether in dance, drama, game, or task: "Faiva is the art of organising and performing social duties related to land, the body and the environment, which are inseparable."⁷⁰

Through *faiva* Taumoepeau resumes the knowledges of her heritage in a practice that generates knowledge, empathy, political capital, and action. She uses her body's strength to compel herself into a physical defence of the environment, a force against the anthropogenic climate crisis.

In *Repatriate I* Taumoepeau dances a Tongan war dance in a large acetate cube that slowly fills with water. As the water level rises, Taumoepeau begins to float, relentlessly performing her ritualised dance. Here, her body submerged is also the site of her heritage in the pacific submerging in the rising sea levels as a result of the climate crisis.

⁷⁰ Ibid.



Figure 49. Latai Taumoepeau, *Repatriate I*, 2016, *Liveworks*, Carriageworks. Performance documentation by Alex Davies.

Implicit in interjecting her body into the public imagination is a gesture to colonisation and globalisation. The Kingdom of Tonga was not colonised as

Australia was with white bodies arriving on ships but instead by capitalism and the effects of the climate crisis, including tourism, plastic coke bottles, global heating, and sea levels rising.

Through performance Taumoepeau explicates the aesthetics of power relations that Wynter ascribes. The disproportional force of her body against a rising sea level or a melting glacier is an aesthetic of power imbalance. Her body here is representative of Pacific Island nations' populations, and of the islands themselves, land and bodies being indivisible.



Figure 50. Latai Taumoepeau, *i-Land-x-Isle*, 2013, Campbelltown Arts Centre (top) and the Museum of Contemporary Art, Sydney (bottom). Performance documentation by Zan Wimberley.

In *i-Land x-isle*, Taumoepeau is suspended beneath a two-tonne block of ice that melts above and through her body over the course of two days. She is restrained by a tangle of ropes, tied in a traditional Tongan architectural lashing

technique used for binding, unable to escape. A slow, cold drip of icy water presents a form of water torture that echoes the watery oblivion faced by Pacific Islanders in the intensifying climate crisis. The power imbalance between island nations that are amongst the lowest contributors to environmental collapse tips towards them as some of the first to be entirely submerged and erased by the crisis. This relationship is visualised in this slow, excruciating performance — a test of pain, endurance, ultimately ending in failure.

3.8.2 Olafur Eliasson: *Ice Watch*

Alongside the polar bear as a symbol of tipping points and thresholds being crossed, the melting iceberg/block/cube as metaphorical microcosm has a prevalence in contemporary artistic expression.⁷¹ But you cannot touch a polar bear in the way that you can touch the ice in Olafur Eliasson's *Ice Watch*.

⁷¹ Liselotte Roosen, Christian Klöckner, and Janet Swim, *Visual Art as a Way to Communicate Climate Change: A Psychological Perspective on Climate Change-Related Art* (2017). 16.



Figure 51. Olafur Eliasson with Minik Rosing, *Ice Watch*, 2014, second iteration 2015, Place du Pantheon, Paris.

In *Ice Watch* Olafur Eliasson and professor of geology Minik Rosing transport twelve large icebergs from Greenland's rapidly disintegrating interior icesheet

to the centre of Copenhagen (and later Paris and London). Over the course of the exhibition, the icebergs melt, converting ice into fresh meltwater and releasing ancient atmospheric bubbles of compressed air. The audience is allowed to physically engage with the ancient air and water, being encouraged to touch, taste, smell and listen to the materials undergoing transformation. The icebergs are sourced from a fjord near Nuuk, having calved from the glacial mouth and drifted into the ocean.

Ice Watch was first installed in Copenhagen's City Hall Square in October 2014, to mark the publication of the Fifth Assessment Report on Climate Change by the Intergovernmental Panel on Climate Change, then again in Paris to coincide with the 2015 United Nations Climate Change Conference, and later in London in 2018. Situating the installation in physical proximity to the concerted international effort to understand and make practical changes to address the climate crisis emphasises the material reality of the crisis. The icebergs remind viewers and policymakers of their accountability, via an aesthetics of power interplay.

In *Ice Watch* the provenance of the ice is critical. The physical material of the melting ice sheet connects the audience to the planetary scale, collapsing the distance from the viewer to the icy poles through a tactile material engagement. Ice captured from glacial calving is not only a prime symbol of the melting ice caps and the rapid onset of the global heating and ecological disaster, but it is also a store of historical information connecting us materially with the past. The compressed ice bubbles from millennia past connect us to the past as much as a preserved woolly mammoth, or the arctic permafrost methane fields. Ice connects us with the air, a vertical relationship between the aerial and the geological that has been laid down over millions of years. This

material transformation equally connects the present with the future, melting ice caps and permafrost releases not only ancient air, but also large reserves of methane, a key potent greenhouse gas that contributes to the runaway greenhouse effect.⁷²

The clock formation of the icebergs is perhaps a little literal, pressing the case that the time to act is running out, and an urgent response to the issue at hand is vital. It contributes to climate crisis discourse, but uses a different material and visual language. The message in *Ice Watch* is unambiguous: it declares boldly that our freshwater ice stores are rapidly melting because of human-constructed processes. It is blunt in its spectacle.

To return to Neimanis' work regarding bodies of water, and bodies *and* water, *Repatriate I*, *i-Land-x-isle*, and *Ice Watch* all demonstrate how interconnected human decision making is to one another through the climate material of water. Water runs through these works as a powerful political aesthetic, overwhelming the body of a Pacific Islander artist, or rigidly occupying public space and shifting the bodies that navigate a thoroughfare. Similarly, Amy Balkin's *Public Smog* manifests an image of a shared space suspended in air, an impossibly porous enclosure made from a shared unanchored resource. *Public Smog* commandeers civic processes of regulation and value by interacting in real-world monetary exchange, activating an aesthetic of power relations embroiled in capitalist networks.

These artworks are boundary objects that synthesise and represent the science, politics, and governance of the climate catastrophe. They access the full

⁷² Victoria Shcherbakova et al., "Archaeal Communities of Arctic Methane-Containing Permafrost," *FEMS Microbiology Ecology* 92, no. 10 (2016); Shakhova et al., "The East Siberian Arctic Shelf: Towards Further Assessment of Permafrost-Related Methane Fluxes and Role of Sea Ice."

breadth of research and publication on the findings of the climate crisis and reinterpret them into a locality that is accessed by audience demographics that include artists, scientists, politicians, and the general public. These artists place their works geophysically alongside sites of political discourse to extrapolate and amplify the aesthetic of power relations.

As with *Our Fetid Rank*, air is a dominant aesthetic in the political discourse of the climate crisis. Air's slippery porousness is shared by all living critters but is disproportionately altered by those with political influence (our elected rank), and entities that can buy access, or steal it, to pollute. The power exchange — the dominance of the few over the many — is emblematic of the climate emergency; air is just one case study.

3.9 Conclusion

Our time is one where the physical materials of our collective world are undergoing extreme and striking transformation due to anthropogenic activity. Understanding the environmental crisis, and the politics that underscore it, can manifest through embodied, physiological, and tangible encounters with air.

This chapter argues that air is a political force through the devices of Susan Leigh Star's boundary object, which was extended by Kate Dunn to include the artwork as boundary object. It also explored Astrida Neimanis's position of the commons as implicating a duty of cross-species care, and air as infrastructure, using Maria Puig de la Bellacasa's identification of soil as infrastructure. The case was made to expand on the definition of aesthetics as being more than beauty, via Mark Johnson's embodied experience and Sylvia Wynter and Kyla Wazana Tompkins explication of aesthetics in order to describe transfer points

of power. Air therefore has a powerful political aesthetic of unstable power relations in the discourse of the climate crisis.

Air is an important aesthetic element to the climate emergency, demonstrating the power imbalance between emission creators and those that guard the decisions about who can pollute and by how much. The results of this are felt physically by all respiring animals through breath. The aesthetics of air in the crisis represents the distorted power dynamic between decision makers, polluters, and the many breathers of air. This relationship is evident in the artworks outlined in this chapter.

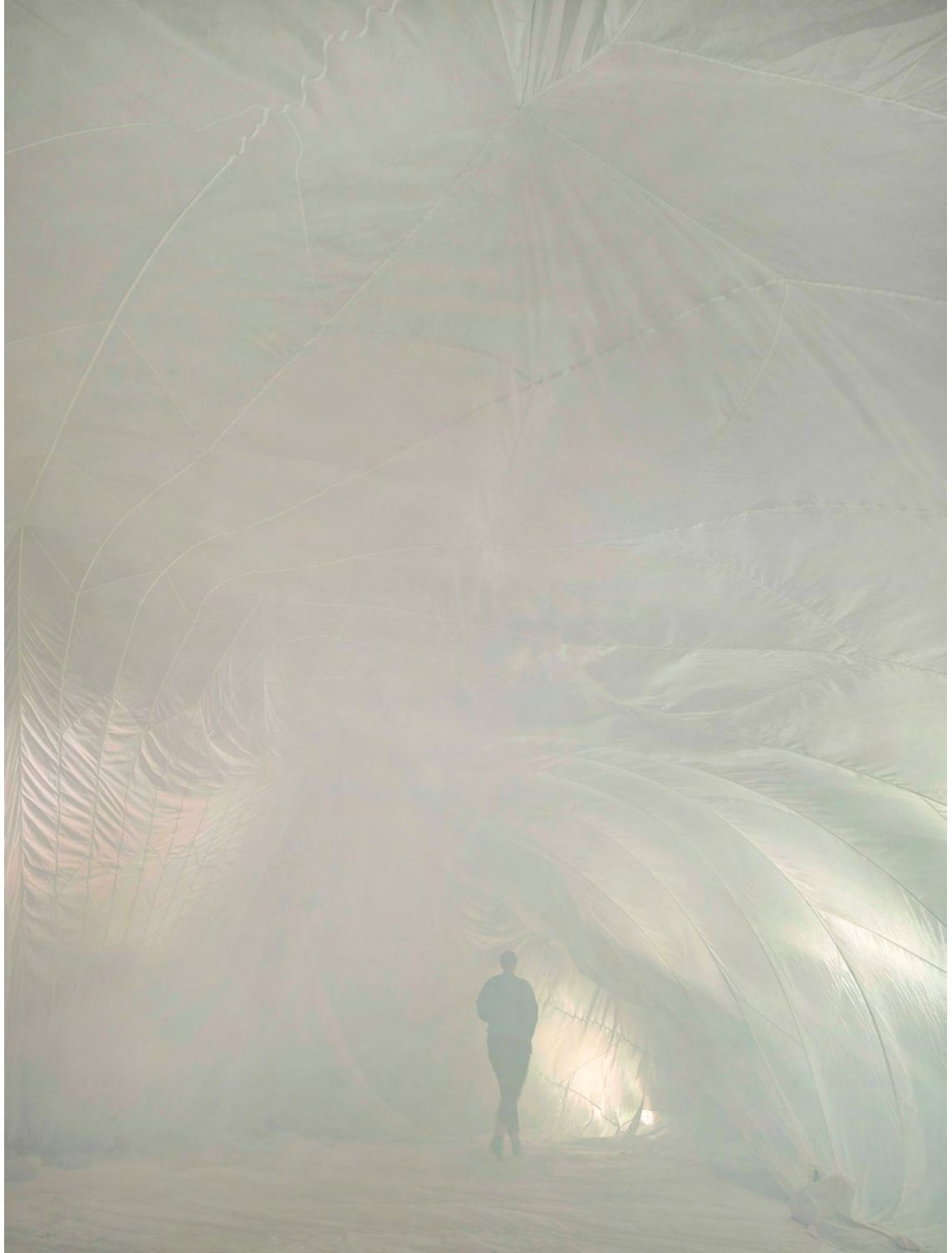
The elements of climate crisis aesthetic are powerful tools in creative practice. These artworks make palpable the devastating changes to our shared environment, where corporeal sensations of life sustaining materials have the capacity to teach on physical, physiological and emotional registers, and the potential to galvanise activism in the face of environmental collapse.

During the time this thesis is being written, extreme catastrophic bushfires in New South Wales and Victoria have blanketed Sydney with harmful dense smoke, obscuring the blue sky with burnt orange — sometimes even red — transforming the colour aesthetic of all visual stimuli. The practice of writing about the air when my attention has been so urgently drawn towards the air, and the orange light it casts, is haunting. Haunting of the ecosystems destroyed, the carbon that has been sunk into the bush is released aerially and invades my body. Ash rains as snow, scorched black leaves collect on the ground and in the ocean, and the whole aesthetic of nature is reshaped by catastrophe.

Politicised air comes full circle, back to our fetid elected rank, who choke on the smoky air in Canberra whilst refuting a link to the climate crisis, coal emissions, and denying colonial connections of appropriated land usage. The effect of the chorus of ineffectual voices in *Our Fetid Rank* is emotional. The work provides an overwhelming clarity of all the decisions not made and the pathways towards prevention not taken. Disgust is compounded by the abject sensation of hearing the tongue smacking, the dry swallowing of their biology, of all our bodies. The air is irrefutably political, and is the subject, aesthetic, and medium of political discourse.

Spaces that are carved out for experimental thinking are filled with stories, stories that may be scientific and political as well as material. Stories that predominate in political power dynamics are elevated and garner greater consideration, funding, and experimental application. Storytelling and future building are political. The following chapter interrogates the role of storytelling in the climate crisis, alongside the role of storytelling in artworks that also consider the material reality of the climate crisis.

Chapter 4: Air as storytelling



You are compelled into a large inflatable parachute buffeted by continual wind and filled with a dense haze the colour of a possible future sky.

Stories are geography, and empathy is first of all an act of imagination, a storyteller's art, and then a way of travelling from here to there... we tell ourselves stories in order to live, or to justify taking lives, even our own, by violence or by numbness and the failure to live; tell ourselves stories that save us and stories that are the quicksand in which we thrash and the well in which we drown, stories of justification, of accursedness, of luck and star-crossed love, or versions clad in the cynicism that is at times a very elegant garment. Sometimes the story collapses, and it demands that we recognise we've been lost, or terrible, or ridiculous, or just stuck.

Rebecca Solnit, *The Faraway Nearby*, 2013

4.1 Introduction

The previous chapters have considered material and language to be inextricably fundamental to making meaning. This final chapter focuses attention on the language elements of the material-language paradigm in order to interrogate the crucial role of storytelling in imagining climate futures.

Storytelling is present in all of the AIR WORKS as well as in each chapter of this thesis. *Different Kinds of Air, a Plant's Diary* relies on the stories of the air to explain why and how its materials differ from familiar air. *Things Fall Apart* requires the storytelling component to reveal the presence of the plant distress pheromone methyl jasmonate in the mist, which is otherwise undetectable. *Our Fetid Rank (Margaret Thatcher's bottom lip and Bill Clinton's tongue)* showcases the official climate narratives broadcast from our elected rank whilst ruminating on the material that forms the discourse. Through close analysis of AIR WORKS, the previous chapters have explored the co-constitutive relationship between material and language and the aesthetics of climate crisis narratives through air.

Imaginative storytelling makes palpable possible futures, plausible histories, and alternative presents. To consider the future of the environment is to imagine worlds. The power of who gets to imagine future worlds informs who and what is allocated funding and attention in the present. Climate future projections are nuanced by ideologies that are underscored by white, Western, techno-science. Storytelling can imagine novel alternatives and interrogate the foundations of current norms.

This chapter interrogates the climate crisis, and Western governance-endorsed techno-scientific climate future narratives in relation to Ursula Le Guin's

examination of the hero narrative arc, and the carrier bag alternatives that the AIR WORKS illustrate.

Alternatives to the hero narrative complicate official scientific or governmental climate imagining and create room to test new ideas. The necessity and significance of storytelling and imagination to think alternative climate futures and climate governance is explored through Kathryn Yusoff and Jennifer Gabrys' "Climate Change and the Imagination" amongst others, to confront the disproportionate consideration that is allotted to white, Western science-based governance in constructing climate futures. The idea of global consensus-building is represented through the United Nation's International Panel on Climate Change reports on the effects of temperature increase and subsequent solution proposals. Storytelling accesses imaginative spaces to create radical alternatives, but what stories get told? Donna Haraway posits a multispecies, multi-authored approach to storytelling to consider survival through a time of climate collapse. Children of compost stories (in Haraway's terms) decentre the hero story and get muddy in the multiple overlapping becoming-with of the future, where artworks and storytelling expresses tangible possible future realities. The implications for materials in organising future decision-making is explored through Katie King's *pastpresents*, a notion that recognises that accumulated histories and transformations are tangible in present materials. As air collects past decisions and shapes the material future of air and life, this chapter proposes *pastpresentfutures*.

The final section considers two proposed geoengineering solutions that are outlined in the IPCC report as examples of climate hero solution stories, each of which are then paired with an artwork that offers access to carrier bag alternatives. *Then Let Us Run (the sky is falling)* is examined in dialogue with

solar radiation management through high atmosphere aerosol dispersal, and Katie Paterson's *Future Library* is a counterpoint to proposed geoengineering strategies of carbon dioxide reduction.

4.2 Climate hero stories and carrier bag alternatives

In her essay "The Carrier Bag Theory of Fiction," Ursula Le Guin writes of the primordial roots of storytelling. Le Guin imagines an oral tradition that privileges the stories of the hunter, those that leave the foraging and collecting of the camp for the quest, the struggle. Tales of the hunt for large game are resplendent with close calls and near misses, as told by the cunning and brave hero. Le Guin envisions these heroes returning with a lumbering flank of protein and stories to share over the fire with those that did not hunt. Hunter stories have a narrative like a straight arrow: an objective, an obstacle, and a (male) hero. The story arrow (which is violent and dangerous) hits its target, killing. The hero kill is satisfying, resolute, and spectacular. This is the occupation of the lithe young male human.¹

Conversely, Le Guin's carrier bag theory of fiction considers the other stories and story types that may be told, not of the quest, but of the collecting, the community. The stories of the carrier bag, the sack, and the repository inhabit multispecies perspectives, examine complex social relations, people with multifaceted roles, and reflect on changes and movements over long time spans. Without the hero, there is room in the story for the other, female, child, companion species, witness, the slow grumble of the geological. Carrier bag storytelling challenges patriarchal knowledges. It decentres the man, the hero,

¹ Le Guin, "The Carrier Bag Theory of Fiction", 4.

the hunter, and destabilises the presumption of human triumph over nature, man over beast. The carrier bag is feminist, and it is multispecies.

Stories from the carrier bag, the repository, are varied, complex, multi-authored, and sometimes bland and quotidian, or thoughtful and creative. These stories can be tricky, funny, or long with no ending. They disrupt hero narrative arcs and time spans, with plural resolutions, subjects and perspectives, and may have awkward and muddled cadence. The carrier bag collects and holds ideas and problems without necessarily finding neat endings, or even endings at all. The resolution may not always be obvious at first; they may fold in on themselves, enacting circular narratives with many players and many combinations for thinking and storytelling.

In this way, the carrier bag allows space to consider problems from multiple perspectives all at once, to understand the tangled knots of interrelations. Similarly, the AIR WORK *Different Kinds of Air, a Plant's Diary* collapses and presents plural carrier bag stories simultaneously by considering multiple pasts, presents and futures, and imagining the details of possible worlds, allowing the climate crisis to be reflected upon within the context of deep time and invisible materials.

4.3 Imagination and the climate

To engage with the discourses of the climate crisis is to engage with modes of speculative imagination. Assembling the collective elements of the climate crisis encompasses the breadth of the planet and all living and non-living materials. The vastness of information about the crisis requires imaginative thinking in order to hold all facets together simultaneously. To synthesise

information and integrate it with primary experiences of nature necessitates strategies for thinking and compiling.

Kathryn Yusoff and Jennifer Gabrys describe the role of the imagination in climate crisis discourses:

Imagination here is understood as a way of seeing, sensing, thinking, and dreaming the formation of knowledge, which creates the conditions for material interventions *in* and political sensibilities *of* the world...²

What we can say now of the imagination is that rather than being the site of division it is a site of interplay *between* material and perceptual worlds, where concepts cohere, forces pull and attract, and things, discourses, subjects, and objects are framed, contested, and brought into being.³

Yusoff and Gabrys demonstrates that the climate crisis is a social, political, and historio-cultural problem as much as it is a scientific and material occurrence. Official (meaning Western and scientific) inquiries into the anthropogenic effects of globalisation and industrialisation are embodied in the United Nations' International Panel on Climate Change special report on the impacts of global heating. The IPCC is the primary body for collecting, synthesising, and collating the scientific research for understanding the scope and scale of the emergency. The IPCC makes projections on climate futures based on current rates of change and makes recommendations for mitigating regulation. The

² Yusoff and Gabrys, "Climate Change and the Imagination." 516 (emphasis in original).

³ Ibid., 517 (emphasis in original).

findings of this report permeate Western cultural imagination from policymakers all the way down to your run-of-the-mill disaster prepper.⁴

The concentration on climate crisis futurity is focused on science and governance, as embodied in the United Nations mandate to monitor and mitigate the negative effects of global heating through fossil fuel emissions. It is significant who and what agencies are endorsed to imagine futures, as those ideas limit the scope and creativity of responses. The IPCC imagines a solution generated by the Western, white arenas of 'science' and 'innovation,' garnering consensus between powerful governments and economies. These are stories not of the many but of the few. If the stories of climate futures are only told and imagined by funded Western research and the politically enfranchised, then the scope of possible futures narrows and the sense of shared responsibility deteriorates. Those that tell the stories of solution and recovery receive resources to implement their vision.

Yusoff observes that geoengineering is imagined within the context of entrepreneurial business solutions and operates alongside the innovation technologies industries. The nomenclature popular in these sectors favours militaristic metaphors, such as the "geoengineering battlefield," the focus of Richard Branson's "Carbon War Room."⁵ The resources deployed in the fight against the climate crisis and the language and stories used to formulate solutions frames cultural expectations about who will 'win the war,' and how. The combative language implies a top-down approach dominated by the military arm of the government, relieving the individual of responsibility to be

⁴ This is the popular culture activity of preparing stores, weapons, and accommodation for a possible future disaster.

⁵ Kathryn Yusoff, "The Geoengine: Geoengineering and the Geopolitics of Planetary Modification," *Environment and Planning A* 45, no. 12 (2013). 2803.

creative and to act. Creativity must be distributed laterally across all levels of action in order to build and reconfigure new potential futures and plural, coexisting voices.

Storytelling is an exploratory tool for thought experiments, a space to radically reshape the realms of possibility, to potentially bring into reality novel or reconstituted ways of being, thinking, doing, and relating. Considering the climate emergency, imaginings and storytelling can anticipate multiple effects of climate crisis and climate recovery. Yusoff and Gabrys reinforce the notion of art as a practice where experimental thinking meets material realities: "political possibility is entangled with aesthetic-material conditions and practices, and how recognition of these interrelations might enable 'collective experimentation' within both creative practices and climate sciences."⁶

Donna Haraway reiterates that "It matters what thoughts think thoughts. It matters what knowledges know knowledges. It matters what relations relate relations. It matters what worlds world worlds. It matters what stories tell stories."⁷ Opening up access and expression of storytelling to those with diverse knowledges, and experiences, layers and complicates imagining. How do Indigenous, immigrant, feminist, and trans stories extend our horizons and illustrate possibilities? How does the integration of earth, gases, minerals, companion species and symbionts into our stories rewrite and reorientate anthropocentric futures? Storytelling creates new ways of seeing the future, and new possibilities to recover from climate emergency. But what stories are currently being told, and who is empowered to tell them?

⁶ Gabrys and Yusoff, "Arts, Sciences and Climate Change: Practices and Politics at the Threshold", 1.

⁷ Donna Haraway, *Staying with the Trouble : Making Kin in the Chthulucene* (Durham : Duke University Press, 2016), 35.

4.4 Storytelling for survival: Donna Haraway

In *Staying with the Trouble: Making Kin in the Chthulucene*, Donna Haraway considers that feminist survival in a future climate necessitates a decentring of the individual whole in storytelling in favour of a making-together with other species; a kinship with soil, with water, with air. To stay with the trouble is to seek multispecies kin, to form collective processes to examine and create the arts of living on a damaged planet; a way to recuperate and persist meaningfully through a time of environmental damage and upheaval.

Staying with the trouble expands and furnishes rich ideas of the future and resists the perverse allure of a single, synchronised catastrophic dystopia or apocalypse; the indulgent creation of a sublime despair or perverse disaster spectacle (a hero narrative). Instead, it means inhabiting a thick meaningful present — engaged, active, and creative — and being informed about the depth of destruction playing out now and into the future:

Staying with the trouble requires learning to be truly present, not as a vanishing pivot between awful or edenic pasts and apocalyptic or salvific futures, but as mortal critters entwined in myriad unfinished configurations of places, times, matters, meanings.⁸

Storytelling invites us to refigure and reconfigure, unmake and make-together again a meaningful present. This process can consider multispecies justice in decision making in troubled times.

⁸ Haraway, *Staying with the Trouble : Making Kin in the Chthulucene*. 1.

A storytelling method might activate *string figures*, a feature in Haraway's work based on a game of creating patterns with a looped string between your hands (often referred to as cat's cradle), passing them back and forth, twisting, dropping, and crossing threads in an elastic play of learning, translation, and continual reshaping. Within this process is the experience of tracking the patterns produced, the inevitable reality of the string itself, and the action of making and unmaking a new configuration using the same string. String figures are a practice as well as a process of elastic thinking, reassembling, and acquiring new perspectives and knowledge. String figures, or SF, is a practice-based game to think together.⁹

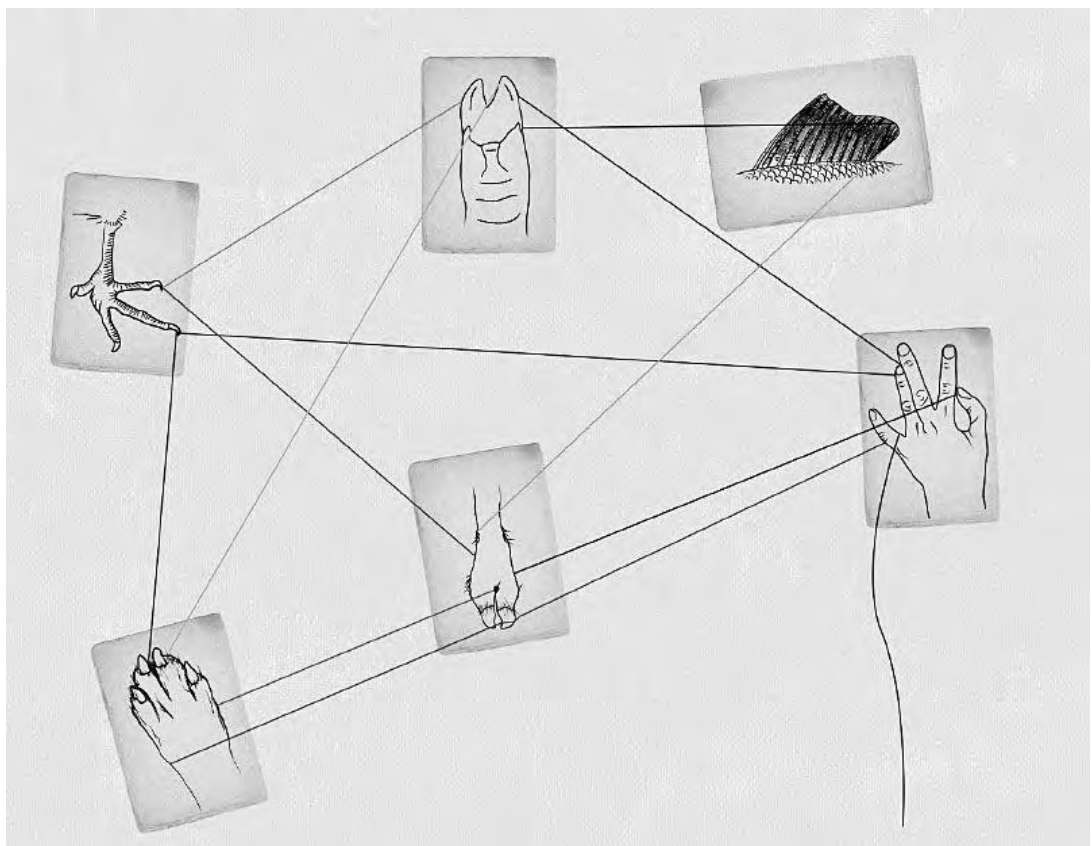


Figure 52. Nassir Mufti, *Multispecies Cat's Cradle*, 2011, in "Playing String Figures with Companion Species," Donna Haraway, *Staying with the Trouble, Making Kin in the Chthulucene* (Durham, NC: Duke University Press, 2016), 9.

⁹ Ibid., 10.

For Haraway, the initials *SF* are a useful stand-in for all of the following: "string figures, speculative fiction, speculative fabulation, speculative feminism, science fact, science fiction, so far."¹⁰ Making art collects fibres of research and reformulates them into new fabrics, it translates thoughts and information into new utterance in myriad mediums. Art can imagine climate futures.

SF stories in art are an invitation to sympoiesis, making-with together, acknowledging the impossibility of objective method, and the impossibility of neutral agentless materials. In Haraway's terms, this storytelling is *tentacular*, sympoietic:

The tentacular ones tangle me in SF. Their many appendages make string figures; they entwine me in the poiesis — the making — of speculative fabulation, science fiction, science fact, speculative feminism, so in de ficelle, so far. The tentacular ones make attachments and detachments; they make cuts and knots; they make a difference; they weave paths and consequences but not determinisms; they are both open and knotted in some ways and not others. SF is storytelling and fact telling; it is the patterning of possible worlds and possible times, material-semiotic worlds, gone, here, and yet to come.¹¹

Thinking through these exchanges, contact zones, and collaborations builds robust worlds and thick stories to imagine together. *Tentacular thinking*

¹⁰ Donna Haraway, "Playing String Figures with Companion Species," in *Staying with the Trouble : Making Kin in the Chthulucene* (Durham: Durham : Duke University Press, 2016). 10.

¹¹ Haraway, *Tentacular Thinking: Anthropocene, Capitalocene, Chthulucene.*" 31.

requires us to rethink our disintegrating present and to form new collaborative stories in order to manifest meaningful futures and to pursue recovery.

4.5 *Pastpresents: the materials in climate futuring*

In a game of SF with Donna Haraway's *naturecultures*, Katie King proposes the notion of the *pastpresent*.¹² Pastpresents are where the present cannot exist without an accumulated past; instead, past and present "continually converge, collapse and co-invent each other."¹³ A lump of coal, for example, is a physical manifestation of its 350 million year history. It is a potent object to think with, physically, conceptually, and culturally.

Air is an apposite example of a pastpresent. Air has a sense of infinity into which substances may be 'blown away,' such as gas exchange, industrial effluent, chemicals release, and carbon-13. These substances are all collected and retained in the air, forming the character of air to which new life responds. Air is the invisible subconscious catch-all of conscious (r)jections of human activity, a place (conceptual and physical) where what has been jettisoned, ejected, blown away into the seeming void of 'gone' is returned. The past is present in the present. Air's current material character is the aggregate of the capitalist project (all that is solid melts into air), industrialisation, colonisation and population growth, environmental destruction, globalised communication, global heating, geologic outgassing, cosmic interference, and the gas exchange of many living organisms across deep time.

¹² Katie King, "Pastpresents: Playing Cat's Cradle with Donna Haraway," <http://playingcatscradle.blogspot.com/2010/10/katie-king-womens-studies-university-of.html>.

¹³ Ibid.

The aggregation of the materials of the air shape physical earth systems and influence how life can evolve into the future. It is a dynamic dance between materials past, present, and future. In this sense, air is not only a *pastpresent*, but a *pastpresentfuture*, where the traces left in the present persist into the future and collectively shape how life can continue to exist (or not) and co-evolve. A *pastpresentfuture* is a frame for describing the enduring character of materials in these works and the speculative fabulations that are at the root of climate crisis discourse.

The physical material realities of the present predicts official climate future stories. Scientific monitoring and research informs future imagining by revealing trends, causal effects, physical reactions, and technological precipitants. The IPCC special report, "Global Warming of 1.5 °C" is an example of storytelling based on the recent history and current state of the materials of physical earth systems.

The materials of climate leave their trace on the earth, and in lifeforms, leaving what Anna Tsing, Elaine Gan, Nils Bubandt, and Heather Anne Swanson call a *haunting*:

Anthropogenic landscapes are also haunted by imagined futures. We are willing to turn things into rubble, destroy atmospheres, sell out companion species in exchange for dreamworlds of progress. Haunting is quite properly eerie: the presence of the past often can be felt only indirectly, and so we extend our senses beyond their comfort zones. Human-made radiocesium has this uncanny quality: it travels in water and soil; it gets inside plants and animals;

we cannot see it even as we learn to find its traces. It disturbs us in its indeterminacy; this is a quality of ghosts.¹⁴

In this way, the air is a ghost of the past in the present. Our air is haunted by all those that breathed before us, and all of the cosmic and terrestrial phenomena that shape the material boundaries of the world. *Different Kinds of Air, a Plant's Diary* collects these ghosts and presents them to the present audience. The airs in this performance installation are a confrontation with the *pastpresent*.

Crucial to *Different Kinds of Air, a Plant's Diary* is the storytelling component, which makes tangible the world from which the air originates and explains some of the differences. As the audience member breathes the air from this period and feels the subtle effects on the body, the work is completed. The story is a springboard into imaginative thinking and world building. The stories multiply into scenes of the different types of bodies and life forms that evolved to thrive in this air; different colours, different scenes, different 'normal.' The physical air that the audience breathes is a direct encounter with a haunted past. The materials of which persist, transform, and are reinvented.

The stories of the air encompass species and geologic forms over time spans that far exceed human life cycles. The airs that are available to breathe belong to eras from before there were humans to become heroes. They illustrate the resounding perseverance of life cycles on earth.

The material of climate future stories and the materials of the artwork are happy bedfellows, lingering equally between storytelling and the physiological

¹⁴ Anna Lowenhaupt Tsing, Elaine Gan, Nils Bubandt, and Heather Anne Swanson, Anna Lowenhaupt Tsing, *Arts of Living on a Damaged Planet* (Minneapolis : University of Minnesota Press, 2017). 2.

response to the material of the airs through the body. They are past presents that stimulate the wonder, imaginings, and stories of possible futures. The storytelling in these works offer an invitation to shared imagination, allowing the body to simultaneously ingest and perceive the effects of the air, and fall away in an abstracted imagining.

4.6 Hero narratives of climate crisis: the IPCC

The hero narrative Le Guin describes at the beginning of this chapter predominates in Western liberal democratic cultures in the form of notions such as growth, capitalism, technological efficiency, and economic rationalism. These particular narratives neglect the material environmental impact that collect into the aggregated narrative of 'climate crisis.' Le Guin writes: "'Technology,' or 'modern science' (using the words as they are usually used, in an unexamined shorthand standing for the 'hard' sciences and high technology founded upon continuous economic growth), is a heroic undertaking. [...] The fiction embodying this myth will be, and has been, triumphant (Man conquers earth, space, aliens, death, the future, etc.) and tragic (apocalypse, holocaust, then or now)."¹⁵

As it is expressed through the sciences, the climate crisis is a hunter story, a story of a kill. It hovers between the triumphant and the apocalyptic. It is a spectacular triumph of collective human action over a much larger beast, and ultimately, a tragedy, as that beast supports human life.

The hero narrative structures also play out in relation to the climate crisis discourse in popular culture. Popular eschatologies tend to favour a heroic

¹⁵ Le Guin, "The Carrier Bag Theory of Fiction ". 153.

ending; a rapture, a flood, a final revelation, a spectacular techno-war, nuclear or biological destruction; the idea being that the apocalypse will occur everywhere on earth, simultaneously and expeditiously.¹⁶ Films, novels, video games in the new genre *CliFi* — a neologism compounding 'climate' and 'fiction' — focus on limited views, or single disaster events with an emphasis on heroic survival.¹⁷

Hero story characteristics can be traced through climate crisis political discourse. Every 'hard' science projection of a future environmental model is storytelling. Statistics are extrapolated, correlated and synthesised and taken to their extreme over time to make predictions about the future; to tell the story of the future of the climate crisis.

The climate scenarios articulated in the IPCC 2018 report "Global Warming of 1.5° C" project and imagine the effects of the mean temperature of the Earth heating by 1.5° and 2° comparatively.¹⁸ The central research objective is to identify all reverberating results have at their nexus the rise in temperature. These include mean temperature rise on land and in the ocean, hot extremes on land, a higher frequency of floods and droughts unevenly distributed across

¹⁶ There is much literature on this topic. See also: Jerry L. Walls, Robert Jewett, and John Shelton Lawrence, *Eschatology in Pop Culture* (Oxford University Press, 2007); Robert M. Geraci, "The Popular Appeal of Apocalyptic Ai," *Zygon* 45, no. 4 (2010); Patrick D. Murphy, "Lessons from the Zombie Apocalypse in Global Popular Culture: An Environmental Discourse Approach to the Walking Dead," *Environmental Communication* 12, no. 1 (2018). Andrew Feinberg, "Apocalypse Soon," *New Scientist* 219, no. 2928 (2013); Wendy Lynne Lee, *Eco-Nihilism : The Philosophical Geopolitics of the Climate Change Apocalypse* (Lanham, Maryland: Lanham, Maryland : Lexington Books, 2017); Madeleine Fagan, "Who's Afraid of the Ecological Apocalypse? Climate Change and the Production of the Ethical Subject," *The British Journal of Politics and International Relations* 19, no. 2 (2017).

¹⁷ Lee, *Eco-Nihilism : The Philosophical Geopolitics of the Climate Change Apocalypse*; Fagan, "Who's Afraid of the Ecological Apocalypse? Climate Change and the Production of the Ethical Subject."; E. Swyngedouw, "Apocalypse Forever? Post-Political Populism and the Spectre of Climate Change," *Theory Cult. Soc.* 27, no. 2-3 (2010); Michael Svoboda, "Cli-Fi on the Screen(S): Patterns in the Representations of Climate Change in Fictional Films," *Wiley Interdisciplinary Reviews: Climate Change* 7, no. 1 (2016).

¹⁸ V. Masson-Delmotte, "IPCC Report 2018."

land masses, sea level rise, polar ice shrinkage, ocean acidification, and mass extinction of species and ecosystems.¹⁹

In the summary for policymakers, the IPCC writes, "Total radiative forcing is positive and has led to an uptake of energy by the climate system. The largest contribution to total radiative forcing is caused by the increase in the atmospheric concentration of CO₂ since 1750."²⁰ One grand direct chain reaction of events metered out in scientific figures, charts and numbers. The major climate event is the heating of the Earth due to human-generated greenhouse gas emissions that causes a domino effect that ends in disease and displacement of humans, and loss of food security and resources.

Let me be clear that I am not undermining the scientific findings in the IPCC report, or denying their immensity or urgency: this is invaluable scientific observation and research that collectively pieces together the expansive character of our current climate emergency. Rather, I am interested in how the narrative is shaped based on these findings, which run in a straight line from current output to projected future result. This story arc is uncomplicated, a direct domino effect toppling from one effect onto another, with register varying in alarm according to the projected mean temperature (1.5 degrees, compared to 2 degrees).²¹ The language is comfortably suited to the kind of institutional document that it is, utilising a logical structure, authoritative scientific register, and referencing figures and graphs. The document speaks

¹⁹ Ibid., 339.

²⁰ IPCC, "Summary for Policymakers," in *Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*, ed. T.F. Stocker, et al. (Cambridge, United Kingdom and New York, NY, USA: Cambridge University Press, 2013).

²¹ M. Collins et al., "Long-Term Climate Change: Projections, Commitments and Irreversibility," 42.

with rationality and includes forthright description of the adverse effects of failing to limit temperature rise.

A *human* narrative unfolds. The primary unit used to assess climate crisis is the impact on the human species, emphasising the effect on human health and displacement, and economic growth, before elaborating on the ecological impacts on other species, which are often then considered as resources; for example, "fish stocks." The climate emergency is a hero story because it is billed as a (hu)man story. Human activity is the cause of this environmental emergency. The scale of the impact of human activity is far greater than humans themselves, it's a Goliath — the planet is the large game that is being hunted into extinction. Humans are the protagonists running from kill to kill, win to win, heeding none of the warning signs.

The AIR WORK *Things Fall Apart* reimagines this conversation to include a response from trees, the mist of the plant distress pheromone methyl jasmonate.

IPCC projections on the future climate differs, alternating between predicted increases of 1.5 degree, 2 degrees, 3 degrees and higher, but the narrative arc remains the same.²² The fifth assessment report for the IPCC, the report on heating of 1.5 degrees, and all projections of future to climate are speculative fictions; storytelling.

However, there are stories that tangle between and through the observational data. In the carrier bag that is the defrosting primordial permafrost we can identify other climate stories. These stories include the actions of community

²² Anonymous, "A Matter of (Half) Degrees." 163.

groups, unseen activity from non-human others, and the effects of legislation. As with *Things Fall Apart*, climate crises stories are plural, multi-authored and overlapping; they are expressed differently in different parts of the world and play out on different timescales.

4.7 The potential for art to influence climate futures (in the carrier bag)

The purpose of the documents of the IPCC is to influence policymakers, and to institute change (rescue) at the national and international level by curbing global temperature increase. The IPCC tell stories that think globally, suggesting methods for mitigating global heating within established structures.

However, storytelling may be used as a resilience-building tool, and for creative experimentation. Storytelling can propose radical changes to the structures themselves and test new ways of organising. Storytelling through the carrier bag imagines different climate narratives, plural coterminous solutions, and creative feminist futures that can change how we envision the shape of the climate crisis and how to meaningfully live through it.

Art is an important medium in which to envision and experiment. In writing of the possibilities presented by art in relation to the climate crisis, Yusoff and Gabrys state that:

The uncertainty, contingency, and experimentation necessarily characteristic of climate change may generate emergent forms of practice that require new approaches — not just to arts and sciences, but also at the new

thresholds, or 'meetings and mutations' that these practices cross.²³

The arts are able to quickly and creatively respond to the shifting sands of climate research. Art can generate new works and perspectives, but also new modes and conventions of art and discourse. This, as Yusoff and Gabrys suggest, benefits both science, and governance: "political possibility is entangled with aesthetic-material conditions and practices, and how recognition of these interrelations might enable 'collective experimentation' within both creative practices and climate sciences."²⁴

Supporting the carrier bag theory of fiction is a discourse of imagining and imagination where Astrida Neimanis, Cecilia Åsberg, and Suzi Hayes, and Yusoff and Gabrys (amongst others) consider the influence of collective imagining on governance and future building.²⁵ Imagining is not frivolous nor self-indulgent fantasy; instead, it presents potent contested complex issues in a space that may be creatively engaged to trial, test, reconfigure, remodel, and reform. Neimanis, Åsberg, and Hayes write that "to consider climate governance is thus also to consider which imaginaries become dominant in our orientations toward climate change, and to what effect."²⁶

²³ Gabrys and Yusoff, "Arts, Sciences and Climate Change: Practices and Politics at the Threshold." 1.

²⁴ Ibid., 1.

²⁵ Cecilia Åsberg Astrida Neimanis, Suzi Hayes, "Post-Humanist Imaginaries," in *Research Handbook on Climate Governance*, ed. Karin Bäckstrand and Eva Löwbrand (Cheltenham, Gloucestershire, UNITED KINGDOM: Edward Elgar Publishing Limited, 2015). Yusoff and Gabrys, "Climate Change and the Imagination."

²⁶ Astrida Neimanis, "Post-Humanist Imaginaries." 481.

4.8 The hero story in climate crisis solution proposals: geoengineering

Geoengineering proposals represent one mode of large-scale intergovernmental imagining, situated at the intersection of science and governance. Popular geoengineering ideas are aimed at slowing the rate of environmental change without vastly upsetting the economic, capitalist status quo. They are hero stories, suggestions that are given currency through their inclusion in the IPCC document, a globally endorsed inquiry into the climate crisis.

Solutions to the climate crisis challenge the structures and infrastructures that support society as it is currently organised. Emissions relating to manufacture, mining, agriculture, transport, and energy are deeply intertwined with economic growth and profit. Appreciable change to these sectors requires rocking the foundations of capitalism and globalised trade across national boundaries; that is, upsetting prevailing hero stories. Between the second and the fifth assessment report of the IPCC, the register has shifted from prevention to adaptation and mitigation.²⁷ The IPCC's fifth assessment report includes an acknowledgement that "there are a wide range of adaptation options that can reduce the risks of climate change (high confidence)."²⁸ The greatest mitigating task is reducing greenhouse gas emission, however, progress towards reducing emissions are complex. Reducing emissions requires concerted effort across nations, each of which have varying degrees of capability to reduce and monitor emissions.²⁹

²⁷ IPCC, "Topic 4: Adaptation and Mitigation," in *Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*, ed. Rajendra K. Pachauri Core Writing Team, Leo Meyer (Geneva, Switzerland: International Panel on Climate Change, 2014).

²⁸ V. Masson-Delmotte, "IPCC Report 2018." 339.

²⁹ X. Fu et al., "Actions on Climate Change, Intended Reducing Carbon Emissions in China Via Optimal Industry Shifts: Toward Hi-Tech Industries, Cleaner Resources and Higher Carbon Shares in Less-Developed Regions," *Energy Policy* 102 (2017); Natalie Daniels, "Living Low Carbon," *Materials World* 23, no. 5 (2015).

Alongside recommendations to reduce greenhouse gas emissions, single-action solutions are being sought; these are grand gesture solutions of compromise, offering a single dominating solution (with significant consequences) to the climate crisis whilst maintaining the status quo.

The fifth assessment IPCC report included an appraisal of proposed geoengineering solutions.³⁰ Geoengineering involves large-scale engineering projects that aim to deliberately influence and alter the climate, temperature, and level of heat radiation from the Sun. They propose to enact conscious planetary modification, embodied hero solution stories that imagine large-scale single action technologically aided fixes. These proposals vision a mastery over, or taming of nature.

This chapter does not seek to measure viability of these ideas, but instead interrogates their narrative arc, the hero sensibility they activate, and the creative alternatives that exist alongside them.

Two geoengineering solutions are elucidated, albeit critically, in the final parts of the IPCC fifth assessment report. Box 3.3 of the report considers the viability of solar radiation management techniques, and carbon dioxide reduction to combat, stall, and reverse the impacts of the climate crisis.³¹

4.8.1 Solar radiation management

The geoengineering proposal that received the most attention in the IPCC report and also in the wider research community is solar radiation management

³⁰ IPCC, "Topic 3: Future Pathways for Adaptation, Mitigation and Sustainable Development."

³¹ Ibid, 89.

(SRM).³² Solar radiation management essentially imagines processes to reflect some of the Sun's light back into space as a method to reduce the warming potential of solar radiation. Considered vertically from the surface of Earth outwards to space, solar radiation management strategies have been proposed for different altitudes. At the surface, land and ocean albedo, or reflected sunlight that is not absorbed as heat, SRM could include modifying colour reflectiveness on land and ocean surface to mitigate heat energy absorption. At tropospheric levels, suggestions include artificially whitening clouds.³³ Proposals for the upper atmosphere include dispersing aerosols to reflect the Sun in the high stratosphere, mimicking the effects of debris from volcanic eruptions; and farthest from the earth on the edge of space, mirrors and shades from satellites would protect the planet.

So far, the greatest amount of SRM-related literature has been on upper atmosphere aerosol injection. However, these techniques have not been adequately tested and have high-risk, unpredictable effects, such as interfering with photosynthesis and therefore food chains, along with significant drawbacks.³⁴ Upper atmospheric injection of aerosols requires continual injection and maintenance. As a one-stop solution it demands prolonged commitment and management that surpasses a single human life span, laying

³² Toby Svoboda, *The Ethics of Climate Engineering : Solar Radiation Management and Non-Ideal Justice* (London: London : Routledge, 2017).; Katherine Dagon and Daniel Schrag, "Quantifying the Effects of Solar Geoengineering on Vegetation," *Climatic Change* 153, no. 1-2 (2019): 235–51; Yusoff, "The Geoengine: Geoengineering and the Geopolitics of Planetary Modification."

³³ Ben Kravitz, Douglas G. Macmartin, and Ken Caldeira, "Geoengineering: Whiter Skies?," *Geophysical Research Letters* 39, no. 11 (2012).

³⁴ Jan C. Minx et al., "Negative Emissions—Part 1: Research Landscape and Synthesis," (2018); Yu Izrael et al., "Field Experiment on Studying Solar Radiation Passing through Aerosol Layers," *Russian Meteorology and Hydrology* 34, no. 5 (2009); John A. Dykema et al., "Stratospheric Controlled Perturbation Experiment: A Small-Scale Experiment to Improve Understanding of the Risks of Solar Geoengineering," *Philosophical Transactions: Mathematical, Physical and Engineering Sciences* 372, no. 2031 (2014); Xy Yu et al., "Impacts, Effectiveness and Regional Inequalities of the Geomip G1 to G4 Solar Radiation Management Scenarios," *Glob. Planet. Change* 129, no. C (2015).

the burden of maintenance on future generations.³⁵ Whilst it may achieve the effect of cooling the planet, this plan neglects the other effects of the inflated ratio of carbon dioxide in the air and oceans.³⁶

An aesthetic consequence of SRM through upper atmospheric injection of aerosols would be the permanent removal of the colour blue in clear skies, or more so, the obfuscation of the blue sky.³⁷ Instead of its familiar blue hue, a dirty milky colour would reside in its place. The colour of the sky after SRM is determined by the size of the particles dispersed and the amount of light scattered by them, causing whiter skies — except at sunset and sunrise, when the particles would bend the light to appear hypercoloured, intensifying the colours of these times.³⁸

The proposal of SRM through aerosol dispersal seemingly leaves minimal trace on the environment and the economy. It would be a single grand masculine act that cools the planet and prevents the secondary and tertiary effects of global heating; a single narrative arc in which the human scientist saves the world as we know it through innovation and invention.

Counter-proposals to this globally endorsed storytelling are found in creative expressions that offer alternatives. The AIR WORKS are material interventions that collectively re-envision alternatives; they write myriad carrier bag stories

³⁵ Minx et al., "Negative Emissions—Part 1: Research Landscape and Synthesis."; Andy Jones et al., "The Impact of Abrupt Suspension of Solar Radiation Management (Termination Effect) in Experiment G2 of the Geoengineering Model Intercomparison Project (Geomip)," *Journal of Geophysical Research: Atmospheres* 118, no. 17 (2013).

³⁶ Vasiliki Manousi and Anastasios Xepapadeas, "Mitigation and Solar Radiation Management in Climate Change Policies," (Fondazione Eni Enrico Mattei (FEEM), 2013).

³⁷ Kravitz, Macmartin, and Caldeira, "Geoengineering: Whiter Skies?."

³⁸ Ibid.

around which people may focus a material engagement and collective imagining to project a reshaped world of governance and nature.

The AIR WORK *Then Let Us Run (the sky is falling)* considers the aesthetic and material reality of living with this potential new sky in a post-geoengineered world.

4.8.2 *Then Let Us Run (the sky is falling)*



Figure 53. Emily Parsons-Lord, *Then Let Us Run (the sky is falling)*, 2018, installation documentation, commissioned by Vitalstatistix for *Climate Century*. Image courtesy of Sam Roberts.

Then Let Us Run (the sky is falling) is an installation that responds to fringe engineering ideas that imagine a human saviour over the planet. The high-risk effects of SRM through upper atmosphere aerosol injection are largely

unknown, however, the light scattering properties of aerosols required for cooling would produce whiter skies.³⁹

A large inflatable parachute porously encloses an aerosol that filters bright lights, washing the work in the hue of the possible future sky. The audience member is invited inside, subsumed into the dense mist, sublimating into the colour of post-geoengineered sky. Large, noisy fans continually buffet the air; the sensation is disorientating, as if perpetually falling. The body of the audience member feels as though it is obliterated, dispersed like the particles in the air.



³⁹ Ibid.



Figure 54. Emily Parsons-Lord, *Then Let Us Run (the sky is falling)*, 2018, installation documentation, commissioned by Vitalstatistix for *Climate Century*. Image courtesy of Sam Roberts.

The work imagines the sky as a constructed monument of our time, a vast built environment that reveals the values that underscoring humanity. A conscious remaking of an object that is familiar but eerily different. The fabricated sky is reminiscent of building a wall between us, the living critters on our planet, and the rest of the chaos of the universe; it seems territorial, protectionist. In this geoengineered new nature, the sky becomes an index for the notion of a sky; a stand-in for what was. It is easy to imagine a time when people will tell stories about 'back when the sky was blue' to suspicious children.

The physical and haptic immersive experience inside the work is noisy and anxiety provoking; it is not peaceful or hopeful. It questions the appropriateness and effectiveness of SRM as a solution to the climate emergency. Experiencing immersion inside this inflatable carrier bag is an

invitation to imagine the smaller stories, the parallel resistances and actions that may co-exist under a new sky.

Then Let Us Run (the sky is falling) is a project in shared imagining. What are the realities of living in a new aesthetic in a post-geoengineered world? The work invites ruminations on the human experience of the natural environment, the built environment, and how it looks and feels. The quality of light that filters through the aerosol is dimmer, flatter, less brilliant. Were that same light to fall on faces, oceans, and plants out in the world, they would look different to how they do on clear sky days as we know them. The entire aesthetic of nature would be unsettlingly different under a new sky.

The aerosol used to reflect the light in *Then Let Us Run (the sky is falling)* is a mixture of glycol, glycerine, water, and mineral oil. It is a sweet-tasting non-toxic haze, a sugar-coating of the disaster. This aerosol is one proposed SRM option, although sulphur, salt, and even diamond dust have been suggested.⁴⁰

The material that forms the enclosure is made from a decommissioned United States Army supply parachute, first deployed in 2005 and retired in 2015. Active during both the Iraq and Afghanistan wars, it is a contentious human-made object from a charged political environment. This object has fallen through skies over battlefields, the resistance of the air on the parachute slowing its cargo, the materials of war. In the battlefields the physical properties of the air are used to cushion the blow. The fabric alludes to the international reputation of the United States as being a global rescuer/perpetrator. It indicates the

⁴⁰ D. Weisenstein, D. Keith, and J. Dykema, "Solar Geoengineering Using Solid Aerosol in the Stratosphere," *Atmospheric Chemistry and Physics* 15, no. 20 (2015).

geopolitical nature of a large-scale geoengineering operation, whereby global decisions may be agreed upon by the few but effect the many.

Kathryn Yusoff picks up on the bio-geopolitical nature of geoengineering as a human-centred connivance:

The possibility of unilateral, yet regionally unequal modification of climate prompts the need to think about biopolitics and geopolitics together; that is, a bio-geopolitics that does not just address power in relation to forms of subjectification and modes of political agency, but extends its consideration to the biosphere, in order to think through forms of collaboration within earth processes rather than outside of them.⁴¹

Through the use of the US Military parachute, *Then Let Us Run (the sky is falling)* deliberately references the militarised language and approach to climate crisis solutions, as well as the disproportionate emissions contributors from the big nations, such as the US.

The scale of the climate emergency surpasses those systems that operate on the Earth's surface, within national boundaries, generational responsibility, governments, and geopolitics, and must now enact a perspective that integrates Earth systems. The human imagination around geoengineering strategies coincides with the anthropogenic ability to affect large scale environmental modification. Geoengineering is a dominating modification process that considers the human species over all other biota and their

⁴¹ Yusoff, "The Geoengine: Geoengineering and the Geopolitics of Planetary Modification." 2800.

entitlement to the materials and processes of the natural environment. The power to imagine climate futures and to make decisions about what they entail is distributed unevenly across species and geopolitical boundaries.⁴²

Storytelling and collective imagining can be marshalled to counter dominating climate stories. Artworks present an opportunity to imagine together and to question "how geoengineering is transformed as an object of concern and praxis of understanding through modes of participation."⁴³ Through participation with the installation, audience members may consider how life may unfold within a different aesthetic and how that would change their relationship with the environment. The different sky represented in the work could influence the physical requirements of life as well as the psychological experience of a new environment across species. *Then Let Us Run (the sky is falling)* disrupts the hero story it investigates by provoking these responses. The work undermines and questions geoengineered quick-fix hero solutions by confronting the viewer with a material and aesthetic encounter with them. The work is itself a bag to contain some stories and ideas of our collective future and a space to be critical of the realities of single-idea solutions.

This work becomes a shared encounter with politics, governance, and the possible worlds that reverberate forth from present-day decision-making.

The single-mindedness of geoengineering is driven by the hero narrative and neglects carrier bag strategies for imagining alternative interspecies futures. *Then Let Us Run (the sky is falling)* prompts the viewer to ask, who gets to tell the stories of the air? Who gets to imagine the future air?

⁴² Svoboda, *The Ethics of Climate Engineering : Solar Radiation Management and Non-Ideal Justice*.

⁴³ Yusoff, "The Geoengine: Geoengineering and the Geopolitics of Planetary Modification." 2805.

4.8.3 Carbon dioxide reduction

Carbon dioxide reduction (CDR) involves technologically augmented methods for sequestering carbon dioxide from the air through the oceans and the land and storing them in hypothetically environmentally benign configurations.

There are drawbacks to this solution, as outlined in the IPCC report:

The climatic and environmental side effects of CDR depend on technology and scale. Examples are associated with altered surface reflectance from afforestation and ocean de-oxygenation from ocean fertilization. Most terrestrial CDR techniques would involve competing demands for land and could involve local and regional risks, while maritime CDR techniques may involve significant risks for ocean ecosystems, so that their deployment could pose additional challenges for cooperation between countries.⁴⁴

Natural carbon sinks lock up carbon from the air; these already exist in the biomass of trees and forests, algae and diluted in the oceans. The uptake of carbon dioxide in plants and plankton sequesters carbon dioxide from the air through photosynthesis. This carbon dioxide reduction 'technology' has evolved through sympoiesis with the air and other forms of life on Earth. The IPCC report assesses the viability and effectiveness of afforestation and reforestation and carbon sequestering through enriching degraded soil, as well as restoring exhausted or damaged land. Although these natural solutions encompass a wider methodology than simply human technology, the hero

⁴⁴ Ibid, 89.

narrative persists in its technological mediation. Human innovation beating nature at its own game, a simple input to a closed system to stimulate output.

Technologically mediated CDR schemes entail risks to the environment, unsustainable resource usage, or emissions from the processes of operation. They include plans to capture carbon dioxide directly from the air through chemical processes; fertilising the oceans with iron, nitrogen or phosphorous to stimulate new carbon-based life in the oceans; the enhanced weathering of rocks; and ocean alkalisation that uses chemical processes of decomposition to convert carbon dioxide to solid or dissolved alkaline bicarbonates.⁴⁵

Each of these options has significant costs, questionable technical viability, or efficacy, and none is as effective as emissions reduction:

The faster reduction of net CO₂ emissions in 1.5 °C compared to 2 °C pathways is predominantly achieved by measures that result in less CO₂ being produced and emitted, and only to a smaller degree through additional CDR. Limitations on the speed, scale and societal acceptability of CDR deployment also limit the conceivable extent of temperature overshoot. Limits to our understanding of how the carbon cycle responds to net negative emissions increase the uncertainty about the effectiveness of CDR to decline temperatures after a peak.⁴⁶

⁴⁵ IPCC, "Topic 4: Adaptation and Mitigation." 4.3.7.4.

⁴⁶ Ibid. 4.3.7.

I have a particular interest in the relationship between air and trees. Trees are nearly entirely made from the carbon dioxide in the air. Trees are air made solid.⁴⁷ They are the other side of planetary gas exchange, where carbon dioxide is taken from the air and transformed into food through photosynthesis, and oxygen is released. From the unanchored invisible becomes a solid, sessile, spatially located body.

The following work by Katie Paterson, *Future Library* (2014–2114), acknowledges the relationship between the co-evolution of life and the material world of chemicals and minerals, and celebrates non-anthropocentric temporal cadence. This work is both a carbon dioxide sequestering project and a carrier bag of stories with this material relationship in mind.

4.8.4 Katie Paterson's *Future Library*



Figure 55. Katie Paterson, *Future Library*, 2014–2114, process documentation. www.futurelibrary.no/#/the-artwork.

⁴⁷ Richard J. Norby, Stan D. Wullschleger, and Carla A. Gunderson, "1 - Tree Responses to Elevated Co₂ and Implications for Forests," in *Carbon Dioxide and Terrestrial Ecosystems*, ed. George W. Koch and Harold A. Mooney (San Diego: Elsevier, 1996), 2-3.

Katie Paterson's *Future Library* brings together storytelling across time spans longer than a human lifetime, the reconfiguration of the material of the air, and the trace recordings of climate fluctuations.

Located in the Nordmarka forest, outside of Oslo, Norway, a clearing has been made to plant one thousand spruce trees in anticipation of being felled in the year 2114. Each year the trees grow, a writer is selected to contribute a short story to be held in trust. The stories will not be published until the hundred-year span is completed, after which time the wood from the spruce forest will be harvested and used to print the unpublished works.

The wood from the forest that was felled to make way for the spruce trees has been processed to build the *Silent Room* in the New Deichmanske Bibliotek (the Oslo Public Library) that will store the unpublished works until they are released to the public.

The invitation to write a work for publication in hundred years' time positions the author to consider the future reader and the world that they inhabit. The invitation extends to a contemporary audience, unable to read the works but also imagining what may occur in the interim, politically, environmentally, and culturally.

The spruce trees are currently growing on the site, bearing witness to the passing of the seasons and the warming of the climate. The carbon that makes the solid 'stuff' of trees is sequestered from the carbon dioxide in the air. This artwork is a CDR project that uses air to tell stories. Each year the tree grows a new tree ring, recording the air and climatic conditions of the immediate

surrounds, recording a story of its own. Tree-ring growth tracks rainfall, temperature and other climatic factors, in each cell they also integrate the invisible remnants of radioactive decay from nuclear weapons through the presence of carbon-14.⁴⁸ The trees of the future library will tacitly track and record the change in climate, or perhaps fall to fire, heat, or the desertification of the area. Yet the trees are also producing oxygen that sustains life that tells stories.

Future Library accounts for the importance of storytelling in future thinking; it is a carrier bag of alternating perspectives and imaginings. The conceptual nature of the artwork is itself a story, in its explanation is a key to provoke wonder in the audience. The management of the project by the board of trustees requires maintenance, not just of the administrations, but also of its meaning through time. The board selects the authors whose voices and ideas are recorded and sustained through time. In 2114 there will be one hundred imaginings, one hundred possibly conflicting, or complementary stories talking to speculative futures.

⁴⁸ Danielle A. Way and Ram Oren, "Differential Responses to Changes in Growth Temperature between Trees from Different Functional Groups and Biomes: A Review and Synthesis of Data," *Tree Physiology* 30, no. 6 (2010); N. Dezzio, Worbes, M., Ishii, I. et al., "Annual Tree Rings Revealed by Radiocarbon Dating in Seasonally Flooded Forest of the Mapiro River, a Tributary of the Lower Orinoco River, Venezuela," *Plant Ecology* 168, no. 1 (2003); Daniel Epron et al., "Pulse-Labeling Trees to Study Carbon Allocation Dynamics: A Review of Methods, Current Knowledge and Future Prospects," *Tree Physiology* 32, no. 6 (2012); Valérie Trouet, Pol Coppin, and Hans Beeckman, "Annual Growth Ring Patterns in *Brachystegia Spiciformis* Reveal Influence of Precipitation on Tree Growth1," *Biotropica* 38, no. 3 (2006).

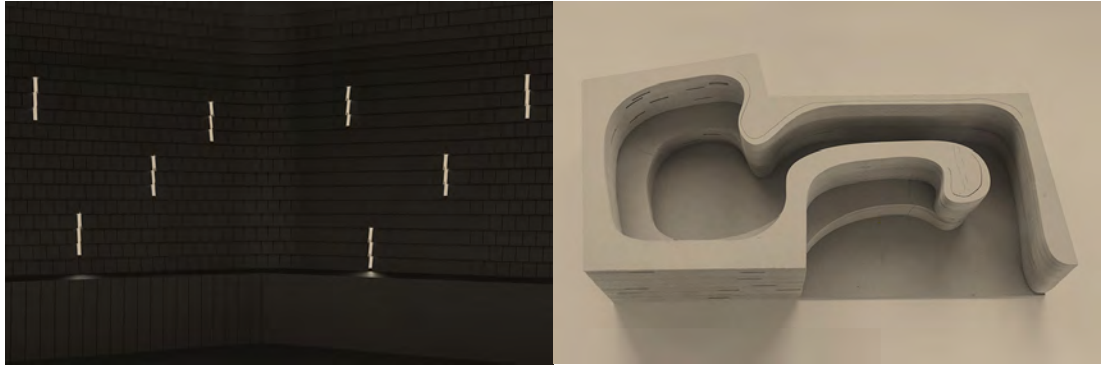


Figure 56. Katie Paterson, *Silent Room*, 2014–2114, concept illustration. © Katie Paterson, <https://www.futurelibrary.no/#/the-artwork>.

The library is a carrier bag, a repository for stories and musings, both by the authors whose works are maintained in trust, but also for those audience members who imagine the contents of the stories selected.

With *Future Library*, Katie Paterson has delineated the boundary of a future space, with geolocated borders. While the trees and the library are in trust and their hundred year future are relatively certain, it is not possible to regulate the air that crosses that site, carrying the stories from all far-flung quarters of the rest of the world, or the condensed history of radiation decay residue. While some of the parameters are set, the becoming-with air, soil, and water are transient visitors to the site, bringing material stories; the trees, however, are pastpresents.

Future Library integrates more-than-human timescales and multi-authored materials with the musings of one hundred authors. Climate imaginaries are contested and negotiated spaces, sites of shared imagining authored by many simultaneously, that integrate the complex perspectives and specialised knowledge of multiple parties. This artwork, alongside *Then Let Us Run (the sky is falling)*, problematises the grand official scientific climate imaginings of the IPCC and proposes alternative modes and mediums of storytelling.

4.9 Conclusion

Then Let Us Run (the sky is falling) brings the audience member into a physical relationship the materials of a possible climate hero solution, but also the aesthetic consequences of that solution. Stories, thoughts, and wonder quietly arise when confronted with the physicality of the artwork. How could a new sky effect the individual, the quotidian, as well as the vast?

Storytelling has unfolded in the artworks discussed in previous chapters of this thesis, with an emphasis on storytelling as language, and language being co-constituted with material in meaning making. Material and language are both essential to express the meaning of the works; the audience must encounter the air physiologically as well as the story to understand the meaning.

This chapter has focussed more closely on the storytelling side of the material-language relationship and considered storytelling in relation to the climate crisis. Diversity of storytelling and imaginative thinking as argued by Ursula Le Guin, Donna Haraway, Kathryn Yusoff and Jennifer Gabrys is essential to envision climate futures, interrogate our present, to meaningfully consider other life forms, and to invent novel responses. The importance of diverse feminist, SF storytelling is to vision a different world, different social and political conventions, and different relationship types. In so doing, it is possible to imagine the end of, or transformation of, the predominant narratives that govern the decision making of individuals and collectives. Through collecting and creating carrier bag stories it is possible to rethink capitalism and white, Western, techno-scientific hero stories, to reimagine progress, and consider the

types of lives it is possible to lead.⁴⁹ Storytelling is a feminist act, a creative strategy to reassemble the dominant ways of thinking and create an empowered future.

Artworks are a mode of storytelling where the material is integrated into the story. The artworks and AIR WORKS presented in this chapter bring the audience member into a physical as well as a notional confrontation with different ideologically nuanced futures, creating spaces for thinking of alternatives, and problematising the given. Storytelling and imagining is active. Agency and responsibility are carried and shared through storytelling. Air as a notion and material to think *through* meanders, circles, flies, and plummets like a carrier bag story. The gaseous, porous nature of air frees the imagination to experiment. Air thinking is vital to consider how to adapt and live meaningfully through the climate crisis.

⁴⁹ Donna Jeanne Haraway and Fabrizio Terranova, *Donna Haraway : Story Telling for Earthly Survival, Story telling for earthly survival* (Brooklyn, NY: Brooklyn, NY : Icarus Films, 2017).

Conclusion

This dissertation was written during the height of the catastrophic 2019–2020 Australian bushfire season. Simultaneously a local and global event, the effects of the bushfires transcended national boundaries, becoming visible as far away as New Zealand and South America. The conflagrations were big enough to create their own weather systems. They burned early and extended over six months, throughout the hottest and driest year on record in Australia.¹

The severity of the bushfire season was the result of compounding years of drought, an effect of global heating. Smoke and ash periodically blanketed the capital cities Sydney, Melbourne, and Canberra, the seats of federal and state-wide decision-making.

This global event compressed scales of time, encompassing the catastrophic present, the aggregated past and an unnerving prediction of the future. The bushfires were the concentrated local effect of the global problem of the climate crisis. The bushfires, like the climate crisis, are a political, cultural, and social problem, as much as they are physical and environmental.

This is an urgent time to (re)consider air.

This dissertation has centred air as an object of enquiry through the practice of contemporary performance and installation art, offering important contributions to new knowledge. It presents air as a potent aesthetic of international, interpersonal, and interspecies power relations through the events of the climate crisis. The AIR WORKS contribute to a haptic knowledge of

¹ Australian Bureau of Meteorology, "Annual Climate Statement 2019."

environmental emergency via the novel manipulation of the component ingredients of air to render recreations of the air of Earth's deep past, and presentations of possible future airs.

This dissertation began by locating the AIR WORKS in an art-historical context, establishing a lineage of art movements that resound between the conceptual art movement of the 1960s, and artists such as Robert Barry, and the environmentally concerned ecofeminist art movement of the 1970s, including Judy Chicago and her peers. This fertile field of precedents shaped the form and subject matter elements of the works; the term *embodied climates* fills a gap that no term in contemporary art fully describes, elaborating on both the materials and the politics of the climate crisis.

A crucial distinction between material and materiality was made, via the work of Tim Ingold and Kate Dunn, to bolster the material characteristics of air. Air was simultaneously positioned as material and idea, using a material feminisms framework as outlined by Stacy Alaimo and Susan Hekman, arguing that both of these elements co-constitute meaning. The AIR WORKS *Different Kinds of Air, a Plant's Diary* and *Things Fall Apart* illustrate this relationship through their inclusion of air and the body as material artistic devices in performance and installation. The air, and other invisible materials of the air, is inhaled by the audience member, initiating a physiological-chemical response, as well as an intellectual and emotional one.

Rather than air existing as a homogenous idea, the AIR WORKS interrogate the limitations of the *idea* of air by investigating its component parts, and the transforming nature of the material over time and across localities. The direct physiological encounter communicates non-verbally, affecting corporeal

sensations that intermingle with other modes of storytelling. Together, these methods for artmaking unpack and test the physical reality of the climate crisis, and how it relates to the physical body, activating a material feminisms framework. The material-language coalition is increasingly important in the growing urgency of the climate crisis. Air, like the climate crisis, is invisible and all-pervasive. Air holds the accumulation of decisions and actions of the past and the geographically distant present. *Our Fetid Rank (Margaret Thatcher's bottom lip and Bill Clinton's tongue)* considers the material and the political aesthetic of the climate crisis.

Expanding on the political aspect of air in our current cataclysm, I argued in chapter 3 that air embodies an aesthetics of the climate crisis. Firstly, I made the case for air as a political object, through Kate Dunn's expanded boundary object, Astrida Neimanis's commons, and also as infrastructure in dialogue with Maria Puig de la Bellacasa's soil infrastructure. By exploding definitions of aesthetics as being restricted to beauty, Mark Johnson argued the case for aesthetics to be embodied. This is further unpacked by Sylvia Wynter and Kyla Wazana Tompkins to demonstrate that aesthetics is the performance of power relations. Air as the aesthetics of climate crisis demonstrates a power imbalance that extends across communities, and species around the globe. The asymmetry of this power dynamic is endemic to patriarchal structures of national and international governance, and the production of scientific research. Artists and storytellers are crucial to vision alternatives and plot pathways to resist crisis and live meaningfully in a materially altered future.

The role of storytelling in both the AIR WORKS and climate crisis narratives demonstrates how creative imagination is essential to all considerations of the future. This was explored through the work of Kathryn Yusoff, Donna Haraway,

and Ursula Le Guin. Alternative stories may exist in a carrier bag of thoughts and ideas that can counter patriarchal hero narratives. This creative accounting for the future influences the decisions that are made in the present on all levels, from international governance to corporate and institutional policy, and individual choices. The AIRWORK *Then Let Us Run (the sky is falling)* envisions one popular hero solution to the climate crisis by bringing high atmosphere aerosol dispersal to the surface, putting it in direct contact with the body. The folly of this vision of the future acts as a case study against single hero solutions. Artists, scientists, and political administrators possess the power to creatively envision alternative presents and potential futures to soften the blow of, as well as live through, the climate and associated crises.

This dissertation insists that air is a key material for understanding the power dynamics pertinent to the climate crisis and offers a perspective to direct potential change. Air challenges human constructions such as nationhood, capitalism, legal individuals, altering anthropocentric perspectives to hold simultaneously the vast, messy, and overlapping climate crises. The human body's biophysical relationship with air underscores thought, emotional development, and the forming of collective societies and the decisions they make. The physical properties of air enable techno-scientific inventiveness that equally connects the disparate and fuels creativity.

Air's porous ability to connect distant species and far-flung places across cosmic time is an invitation to abandon the constraints of the body and tell lofty, surprising, ambitious carrier bag stories; to imagine our collective futures and to reconfigure our present. Air is a powerful catalyst for change evolutionarily, and it is clear that decisions made now will return to us in unexpected ways in the future.

The AIR WORKS create local encounters to consider these perspectives and challenge the material preconceptions of the climate crisis. Through the embodied experience of breathing different kinds of air, the audience members' attention is directed to question tacit assumptions about the air, and expand the realms of possibility.

The devastating effect of the 2019–2020 Australian summer bushfire season intensifies the urgency that both the air and the climate crisis bring to any possible future. The depth and vividness of the traces left by human decision-making on the environment and the Earth's geology are profound. Immediate and creative shifts in perspective are required of artists and storytellers to build a multispecies feminist future.

Bibliography

- Alaimo, Stacy. *Undomesticated Ground: Recasting Nature as Feminist Space*. Cornell University Press, 2000.
- Alaimo, Stacy., and Hekman, Susan,. "Introduction: Emerging Models of Materiality in Feminist Theory." In *Material Feminisms*, edited by Stacy Alaimo and Susan Hekman, 1-20: Indiana University Press, 2008.
- Anonymous. "A Matter of (Half) Degrees." *Nature* 562, no. 7726, 2018.
- Anthes, Richard A. *The Atmosphere*, Columbus, Ohio: Columbus, Ohio : C. E. Merrill Pub. Co., 1975.
- Arieli, R. "Observed Bubble Dynamics in Oxygen or Heliox Breathing and Altitude Decompression Sickness." *Journal of Applied Physiology* 103, no. 3, 2007.
- Australian Government Department of Industry, Science, Energy and Resources. "Estimating Greenhouse Gas Emissions from Bushfires in Australia's Temperate Forests: Focus on 2019-20." 17. Published online <https://www.industry.gov.au/sites/default/files/2020-04/estimating-greenhouse-gas-emissions-from-bushfires-in-australias-temperate-forests-focus-on-2019-20.pdf>: Australian Government, 2020.
- Bachelard, Gaston. "Air and Dreams : An Essay on the Imagination of Movement." Dallas: Dallas : Dallas Institute Publications, Dallas Institute of Humanities and Culture, 1988.
- Bakke, Monika. "Deep Time Environments: Art and the Materiality of Life Beyond the Human." *Journal of Electronic Publishing* 19, no. 2, 2016.
- . *Going Aerial: Air, Art, Architecture*. Jan van Eyck Academie, 2006.
- . *The Life of Air, Dwelling, Communicating, Manipulating*. Edited by Monika Bakke. Open Humanities Press, 2011.
- Baldwin, Ian T. "Volatile Signaling in Plant-Plant Interactions: 'Talking Trees' in the Genomics Era." *Science* 311, 2006.
- Balkin, Amy. "Public Smog." Chap. 29 In *Art in the Anthropocene Encounters among Aesthetics, Politics, Environments and Epistemologies*, edited by Heather; Turpin Davis, Etienne, 341-46. London, England: London, England : Open Humanities Press, 2015.
- Bekker, A., H. D. Holland, P. L. Wang, D. Rumble, H. J. Stein, J. L. Hannah, L. L. Coetzee, and N. J. Beukes. "Dating the Rise of Atmospheric Oxygen." *Nature* 427, no. 6970, 2004.
- Benschop, Ruth. "Sts on Art and the Art of Sts: An Introduction." *Krisis Journal for Contemporary Philosophy*, no. 1, 2009.
- Berger, C. *Conceptualism and Materiality: Matters of Art and Politics*. Brill, 2019.
- Berner, Robert A., and Donald E. Canfield. "A New Model for Atmospheric Oxygen over Phanerozoic Time." *American Journal of Science* 289, no. 4, 1989.
- Boezem, Marinus. "Air Doors." Installation using warm and cool air. Amsterdam: "Show V", 1965.
- Bolin, Bert. *A History of the Science and Politics of Climate Change : The Role of the Intergovernmental Panel on Climate Change*. Cambridge University Press, 2007.
- Born, Georgina, and Andrew Barry. "Art-Science." *Journal of Cultural Economy* 3, no. 1 (2010/03/01 2010): 103-19.

- Buchloh, B., and R. Barry. "A Conversation with Robert Barry *." *October*, no. 159 (2017): 119-42.
- Budden, K. G. *Radio Waves in the Ionosphere : The Mathematical Theory of the Reflection of Radio Waves from Stratified Ionised Layers*. Cambridge [Eng.]: Cambridge Eng. : University Press, 1961.
- Burke, Edmund. "A Philosophical Enquiry into the Origin of Our Ideas of the Sublime and Beautiful." edited by James T. Boulton. London: London : Routledge and Kegan Paul, 1958.
- Burrows, S. M., Butler, T. and Jockel, P., Tost, H., Kerkweg, A., Poschl, U. and Lawrence, M. G. "Bacteria in the Global Atmosphere. Part 1: Modeling of Emissions and Transport between Different Ecosystems." *Atmospheric Chemistry and Physics* 9, no. 23, 2009.
- Burrows, S. M., Elbert, W., Lawrence, M. G. and Poschl, U. "Bacteria in the Global Atmosphere - Part 1: Review and Synthesis of Literature Data for Different Ecosystems." *Atmospheric Chemistry and Physics* 9, no. 23, 2009.
- Burrows, S. M., W. Elbert, M. G. Lawrence, and U. Pöschl. "Bacteria in the Global Atmosphere – Part 1: Review and Synthesis of Literature Data for Different Ecosystems." *Atmos. Chem. Phys.* 9, no. 23, 2009.
- Cardoso, Maria Fernanda. PhD thesis "The Aesthetics of Reproductive Morphologies." University of Sydney, 2012.
- Carr, Tessa W., and Deanna Shoemaker. "Hauntings: Marking Flesh, Time, Memory." *Text and Performance Quarterly* 37, no. 1, 2017.
- Carrington, Damian. "Why the Guardian Is Changing the Language It Uses About the Environment." *The Guardian*, 2019.
- Catani, Marco, Flavio Dell'Acqua, and Michel Thiebaut de Schotten. "A Revised Limbic System Model for Memory, Emotion and Behaviour." *Neuroscience and biobehavioral reviews* 37, no. 8, 2013.
- Chicago, Judy. "The Dinner Party." *Scholastic Art* 29, no. 6, 1999.
- Chödrön, Pema. *When Things Fall Apart: Heart Advice for Difficult Times*. Boston: Shambhala, 1997.
- Chung, Anita. *Drawing Boundaries : Architectural Images in Qing China*. Honolulu: Honolulu : University of Hawaii Press, 2004.
- Claire, M. W. "Clues to Atmospheric Evolution in Earth's Ancient Sediments." *Mineralogical Magazine* 77, no. 5, 2013.
- Cloud, P. E. "Atmospheric and Hydrospheric Evolution on the Primitive Earth. Both Secular Accretion and Biological and Geochemical Processes Have Affected Earth's Volatile Envelope." *Science*, 160, no. 3829, 1968.
- Collins, M., R. Knutti, J. Arblaster, J.-L. Dufresne, T. Fichet, P. Friedlingstein, X. Gao, *et al.* "Long-Term Climate Change: Projections, Commitments and Irreversibility." Chap. 12 In *Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*, edited by T.F. Stocker, D. Qin, G.-K. Plattner, M. Tignor, S.K. Allen, J. Boschung, A. Nauels, *et al.*, 1029–136. Cambridge, United Kingdom and New York, NY, USA: Cambridge University Press, 2013.
- Connor, S. *The Matter of Air: Science and Art of the Ethereal*. Reaktion Books, 2010.
- Coulson, Amanda. "Teresa Margolles." *Frieze*, no. 85, 2004.

- Crutzen, Paul J., and Veerabhadran Ramanathan. "The Ascent of Atmospheric Sciences." *Science* 290, no. 5490, 2000.
- Dagon, Katherine, and Daniel Schrag. "Quantifying the Effects of Solar Geoengineering on Vegetation." *Climatic Change* 153, no. 1-2, 2019.
- Daniels, Natalie. "Living Low Carbon." *Materials World* 23, no. 5, 2015.
- Dezzeo, N., Worbes, M., Ishii, I. et al. "Annual Tree Rings Revealed by Radiocarbon Dating in Seasonally Flooded Forest of the Mapire River, a Tributary of the Lower Orinoco River, Venezuela." *Plant Ecology* 168, no. 1, 2003.
- Doolette, David, and Simon Mitchell. "The Physiological Kinetics of Nitrogen and the Prevention of Decompression Sickness." *Clinical Pharmacokinetics* 40, no. 1, 2001.
- Dunn, Kate. PhD thesis, chap. 2.1 "Boundary Objects – Theoretical Framework for Modes of Collaboration." University of Sydney, 2017.
- Dykema, John A., David W. Keith, James G. Anderson, and Debra Weisenstein. "Stratospheric Controlled Perturbation Experiment: A Small-Scale Experiment to Improve Understanding of the Risks of Solar Geoengineering." *Philosophical Transactions: Mathematical, Physical and Engineering Sciences* 372, no. 2031, 2014.
- Ellis-Petersen, Hannah. "Delhi Residents Engulfed in Pollution Blame Authorities for Inaction." *The Guardian*, November 4, 2019.
- . "Flights Diverted in Delhi as Toxic Smog Hits Worst Levels of 2019." *The Guardian*, November 3, 2019.
- Epron, Daniel, Michael Bahn, Delphine Derrien, Fernando Alfredo Lattanzi, Jukka Pumpanen, Arthur Gessler, Peter Högberg, et al. "Pulse-Labeling Trees to Study Carbon Allocation Dynamics: A Review of Methods, Current Knowledge and Future Prospects." *Tree Physiology* 32, no. 6, 2012.
- Espinoza, Fernando. "General Characteristics of Waves." In *Wave Motion as Inquiry : The Physics and Applications of Light and Sound*. Cham: Cham : Springer International Publishing, 2017.
- Essaidi, Jalila. *Bulletproof Skin : Exploring Boundaries by Piercing Barriers*. [in English] 2012.
- Fagan, Madeleine. "Who's Afraid of the Ecological Apocalypse? Climate Change and the Production of the Ethical Subject." *The British Journal of Politics and International Relations* 19, no. 2, 2017.
- Faithfull, Simon. "Escape Vehicle No.6." Performance and video of chair being lifted into space. London: Arts Catalyst, 2004.
- Feinberg, Andrew. "Apocalypse Soon." *New Scientist* 219, no. 2928, 2013.
- FireSense. "Smoke Bomb Bvs." In *Material Safety Data Sheet* edited by Brandax. Norwest, NSW: FireSense, 2019.
- French, Marilyn. *Is There a Feminist Aesthetic? Aesthetics in Feminist Perspective*. Edited by Hilde S. Hein and Carolyn Korsmeyer. Bloomington: Bloomington : Indiana University Press, 1993.
- Fu, X., M. Lahr, Z. Yaxiong, and B. Meng. "Actions on Climate Change, Intended Reducing Carbon Emissions in China Via Optimal Industry Shifts: Toward Hi-Tech Industries, Cleaner Resources and Higher Carbon Shares in Less-Develop Regions." *Energy Policy* 102, 2017.

- Gabrys, Jennifer, and Kathryn Yusoff. "Arts, Sciences and Climate Change: Practices and Politics at the Threshold." *Science as Culture* 21, no. 1, 2012.
- Gagliano, Monica. "Green Symphonies: A Call for Studies on Acoustic Communication in Plants." *Behavioral Ecology* 24, no. 4, 2013.
- . "Seeing Green: The Re-Discovery of Plants and Nature's Wisdom." *Societies* 3, no. 1, 2013.
- Gagliano, Monica, Michael Renton, Nili Duvdevani, Matthew Timmins, and Stefano Mancuso. "Out of Sight but Not out of Mind: Alternative Means of Communication in Plants." [In eng]. *PloS one* 7, no. 5, 2012.
- Geraci, Robert M. "The Popular Appeal of Apocalyptic Ai." *Zygon* 45, no. 4, 2010.
- Haraway, Donna. "A Cyborg Manifesto: Science, Technology, and Socialist-Feminism in the Late Twentieth Century." Chap. 8 In *Simians, Cyborgs and Women: The Reinvention of Nature*. New York: Routledge, 1991.
- . "It Matters What Stories Tell Stories; It Matters Whose Stories Tell Stories." *a/b: Auto/Biography Studies* 34, no. 3, 2019.
- . "A Manifesto for Cyborgs: Science, Technology, and Socialist Feminism in the 1980s." *Australian Feminist Studies* 2, no. 4, 1987.
- . *Simians, Cyborgs, and Women : The Reinvention of Nature*. London: Free Association Books, 1991.
- . "Situated Knowledges: The Science Question in Feminism and the Privilege of Partial Perspective." *Feminist Studies* 14, no. 3, 1988.
- . "Symbiogenesis, Symptoiesis, and Art Science Activisms for Staying with the Trouble." In *Arts of Living on a Damaged Planet*. Ghosts and Monsters of the Anthropocene, 25-50: University of Minnesota Press, 2017.
- Haraway, Donna, *Tentacular Thinking: Anthropocene, Capitalocene, Chthulucene*. Staying with the Trouble : Making Kin in the Chthulucene. Durham: Duke University Press, 2016.
- . "The Companion Species Manifesto : Dogs, People, and Significant Otherness." Chicago, Ill.: Chicago, Ill. : Prickly Paradigm, 2003.
- . "Playing String Figures with Companion Species." In *Staying with the Trouble : Making Kin in the Chthulucene*. Durham : Duke University Press, 2016.
- . *Staying with the Trouble : Making Kin in the Chthulucene*. Durham : Duke University Press, 2016.
- Haraway, Donna, and Fabrizio Terranova. *Donna Haraway : Story Telling for Earthly Survival, Story telling for earthly survival*. Brooklyn, NY: Brooklyn, NY : Icarus Films, 2017.
- Hartmann, D.L., A.M.G. Klein Tank, M. Rusticucci, L.V. Alexander, S. Brönnimann, Y. Charabi, F.J. Dentener, et al. "Observations: Atmosphere and Surface." Chap. 2 In *Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*, edited by T.F. Stocker, D. Qin, G.-K. Plattner, M. Tignor, S.K. Allen, J. Boschung, A. Nauels, et al., 159–254. Cambridge, United Kingdom and New York, NY, USA: Cambridge University Press, 2013.
- Hatley, James. "Aion (Living Lexicon for the Environmental Humanities)." *Environmental Humanities* 6, (2015).

- . "The Virtue of Temporal Discernment Rethinking the Extent and Coherence of the Good in a Time of Mass Species Extinction." *Environmental Philosophy* 9, no. 1 (2012): 1-22.
- Herrero, Jose L., Simon Khuvis, Erin Yeagle, Moran Cerf, and Ashesh D. Mehta. "Breathing above the Brain Stem: Volitional Control and Attentional Modulation in Humans." *Journal of neurophysiology* 119, no. 1, 2018.
- Houser, Heather. "The Aesthetics of Environmental Visualizations: More Than Information Ecstasy?" *Public Culture* 26, no. 2, 2014.
- Howe, Joshua P. *Making Climate Change History : Primary Sources from Global Warming's Past*. Making Climate Change History : Documents from Global Warming's Past. Seattle: Seattle : University of Washington Press, 2017.
- Information, NOAA National Centers for Environmental. "State of the Climate: Global Climate Report for Annual 2019." published online <https://www.ncdc.noaa.gov/sotc/global/201913>: National Oceanic and Atmospheric Administration, 2020.
- Ingold, Tim. "Materials against Materiality." *Arch. Dial.* 14, no. 1, 2007.
- IPCC. "Climate Change 2007: Synthesis Report. Contribution of Working Groups I, II and III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change." In *Climate Change 2007: Synthesis Report.* , edited by R.K and Reisinger Pachauri, A., 104. Geneva, Switzerland: IPCC, 2007.
- . *Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*. Cambridge, United Kingdom and New York, NY, USA: Cambridge University Press, 2013. doi:10.1017/CBO9781107415324.
- . "Summary for Policymakers." Chap. SPM In *Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*, edited by T.F. Stocker, D. Qin, G.-K. Plattner, M. Tignor, S.K. Allen, J. Boschung, A. Nauels, *et al.*, 1–30. Cambridge, United Kingdom and New York, NY, USA: Cambridge University Press, 2013.
- . "Topic 3: Future Pathways for Adaptation, Mitigation and Sustainable Development." In *Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*, edited by Rajendra K. Pachauri Core Writing Team, Leo Meyer. Geneva, Switzerland: International Panel on Climate Change, 2014.
- . "Topic 4: Adaptation and Mitigation." In *Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*, edited by Rajendra K. Pachauri Core Writing Team, Leo Meyer. Geneva, Switzerland: International Panel on Climate Change, 2014.
- Izrael, Yu, V. Zakharov, N. Petrov, A. Ryaboshapko, V. Ivanov, A. Savchenko, Yu Andreev, *et al.* "Field Experiment on Studying Solar Radiation Passing through Aerosol Layers." *Russian Meteorology and Hydrology* 34, no. 5, 2009.
- Jill, Fields. "Frontiers in Feminist Art History." *Frontiers: A Journal of Women Studies* 33, no. 2, 2012.

- Johnson, Ken. "Planter of the Seeds of Mind-Expanding Conceptualism " *The New York Times*, 2012.
- Johnson, Mark. "Introduction: The Aesthetics of Embodied Life." In *The Aesthetics of Meaning and Thought : The Bodily Roots of Philosophy, Science, Morality, and Art*. Chicago: The University of Chicago Press, 2018.
- Jones, Andy, Jim M. Haywood, Kari Alterskjær, Olivier Boucher, Jason N. S. Cole, Charles L. Curry, Peter J. Irvine, *et al.* "The Impact of Abrupt Suspension of Solar Radiation Management (Termination Effect) in Experiment G2 of the Geoengineering Model Intercomparison Project (Geomip)." *Journal of Geophysical Research: Atmospheres* 118, no. 17, 2013.
- Jones, Curated by Amelia. "Sexual Politics: Judy Chicago's Dinner Party in Feminist Art History." Armand Hammer Museum: UCLA, 1996.
- Kahn, Douglas. *Earth Sound Earth Signal : Energies and Earth Magnitude in the Arts*. 1 [edition]. ed. Berkeley: Berkeley : University of California Press, 2013.
- Karban, Richard. "Plant Behaviour and Communication." *Ecology Letters* 11, 2008.
- Kenney, Martha. *Fables of Response-Ability: Feminist Science Studies as Didactic Literature*. Vol. 5, 2019.
- Khazan, I. Z. "Breathing." In *The Clinical Handbook of Biofeedback*, edited by I. Z. Khazan, 2013.
- King, Katie. "Pastpresents: Playing Cat's Cradle with Donna Haraway." <http://playingcatscradle.blogspot.com/2010/10/katie-king-womens-studies-university-of.html>.
- Kjeldsen, Jens, and E. Kjeldsen. "Strategies of Visual Argumentation in Slideshow Presentations: The Role of the Visuals in an Al Gore Presentation on Climate Change." *An International Journal on Reasoning* 27, no. 4, 2013.
- Klinger, C. "The Critique of 'Aesthetic Ideology', from 'Cunt-Art' and 'Ecriture-Feminine' to the Current State of the Discussion in Feminist Aesthetics." *Dtsch. Z. Philos.* 46, no. 5, 1998.
- Koch, George W., and Harold A. Mooney. "22 - Response of Terrestrial Ecosystems to Elevated Co2: A Synthesis and Summary." In *Carbon Dioxide and Terrestrial Ecosystems*, edited by George W. Koch and Harold A. Mooney, 415-29. San Diego: Academic Press, 1996.
- Kolbert, Elizabeth. "The Sixth Extinction?". *Science World* 71, no. 11, 2015.
- Kravitz, Ben, Douglas G. Macmartin, and Ken Caldeira. "Geoengineering: Whiter Skies?". *Geophysical Research Letters* 39, no. 11, 2012.
- Lakoff, George & Johnson, Mark. *Philosophy in the Flesh : The Embodied Mind and Its Challenge to Western Thought*. Edited by Mark Johnson. New York: New York : Basic Books, 1999.
- Le Guin, Ursula K. "The Carrier Bag Theory of Fiction " In *Dancing at the edge of the world : thoughts on words, women, places*, New York : Grove Press, 1989.
- Lee, Wendy Lynne. *Eco-Nihilism : The Philosophical Geopolitics of the Climate Change Apocalypse*. Lanham, Maryland: Lanham, Maryland : Lexington Books, 2017.
- Leigh Star, Susan. "This Is Not a Boundary Object: Reflections on the Origin of a Concept." *Science, Technology, & Human Values* 35, no. 5, 2010.
- Lewallen, Constance. *Ant Farm, 1968-1978*. Edited by Chip Lord and Steve Seid. Berkeley: Berkeley : University of California Press : Berkeley Art Museum : Pacific Film Archive, 2004.

- Lewitt, Sol. "Paragraphs on Conceptual Art." *Artform* 10, no. Summer, 1967.
- Lippard, Lucy R. *Six Years : The Dematerialization of the Art Object from 1966 to 1972*. London : Studio Vista, 1973.
- Lovell, P. G., T. Troscianko, and Ca Parraga. "Distance Judgments Based on Rayleigh Scattering: The Detection of Colour Changes with Distance in Blue-Yellow Opponent Channels." *Perception* 34, no. 2, 2005.
- Luke, Timothy W. "The Climate Change Imaginary." *Current Sociology* 63, no. 2, 2015.
- Manousi, Vasiliki, and Anastasios Xepapadeas. "Mitigation and Solar Radiation Management in Climate Change Policies." Fondazione Eni Enrico Mattei (FEEM), 2013.
- Marshak, Stephen. *Earth : Portrait of a Planet*. 2nd ed. New York: W. W. Norton, 2005.
- Mathew, Deborah. "What Is Ecofeminist Art?". *Women & Environments International Magazine*, no. 52/53, 2001.
- Maury, Jean-Pierre. *The Atmosphere : Five Billion Million Tons of Air*. New York: New York : Barron's Educational Series, 1989.
- Meterology, Australian Bureau of. "Annual Climate Statement 2019." In *Annual Climate Statement*: Bureau of Meterology, 2020.
- Minx, Jan C., William F. Lamb, Max W. Callaghan, Sabine Fuss, Jérôme Hilaire, Felix Creutzig, Thorben Amann, *et al.* "Negative Emissions—Part 1: Research Landscape and Synthesis." 063001, 2018.
- Mirzoeff, Nicholas. "Visualizing the Anthropocene." *Public Culture* 26, no. 2 (2014).
- Moon, Kavior. "From Air to Architecture." Chap. 3 In *Conceptualism and Materiality: Matters of Art and Politics*, edited by Christian Berger, 57-88. Leiden: Brill, 2019.
- Murphy, Patrick D. "Lessons from the Zombie Apocalypse in Global Popular Culture: An Environmental Discourse Approach to the Walking Dead." *Environmental Communication* 12, no. 1, 2018.
- Neimanis, Asstrida, Cecilia Asberg, Suzi Hayes. "Post-Humanist Imaginaries." Chap. 42 In *Research Handbook on Climate Governance*, edited by Karin Bäckstrand and Eva Lövbrand, 480-90. Cheltenham, Gloucestershire, UK: Edward Elgar Publishing Limited, 2015.
- Neimanis, Astrida. "Bodies of Water : Posthuman Feminist Phenomenology." London : Bloomsbury Academic, an imprint of Bloomsbury Publishing Plc, 2017.
- . "Embodying Water." In *Bodies of Water : Posthuman Feminist Phenomenology*: London : Bloomsbury Academic, an imprint of Bloomsbury Publishing Plc, 2017.
- . "Introduction: Figuring Bodies of Water." In *Bodies of Water : Posthuman Feminist Phenomenology*, 1-26: London : Bloomsbury Academic, an imprint of Bloomsbury Publishing Plc, 2017.
- Norby, Richard J., Stan D. Wullschleger, and Carla A. Gunderson. "1 - Tree Responses to Elevated Co2 and Implications for Forests." In *Carbon Dioxide and Terrestrial Ecosystems*, edited by George W. Koch and Harold A. Mooney, 1-21. San Diego: Academic Press, 1996.
- Obama, Barack. "President Obama Speaks on Climate Change." Georgetown University, 2013.
- Oechel, Walter C., and George L. Vourlitis. "10 - Direct Effects of Elevated Co2 on Arctic Plant and Ecosystem Function." In *Carbon Dioxide and Terrestrial Ecosystems*,

- edited by George W. Koch and Harold A. Mooney, 163-76. San Diego: Academic Press, 1996.
- Orenstein, Gloria Feman. "The Greening of Gaia: Ecofeminist Artists Revisit the Garden." *Ethics and the Environment* 8, no. 1, 2003.
- Owens, Craig. "The Discourse of Others: Feminists and Postmodernism." Chap. 29 In *The Expanding Discourse : Feminism and Art History*, edited by Norma Broude and Mary D. Garrard, 486-502. New York: New York : Routledge, Taylor & Francis Group, 2018.
- Owensby, Clenton E., Jay M. Ham, Alan Knapp, Charles W. Rice, Patrick I. Coyne, and Lisa M. Auen. "9 - Ecosystem-Level Responses of Tallgrass Prairie to Elevated Co2." In *Carbon Dioxide and Terrestrial Ecosystems*, edited by George W. Koch and Harold A. Mooney, 147-62. San Diego: Academic Press, 1996.
- Oxford English Dictionary, The*. 2nd Edition ed. London: Oxford University Press, 2005.
- Oxford English Dictionary, The*. 2nd Edition ed. London: Oxford University Press, 2005.
- Palabiyik, Ibrahim, Omer Toker, Nevzat Konar, Barış Öner, and Ahmet Demirci. "Development of a Natural Chewing Gum from Plant Based Polymer." *formerly: 'Journal of Environmental Polymer Degradation'* 26, no. 5, 2018.
- Pearson, P. N., and M. R. Palmer. "Atmospheric Carbon Dioxide Concentrations over the Past 60 Millions Years." [In English]. *Nature* 406, no. 6797, 2000.
- Peiffer, Prudence. "Judy Chicago." 280. New York: Artforum Inc., 2014.
- Petit, J. R., J. Jouzel, D. Raynaud, N. I. Barkov, J. M. Barnola, I. Basile, M. Bender, *et al.* "Climate and Atmospheric History of the Past 420,000 Years from the Vostok Ice Core, Antarctica." [In English]. *Nature* 399, no. 6735, 1999.
- Pongratz, Julia, Ken Caldeira, Christian H. Reick, and Martin Claussen. "Coupled Climate–Carbon Simulations Indicate Minor Global Effects of Wars and Epidemics on Atmospheric Co2 between Ad 800 and 1850." *The Holocene* 21, no. 5, 2011.
- Pratt, Sara. "Giant Prehistoric Insects Couldn't Compete with Birds." 19. Alexandria, 2012.
- Puig de La Bellacasa, Maria. "Ecological Thinking, Material Spirituality, and the Poetics of Infrastructure." Chap. 2 In *Boundary Objects and Beyond : Working with Leigh Star*, edited by Geoffrey C. Bowker, Stefan Timmermans 1968-, Adele E. Clarke and Ellen Balka., 22. Cambridge, Massachusetts: Cambridge, Massachusetts : The MIT Press, 2015.
- . "Making Time for Soil: Technoscientific Futurity and the Pace of Care." *Social Studies of Science* 45, no. 5, 2015.
- Pye, David. "The Nature and Art of Workmanship." London: London, Cambridge U.P., 1968.
- Rich, Nathaniel. "Losing Earth: The Decade We Almost Stopped Climate Change. A Tragedy in Two Acts." *New York Times Magazine*, 2018.
- Robin, Libby. "Environmental Humanities and Climate Change: Understanding Humans Geologically and Other Life Forms Ethically." *Wiley Interdisciplinary Reviews: Climate Change* 9, no. 1, 2018.
- Robinson, Hilary, and Maria Elena Buszek. *A Companion to Feminist Art*. Hoboken, NJ: Hoboken, NJ : John Wiley and Sons, Incorporated, 2019.

- Roosen, Liselotte, Christian Klöckner, and Janet Swim. *Visual Art as a Way to Communicate Climate Change: A Psychological Perspective on Climate Change–Related Art*, 2017.
- Sarkar, Anjali A. "Functional Correlation between Breathing and Emotional States." *MedCrave MOJ Anatomy & Physiology* 3, no. 5, 2017.
- Shakhova, Natalia, Igor Semiletov, Valentin Sergienko, Leopold Lobkovsky, Vladimir Yusupov, Anatoly Salyuk, Alexander Salomatin, *et al.* "The East Siberian Arctic Shelf: Towards Further Assessment of Permafrost-Related Methane Fluxes and Role of Sea Ice." *Philosophical transactions. Series A, Mathematical, physical, and engineering sciences* 373, no. 2052, 2015.
- Shaw, George H. *Earth's Early Atmosphere and Oceans, and the Origin of Life*. Edited by SpringerLink. 1st ed 2016. ed.: Cham : Springer International Publishing : Imprint: Springer, 2016.
- Shcherbakova, Victoria, Yoshitaka Yoshimura, Yana Ryzhmanova, Yukihiro Taguchi, Takahiro Segawa, Victoria Oshurkova, and Elizaveta Rivkina. "Archaeal Communities of Arctic Methane-Containing Permafrost." *FEMS Microbiology Ecology* 92, no. 10, 2016.
- Sheng, Zhou, Teng Fei, and Tong Qing. "Mitigating Sulfur Hexafluoride (Sf6) Emission from Electrical Equipment in China." *Sustainability* 10, no. 7, 2018.
- Sleigh, Charlotte, and Sarah Craske. "Art and Science in the UK: A Brief History and Critical Reflection." *Interdisciplinary Science Reviews* 42, no. 4, 2017.
- Smithson, Robert. "Museum Devoted to Emptiness, Dialogue with Allen Kaprow." Berkeley: Robert Smithson: The Collected Writings, , 1967.
- Solnit, Rebecca. *A Field Guide to Getting Lost*. New York : Viking, 2005.
- . "Yves Klein and the Blue of Distance." *New England Review* 26, no. 2, 2005.
- Solomon, Susan, Gian-Kasper Plattner, Reto Knutti, and Pierre Friedlingstein. "Irreversible Climate Change Due to Carbon Dioxide Emissions." *Proceedings of the National Academy of Sciences of the United States of America* 106, no. 6, 2009.
- Specht, H., and H. F. Brubach. "Inhalation of Sulfur Hexafluoride." *Science* 114, no. 2973, 1951.
- Star, Susan Leigh, and James R. Griesemer. "Institutional Ecology, 'Translations' and Boundary Objects: Amateurs and Professionals in Berkeley's Museum of Vertebrate Zoology." *Social Studies of Science* 19, no. 3, 1989.
- Star, Susan, and Karen Ruhleder. "Steps toward an Ecology of Infrastructure: Design and Access for Large Information Spaces." *Information Systems Research* 7, no. 1, 1996.
- Steffen, Will, Johan Rockström, Katherine Richardson, Timothy M. Lenton, Carl Folke, Diana Liverman, Colin P. Summerhayes, *et al.* "Trajectories of the Earth System in the Anthropocene." *Proceedings of the National Academy of Sciences* 115, no. 33, 2018.
- Sullivan, Mark. "The Gift of Distance: Chinese Landscape Painting as a Source of Inspiration." *Southwest Review* 92, no. 3, 2007.
- Svoboda, Michael. "Cli-Fi on the Screen(S): Patterns in the Representations of Climate Change in Fictional Films." *Wiley Interdisciplinary Reviews: Climate Change* 7, no. 1, 2016.

- Svoboda, Toby. *The Ethics of Climate Engineering : Solar Radiation Management and Non-Ideal Justice*. London: London : Routledge, 2017.
- Swyngedouw, E. "Apocalypse Forever? Post-Political Populism and the Spectre of Climate Change." *Theory Cult. Soc.* 27, no. 2-3, 2010.
- Taumoepeau, Latai "War Dance of the Final Frontier, a Reflection." edited by Climate Century. Port Adelaide Vitalstatistix, 2018.
- Thatcher, Margaret. "Speech to United Nations General Assembly (Global Environment)." In *United Nations General Assembly*. New York: Margaret Thatcher Foundation, 1989.
- Tompkins, K. W. "Sweetness, Capacity, Energy." *American Quarterly* 71, no. 3, 2019.
- Trouet, Valérie, Pol Coppin, and Hans Beeckman. "Annual Growth Ring Patterns in *Brachystegia Spiciformis* Reveal Influence of Precipitation on Tree Growth1." *Biotropica* 38, no. 3, 2006.
- Tsing, Anna Lowenhaupt. *Arts of Living on a Damaged Planet*. Minneapolis : University of Minnesota Press, 2017.
- Tyndall, Geoffrey S., John J. Orlando, Guy P. Brasseur, Guy Brasseur, and Research National Center for Atmospheric. *Atmospheric Chemistry and Global Change*. New York: New York : Oxford University Press, 1999.
- V. Masson-Delmotte, P. Zhai, H. O. Pörtner, D. Roberts, J. Skea, P.R. Shukla, A. Pirani, W. Moufouma-Okia, C. Péan, R. Pidcock, S. Connors, J. B. R. Matthews, Y. Chen, X. Zhou, M. I. Gomis, E. Lonnoy, T. Maycock, M. Tignor,. "Global Warming of 1.5°C. An IPCC Special Report on the Impacts of Global Warming of 1.5°C above Pre-Industrial Levels and Related Global Greenhouse Gas Emission Pathways, in the Context of Strengthening the Global Response to the Threat of Climate Change, Sustainable Development, and Efforts to Eradicate Poverty." In *IPCC, 2018: Summary for Policymakers*, edited by T. Waterfield, 32. Geneva, Switzerland: World Meteorological Organization, 2018.
- van der Hel, Sandra, Iina Hellsten, and Gerard Steen. "Tipping Points and Climate Change: Metaphor between Science and the Media." *Environmental Communication* 12, no. 5, 2018.
- Walker, Gabrielle. *An Ocean of Air: Why the Wind Blows and Other Mysteries of the Atmosphere*. 1st ed. London: Bloomsbury, 2007.
- Walls, Jerry L., Robert Jewett, and John Shelton Lawrence. *Eschatology in Pop Culture*. Oxford University Press, 2007.
- Way, Danielle A., and Ram Oren. "Differential Responses to Changes in Growth Temperature between Trees from Different Functional Groups and Biomes: A Review and Synthesis of Data." *Tree Physiology* 30, no. 6, 2010.
- Weisenstein, D., D. Keith, and J. Dykema. "Solar Geoengineering Using Solid Aerosol in the Stratosphere." *Atmospheric Chemistry and Physics* 15, no. 20, 2015.
- Weng, Jing-Ke, and Clint Chapple. "The Origin and Evolution of Lignin Biosynthesis." *New Phytologist* 187, no. 2, 2010.
- West, John B. "High Life : A History of High-Altitude Physiology and Medicine." New York: New York : Published for the American Physiological Society by Oxford University Press, 1998.
- Whitehead, Mark. *State, Science and the Skies: Governmentalities of the British Atmosphere*. Royal Geographical Society lbg. Edited by Joanna Bullard Kevin Ward. Chichester, UK: Wiley Blackwell, 2009.

- Wigley, T.M.L. "The Paris Warming Targets: Emissions Requirements and Sea Level Consequences." *Climatic Change* 147, no. 1, 2018.
- Willis, Rebecca. "Taming the Climate? Corpus Analysis of Politicians' Speech on Climate Change." *Environmental Politics* 26, no. 2, 2017.
- Wilson, Richard. *Atmosphere*. [in English] Vol. 1st ed, Chandni Chowk, Delhi: Global Media, 2007.
- Withers, Josephine. "Judy Chicago's Dinner Party: A Personal Vision of Women's History." Chap. 26 In *The Expanding Discourse : Feminism and Art History*, edited by Norma Broude and Mary D. Garrard, 453-65. New York : Routledge, Taylor & Francis Group, 2018.
- Womack, Ann M., Brendan J. M. Bohannan, and Jessica L. Green. "Biodiversity and Biogeography of the Atmosphere." *Philosophical Transactions of the Royal Society B: Biological Sciences* 365, no. 1558, 2010.
- Wynter, Sylvia. "Rethinking "Aesthetics" : Notes Towards a Deciphering Practice." [In English]. *Ex-iles: essays on Caribbean cinema Ex-iles : essays on Caribbean cinema. Mbye B. Cham (ed.)*, 1992.
- Yu, X. Y., J. M. Barnett, B. G. Amidan, K. P. Recknagle, J. E. Flaherty, E. J. Antonio, and J. A. Glissmeyer. "Evaluation of Nitrous Oxide as a Substitute for Sulfur Hexafluoride to Reduce Global Warming Impacts of Ansi/Hps N13.1 Gaseous Uniformity Testing." *Atmospheric Environment* 176, 2018.
- Yu, Xy, Jc Moore, Xf Cui, A. Rinke, Dy Ji, B. Kravitz, and Jh Yoon. "Impacts, Effectiveness and Regional Inequalities of the Geomip G1 to G4 Solar Radiation Management Scenarios." *Glob. Planet. Change* 129, no. C, 2015).
- Yusoff, Kathryn. *A Billion Black Anthropocenes or None*. Minneapolis, MN: Minneapolis, MN : University of Minnesota Press, 2018.
- . "Biopolitical Economies and the Political Aesthetics of Climate Change." *Theory, Culture & Society* 27, no. 2-3, 2010.
- . "The Geoengine: Geoengineering and the Geopolitics of Planetary Modification." *Environment and Planning A* 45, no. 12, 2013.
- . "Geologic Life: Prehistory, Climate, Futures in the Anthropocene." *Environment and Planning D: Society and Space* 31, no. 5, 2013.
- . "Geology, Race, and Matter." In *A Billion Black Anthropocenes or None*. Minneapolis, MN: Minneapolis, MN : University of Minnesota Press, 2018.
- . "Queer Coal: Genealogies in/of the Blood." *philoSOPHIA* 5, no. 2, 2015.
- Yusoff, Kathryn, and Jennifer Gabrys. "Climate Change and the Imagination." *Wiley Interdisciplinary Reviews: Climate Change* 2, no. 4, 2011.
- Zhuang, Quan, Bruce Clements, Andrew McFarlan, and Yemi Fasoyinu. "Decomposition of the Most Potent Greenhouse Gas (G Hg) Sulphur Hexafluoride (S F 6) Using a Dielectric Barrier Discharge (D Bd) Plasma." *Canadian Journal of Chemical Engineering* 92, no. 1, 2014.
- Zubiaurre, Maite. "Litter and the Urban Imaginary: On Chewing Gum and Street Art." Chap. 5 In *The Routledge Companion to Urban Imaginaries*, edited by Christoph Lindner, Meissner, Miriam. London: Routledge, 2018.