minoritarian ecologies: performance before a more-than-human world

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minoritarian ecologies:
performance before a more-than-human world

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Abstract

This practice-based project investigates modalities of performing eco-aesthetic assemblages across the modern nature—culture divide. Assemblages are here understood as non-hierarchical associations between bodies that are different amongst themselves. I argue that eco-aesthetic practices that work towards naturalcultural assemblages contribute to the wider field of ecological thought and cultural understanding of the nonhuman environment or nature.

The research uses a transversal practico-theoretical approach that, following posthumanist and neomaterialist elaborations of ontology and epistemology, creates a 'material-discursive entanglement' (Barad, 2007) of bodies and concepts. In this posthuman continuum of practice, I argue that eco-aesthetics is an ethico-political disposition of fostering relations of accountability and responsibility with the bodies implicated in performance, especially the nonhumans understood to be minorities in the current politico-economic organisation.

The research is situated within the landscape of modern biopolitics, which is understood as a set of conceptual and material strategies of appropriation of life through the 'logic of colonisation' (Plumwood, 1993). Situated naturalcultural performances enact a different modality of 'intra-action' (Barad, 2007) with the world, by creating and maintaining fields in which life is seen as a force of generative difference.

The dissertation is divided in three parts which correspond to three entangled modes of performing research. The first part is a critical ontology which individuates operative modalities of modern boundary-making techniques. This part also outlines an alternative landscape of art and philosophy which go beyond binary thinking. The second part, through a posthumanist reconfiguration of the concept of assemblage from Gilles Deleuze and Fèlix Guattari, and apparatus, in the work of Michel Foucault and Karen Barad,

shapes an analytics for locating possibilities of material-discursive reconfiguration of the existing power relations. The third part follows the narrative of my artistic projects that sought to create naturalcultural performances with plants, trees, molecules of carbon-dioxide, sheep, and earth. This material-discursive entanglement of critique, analytics and performance as artistic practice together shapes a posthuman ecological praxis that is oriented towards naturalcultural justice.

a. List of contents:
Abstract i

b. List of figures viii

c. List of accompanying material xxi

d. Acknowledgements xxiv

e. Author's declaration xxviii

f. Definitions xxix

Dissertation:
0. Introduction: 1
Cultures and natures

0.1. Assemblies and divides 1
0.2. Assembling posthuman ecologies 6

Part I: 15
1. *"Staying with the trouble[d]":*
an ontology of the anthropocenic present

1.0. Quasi-modern quasi-human 16

1.1. Ecology 21
1.1.1. Science and/or philosophy 21
1.1.2. Radical ecologies 23

1.2. Nature 39

1.2.1. Arcadia and chaos 39
1.2.2. Contesting natures 42
1.2.3. Arts of natures-cultures 45

1.3. Environment 51
1.3.1. Centre / surroundings 51
1.3.2. System/environment cybernetics 53
1.3.3. Place and site-specificity 57
1.3.4. Maps and territories 64
1.3.5. The Anthropocene 71
1.3.6. Art in global warming 77

1.4. Object 84
1.4.1. “Objects wrapped in objects wrapped in objects…” 84
1.4.2. Object-Oriented Philosophy and visual art 88

1.5. Matter 90
1.5.1. Lively, vibrant, generative, carnal materialities 90
1.5.2. New materialisms and visual art 94

1.6. Nonhuman 100
1.6.1. “Other than nonmen” 100
1.6.2. When other-than-humans meet 104

1.7. Ecology of difference 109

Part II: 113
2. *Flat ecology:*
an analytics of the possible

2.0. Introduction 114
2.1. Flat ecology 115
2.1.1. Plane-ing immanence 115

2.1.2. Material-discursive entanglement 120

2.2. Agency 125

2.3. Apparatus ⇔assemblage 133
2.3.1. Apparatus/*dispositif* 133
2.3.2. Assemblage/*agencement* 139
2.3.3. Spacetimematterings of assemblage/apparatus 144

2.4. 'Situated-dispersal' of assemblage 147

2.5. Posthuman polytics of becoming 155
2.5.1. Minoritarian ecologies 156

Part III: 165
Minoritarian performance:
infraphysics of becoming

3.0. Introduction 166

3.1. Assembling ecologies 167
a. *confluence* 167
b. *dancing ecology* 172

3.2. Paper works 177
a. *grow buy cut sell* 177
b. *black box white paper* 180

3.3. "All that is air…." 184
a. How carbon-dioxide comes to matter (and not) 184
b. *all that is air melts into city: Speculative Geohistory of a European Emission Allowance* 188
c. 'Outsiders-within' apparatuses 194

3.4. Wool futures 200
a. “Sheep came” and left 200
b. *counting live stock(s)* 202

3.5. Clouds and atmosphere 209
a. Unbearable lightness of data 209
b. *office of ecological labour: surfacing deep correlation* 213
c. Planetary situated-dispersal 219

3.6. Lives of metals 222
a. Minerals data dollars 222
b. *we ❤ copper & copper ❤ us vol. 1: #copper #love #maintenance* 225
c. Where copper lives: first strata of a biopic 234
d. *we ❤ copper & copper ❤ us vol. 3: mineralizacija* 240
e. Postscript on unmining 249

3.7. *burning hearts of a thousand tiny matters* 251

4. Infraphysics of becoming-minoritarian 255

5. Conclusions: 261
For posthuman commonings

5.1. A becoming of praxis 261
5.2. Affirmation of in/determinacy 266
5.3. Posthuman eco-aesthetics in the social 269
5.4. Posthuman ecology and climate justice 272

g. Appendix I:
postajanje-zemlja: 275

#occupy #withdraw #copperlove

h. List of cited practices 284

i. List of textual references 288

b. List of figures

Part I.

1.01. Stansvik. Helsinki, Finland.
1.02. Office. London, UK.
1.03. Stockholm, Sweden.
1.04. Frihamnen port area. Stockholm, Sweden.
1.05. Falun disused copper mine. Falun, Sweden.
1.06. London, UK.
1.07. Outskirts of Bor, Serbia.
1.08. Kemiönsaari, Finland.
1.09. Areca palms at IKEA. London, UK.
1.10. Sirogojno, Serbia.
1.11. Seat of Intercontinental Exchange, Inc., London, UK.
1.12. Free newspapers. London, UK.
1.13. Mynydd Parys disused copper mine. Isle of Anglesey, Wales, UK.
1.14. Hyvinkää County, Finland.
1.15. A 'chain of cards' in a power loom. Nörkoppings stadsmuseum, Nörkopping.
1.16. An airport. London, UK.
1.17. Mining and Smelting Combine Bor. Bor, Serbia.
1.18. London, UK.
1.19. London, UK.
1.20. Klovakärrsgruvan. Kemiönsaari, Finland.
1.21. Garden centre. London, UK.
1.22. Bor, East Serbia.
1.23. Mona mine. Isle of Anglesey, Wales, UK.
1.24. Stockholm, Sweden.
1.25. Östergårdsgrufvan. Kemiönsaari, Finland.
1.26. Skomvær lighthouse. Skomvær, Røst archipelago, Norway.
1.27. Musikhuset. Stockholm, Sweden.

1.28. Seat of NASDAQ OMX Nordic. Frihamnen, Stockholm, Sweden.
1.29. West End, London, UK.
1.30. Dam in construction. North Sweden.
1.31. London, UK.
1.32. Parys mine. Mynydd Parys, Isle of Anglesey, Wales, UK.
1.33. Mäntsäla municipality, Finland.
1.34. Hyvinkää, Finland.
1.35. Surroundings of Bor, Serbia.
1.36. London, UK.
1.37. Dracaena Marginata (dragon trees) at IKEA. London, UK.
1.38. Frihamnen, Stockholm, Sweden.
1.39. City of London, London, UK.
1.40. Post office. Belgrade, Serbia.
1.41. Mining and Smelting Combine Bor. Bor, Serbia.
1.42. Stockholm, Sweden.
1.43. Zlot cave. Serbia.
1.44. London, UK.
1.45. Seat of Sirogojno Company. Sirogojno, Serbia.
1.46. Mäntsälä municipality, Finland.
1.47. Stenholmsgruvan. Kemiönsaari, Finland.
1.48. City of London, London, UK.
1.49. Kettle's Yard. Cambridge, UK.
1.50. Mining and Smelting Combine Bor. Bor, East Serbia.
1.51. Hyvinkää municipality, Finland.
1.52. Geological map of Karkilla (detail). Geological Survey of Finland.
1.53. Bor, Serbia.
1.54. Skomvær lighthouse. Skomvær, Røst archipelago, Norway.
1.55. Stockholm, Sweden.
1.56. Museum of Wool. Sirogojno, West Serbia.
1.57. Stockholm, Sweden.
1.58. Mining and Smelting Combine Bor. Bor, Serbia.
1.59. Finsbury Square, London, UK.
1.60. Hyvinkää municipality, Finland.

1.61. Bor, East Serbia.
1.62. Mynyyd Parys, Isle of Anglesey, Wales.
1.63. “Children of smoke.” Bor, Serbia.
1.64. Mining and Smelting Combine Bor. Bor, Serbia.
1.65. Östergårdsgrufvan. Kemiönsaari, Finland.
1.66. Mining and Smelting Combine Bor. Bor, Serbia.
1.67. New Cross, London, UK.
1.68. Klovakärrsgruvan disused copper mine. Kemiönsaari, Finland.
1.69. Sirogojno, Serbia.
1.70. City of London, London, UK.
1.71. Mining and Smelting Combine Bor. Bor, Serbia.
1.72. Stockholm, Sweden.
1.73. Old Pit. Bor, Serbia.
1.74. Zlot caves, Serbia.
1.75. Southern Finland.
1.76. Mining and Smelting Combine Bor. Bor, Serbia.
1.77. Geological test samples. Mining and Smelting Combine Bor. Bor, Serbia.
1.78. City of London, London, UK.
1.79. Electrolysis. Mining and Smelting Combine Bor. Bor, Serbia.
1.80. Pen. Ethno Museum, Sirogojno, Serbia.
1.81. Mining and Smelting Combine Bor. Bor, Serbia.
1.82. Slag. Mynydd Parys, Isle of Anglesey, Wales.
1.83. Wool spinning manufacturing. Sirogojno, Serbia.
1.84. Östergårdsgrufvan, Kemiönsaari, Finland.
1.85. Jussarö disused iron mine. Jussarö, Finland.
1.86. Copper rod plant. Mining and Smelting Combine Bor. Bor, Serbia.
1.87. Mäntsälä municipality, Finland.
1.88. Skomvær lighthouse. Skomvær, Røst archipelago, Norway.
1.89. Östergårdsgrufvan. Kemiönsaari, Finland.
1.90. Hyvinkää municipality, Finland.
1.91. Skansen open-air museum. Stockholm, Sweden.
1.92. Klovakärrsgruvan. Kemiönsaari, Finland.
1.93. Zlot cave. Serbia.

1.94. Mäntsälä municipality, Finland.
1.95. Utö, Finland.
1.96. Klovakärrsgruvan. Kemiönsaari, Finland.

Part II.

2.01. Heartbeat tracking app. *confluence*.
2.02. Plant and photo-sensitive paper. *confluence 0.2*.
2.03. Speaker made from conductive paint. In collaboration with Emilie Giles. *assembling ecologies*.
2.04. Prototyping a conductive circuit. In collaboration with Emilie Giles. *assembling ecologies*.
2.05. Light sensor on a new guinea. In collaboration with Emilie Giles. *dancing ecologies*.
2.06. *intra-dance with trees, dunes and sea*, workshop at Inter-format Symposium on Flux of Sand and Aquatic Ecosystems. Nida Art Colony, Nida, Lithuania.
2.07. White gerber. *confluence 0.1*. 9 April 2013, London.
2.08. Diagram for *dancing ecologies*.
2.09. Paper share convoy. *black box paper walk* test run. February 2014, Stockholm.
2.10. Critical-creative accounting. *black box white paper*.
2.11. 'Paper share' transportation. *black box white paper*. February 2014, Stockholm.
2.12. Score diagramming. Development of *all that is air melts into city*.
2.13. Rehabilitating a digital camera to 'see' near-infrared spectrum. Development of *all that is air melts into city*.
2.14. Walking itinerary for day seven. Performing *all that is air melts into city*. 1 – 18 May 2014, London.
2.15. Performance score. *all that is air melts into city*.
2.16. Assembly of dracaena marginatas. Logistics of *all that is air melts into*

city.
2.17. Floor mapping. Installing the 'office' of *all that is air melts into city*. April 2014, arebyte gallery, London.
2.18. Carbon convoy assembling. *all that is air melts into city*.
2.19. Performance score. *counting live stock(s)*.
2.20. Making balls of yarn. *counting live stock(s)*.
2.21. Setting up counting office in field. *counting live stock(s)*. October 2014, Zlatibor, Serbia.
2.22. Manual correlation plotting. Research for *office of ecological labour*.
2.23. Tracking exercise. *office of ecological labour*.
2.24. On-site monitoring. Preparations for *office of ecological labour*. Herbert Read Gallery, UCA Canterbury, London.
2.25. Performance score. *office of ecological labour*.
2.26. Co-performers. *office of ecological labour*.
2.27. Timeline score. *Office of ecological labour*.
2.28. Monitoring internet volume usage. Preparations for *office of ecological labour*. Herbert Read Gallery, UCA Canterbury.
2.29. Composing *#copper #love #machine*. *we ♥ copper & copper ♥ us vol. 1.*
2.30. Retracing exploration data of Geological Survey of Finland. Fieldwork of *we ♥ copper & copper ♥ us vol. 1.*
2.31. Phone dissasembly. Fairphone workshop at Open Source Circular Economy Days. 13 June 2015, Helsinki.
2.32. Developing #copper #love #machine. *we ♥ copper & copper ♥ us vol. 1.*
2.33. Developing #weheartcopper web deposit. In collaboration with Romulus Studio. *we ♥ copper & copper ♥ us vol. 1.*
2.34. Sketch for *#copper #love #machine*. *we ♥ copper & copper ♥ us vol. 1.*
2.35. Undiscovered copper deposit. *we ♥ copper & copper ♥ us vol. 1.*
2.36. Pattern design for *#copper #love #machine*. *we ♥ copper & copper ♥ us vol. 1.*
2.37. Sewing *#copper #love #machine*. In collaboration with Siru Juntunen. *we ♥ copper & copper ♥ us vol. 1.* May – June 2015, Helsinki International Artist Programme.
2.38. *#copper #love #machine* material gymnastics. *we ♥ copper & copper ♥ us*

vol. 1. Helsinki International Artist Programme.
2.39. *#copper #love #maintenance. we ♥ copper & copper ♥ us vol. 1*. 17 June 2015, Galleri Augusta, Helsinki International Artist Programme.
2.39. #copper #love #maintenance. we ♥ copper & copper ♥ us vol. 1. 17 June 2015, Galleri Augusta, Helsinki International Artist Programme.
2.41. Meeting lithic bodies in Skomvær. In collaboration with Marika Troili. Skomvær, Røst Artist in Residency.
2.42. Trans-species gatherings. In collaboration with Marika Troili. Røst Artist in Residency, Skomvær.
2.43. Pre-enactment of *for tilva roš, mynydd parys, buenavista del cobre, and other red mountains*. *In Process*, December 2015 – January 2016, Project Space, University of Westminster.
2.44. Pre-enactment of *for tilva roš, mynydd parys, buenavista del cobre, and other red mountains*.
2.45. Pre-enactment of *for tilva roš, mynydd parys, buenavista del cobre, and other red mountains*.
2.46. Analytics of extraction industry chain. Score for *we ♥ copper & copper ♥ us vol. 3: mineralizacija*.
2.47. Copper comes home. Fieldwork for *mineralizacija*. Bor, Serbia.
2.48. Performance score. *we ♥ copper & copper ♥ us vol. 3: mineralizacija*.
2.49. Material-discursive scoring of laboratory experiments, by Dr Aleksandra Mitovski. *we ♥ copper & copper ♥ us vol. 3: mineralizacija*. Technical Faculty in Bor, Serbia.
2.50. Matter-real entanglements. In collaboration with Marika Troili. Røst Artist in Residency, Skomvær.

Part III.

3.01. Plant-human tracking (detail). *confluence 0.1*. 9 April 2013, Harrow on the Hill.

3.02. *confluence 0.1*. Performance documentation (detail).
3.03. *confluence 0.1*. Performance documentation (detail)..
3.04. *confluence 0.2*. Performance documentation (detail).
3.05. *confluence 0.2*. Performance documentation (detail).
3.06. *confluence 0.2*. Performance documentation (detail).
3.07. *dancing ecology 0.10*. Performance documentation, video still. 24 September 2013, Harrow on the Hill.
3.08. *dancing ecology 0.45*. Performance documentation, video still. 2 October 2014, Utrecht.
3.09. *dancing ecology 0.50*. Performance documentation, video still. 4 October 2014, Harrow on the Hill.
3.10. *dancing ecology 0.63*. Performance documentation, video still. 5 October 2013, Harrow on the Hill.
3.11. *dancing ecology 0.70*. Performance documentation, video still. 7 October 2013, Harrow on the Hill.
3.12. Research for *grow buy cut sell*. 18 February, 2014. Dalarna, Sweden.
3.13. *grow buy cut sell*. 18 February 2014, Dalarna, Sweden.
3.14. *grow buy cut sell*. Video still. 18 February, 2014, Dalarna, Sweden.
3.15. Paper share convoy at the seat of NASDAQ OMX Nordic. *black box white paper*. 25 February 2014, Stockholm, Sweden.
3.16. *black box white paper*. Performance documentation, slideshow still. 25 February 2014, Stockholm.
3.17. *black box white paper*. Performance documentation, detail. 25 February 2014, Stockholm.
3.18. *black box white paper*. Performance documentation, detail. 25 February, Stockholm.
3.19. *air 261*. Near-infrared photograph, performance material, *all that is air melts into city: speculative geohistory of a EU emission allowance*. 14 May 2014, London, UK.
3.20. *city 261*. Near-infrared photograph, performance material, *all that is air melts into city*.
3.21. Measuring carbon-dioxide concentration. Carbon convoy in *all that is air melts into city*.

3.22. *#allthatisair #update261*. Website screenshot, *all that is air melts into city*.
3.23. *all that is air melts into city*. 'Office' after day two of performance. 3 May 2014, arebyte gallery, London.
3.24. *#city051*. Normalized Difference Vegetation Index (NDVI) performance documentation photo, *all that is air melts into city*. 2 May 2014, London.
3.25. *#air190*. Normalized Difference Vegetation Index (NDVI) performance documentation photo, *all that is air melts into city*. 9 May 2014, London.
3.26. *#city111*. Normalized Difference Vegetation Index (NDVI) performance documentation photo, *all that is air melts into city*. 7 May 2014, London.
3.27. *#air198*. Normalized Difference Vegetation Index (NDVI) performance documentation photo, *all that is air melts into city*. 9 May 2014, London.
3.28. *all that is air melts into city*. 'Office' after day four of performance. 7 May 2014, arebyte gallery, London.
3.29. *all that is air melts into city*. 'Office' at work.
3.30. *#city212*. Normalized Difference Vegetation Index (NDVI) performance documentation photo, *all that is air melts into city*. 13 May 2014, London.
3.31. *#air198*. Normalized Difference Vegetation Index (NDVI) performance documentation photo, *all that is air melts into city*. 9 May 2014, London.
3.32. *all that is air melts into city*. 'Office' after day eight of performance. 14 May 2014, arebyte gallery, London.
3.33. *beginnings and ends of all that is air*. Video still, performative presentation of *all that is air melts into city*. 17 May 2014, arebyte gallery, London.
3.34. *beginnings and ends of all that is air*. Video still, performative presentation of *all that is air melts into city*. 17 May 2014, arebyte gallery, London.
3.35. *counting live stock(s)*. Performance documentation, video still. 2 October 2014, Čigota, Zlatibor.
3.36. *counting live stock(s)*. Performance documentation, video still. 2 October 2014, Čigota, Zlatibor.
3.37. *counting live stock(s)*. Performance documentation, video still. 2 October 2014, Čigota, Zlatibor.

3.38. *counting live stock(s)*. Performance documentation, video still. 2 October 2014, Čigota, Zlatibor.
3.39. *counting live stock(s)*. Performance documentation, video still. 2 October 2014, Čigota, Zlatibor.
3.40. *counting live stock(s)*. Performance documentation, video still. 2 October 2014, Čigota, Zlatibor.
3.41. *counting live stock(s)*. Performance documentation, video still. 2 October 2014, Čigota, Zlatibor.
3.42. *counting live stock(s)*. Performance documentation, video still. 2 October 2014, Čigota, Zlatibor.
3.43. *counting live stock(s)*. Performance documentation, video still. 2 October 2014, Čigota, Zlatibor.
3.44. *office of ecological labour: surfacing deep correlation,* performance environment. *Despite Efficiency: Labour*. 2 December 2014, Herbert Read Gallery, University for the Creative Arts, Canterbury.
3.45. Saribus rotundifolius (footstool palms) and installation, *office of ecological labour*.
3.46. *office of ecological labour*. Performance documentation, video still. Video: Louisa Love. 2 December 2014, Herbert Read Gallery, UCA Canterbury.
3.47. *office of ecological labour*. Performance documentation. 2 December 2014, Herbert Read Gallery, UCA Canterbury.
3.48. *office of ecological labour*. Performance documentation. 2 December 2014, Herbert Read Gallery, UCA Canterbury.
3.49 . *office of ecological labour*. Video: Louisa Love. 2 December 2014, Herbert Read Gallery, UCA Canterbury.
3.50. Plotting correlation, *office of ecological labour*. Performance documentation. 2 December 2014, Herbert Read Gallery, UCA Canterbury.
3.51. *office of ecological labour*. Performance documentation, video still. Video: Louisa Love. 2 December 2014, Herbert Read Gallery, UCA Canterbury.
3.52. Mindfulfillness meditation, *office of ecological labour*. Performance documentation. Photo: Louisa Love. 2 December 2014, Herbert Read Gallery, UCA Canterbury.
3.53. Performance documentation, *office of ecological labour*. Video: Louisa

Love. 2 December 2014, Herbert Read Gallery, UCA Canterbury.
3.54. Data measurement post-its, *office of ecological labour*. Performance documentation. 2 December 2014, Herbert Read Gallery, UCA Canterbury.
3.55. Aerodynamic exercise, *office of ecological labour*. Performance documentation, video still. Video: Louisa Love. 2 December 2014, Herbert Read Gallery, UCA Canterbury.
3.56. Aerodynamic exercise, *office of ecological labour*. Performance documentation, video still. Video: Louisa Love. 2 December 2014, Herbert Read Gallery, UCA Canterbury.
3.57. *we ♥ copper & copper ♥ us vol. 1: #copper #love #maintenance*. Installation view, *Excavations*. June – August 2015, Galleri Augusta, Helsinki International Artist Programme.
3.58. *#copper #love #machine*. Installation view.
3.59. *#copper #love #machine*. Installation view.
3.60. *#copper #love #machine*. Installation view.
3.61. *weheartcopperheartus.co*. Website screenshot, *we ♥ copper & copper ♥ us vol. 1: #copper #love #maintenance.*
3.62. *weheartcopperheartus.co*. Website screenshot.
3.63. *weheartcopperheartus.co*. Website screenshot.
3.64. *#copper #love #maintenance*. Performance documentation. 17 June 2015, Galleri Augusta, Helsinki International Artist Programme.
3.65. *#copper #love #maintenance*. Performance documentation. 17 June 2015, Galleri Augusta, Helsinki International Artist Programme.
3.66. *#copper #love #maintenance*. Performance documentation. 17 June 2015, Galleri Augusta, Helsinki International Artist Programme.
3.67. After *#copper #love #maintenance*. Installation view.
3.68. *weheartcopperheartus.co*. Website screenshot.
3.69. Rudna Glava, prehistoric mining site, *we ♥ copper & copper ♥ us vol. 3: mineralizacija*. Video documentation. 14 January 2016, Majdanpek, Serbia.
3.70. Flash furnace, Smelter of Mining and Smelting Combine Bor (RTB Bor). *mineralizacija*. Video documentation. Video: Duško Jelen. 13 January 2016, Bor, Serbia.
3.71. Old slag. Smelter of RTB Bor. Video documentation, *mineralizacija*. Video:

Duško Jelen. 13 January 2016, Bor, Serbia.

3.72. Electronic and electric waste recycling factory, *mineralizacija*. Video documentation. 5 January 2016, Niš, Serbia.

3.73. Electronic waste recycling, *mineralizacija*. Video documentation. Video: Marika Troili. 5 January 2016, Niš, Serbia.

3.74. Copper recycled from wires, *mineralizacija*. Video: Marika Troili. 6 January 2016, Niš, Serbia.

3.75. Blue stone synthesis performed by Dr Aleksandra Mitovski, *mineralizacija*.Video documentation. Video: Duško Jelen. 11 January 2016, Technical Faculty in Bor.

3.76. Blue stone synthesis performed by Dr Aleksandra Mitovski, *mineralizacija*. Video documentation. Video: Duško Jelen. 11 January 2016, Technical Faculty in Bor.

3.77. Blue stone synthesis performed by Dr Aleksandra Mitovski, *mineralizacija*. Video documentation. Video: Duško Jelen. 11 January 2016, Technical Faculty in Bor.

3.78. Copper(II)-oxide crystallisations, *mineralizacija*. Video documentatation. Video: Duško Jelen. 12 January 2016, Technical Faculty in Bor.

3.79. Making crystal-slag, *mineralizacija*. Video documentation. Video: Duško Jelen. 13 January 2016, Smelter of RTB Bor.

3.80. Slag exiting the furnace, *mineralizacija*. Video documentation, Video: Duško Jelen. 13 January 2016, Smelter of RTB Bor.

3.81. Slag disposal, *mineralizacija*. Video documentation. Video: Marika Troili. 14 January 2016, Smelter of RTB Bor.

3.82. Unmining, *mineralizacija*. Video documentation. Video: Duško Jelen. 13 January 2016, Smelter of RTB Bor.

3.83. Unmining, *mineralizacija*. Video documentation. Video: Duško Jelen. 13 January 2016, Smelter of RTB Bor.

3.84. Unmining, *mineralizacija*. Video documentation. Video: Duško Jelen. 13 January 2016, Smelter of RTB Bor.

3.85. Rudna Glava, prehistoric mining site, *mineralizacija*. Video documentation. Rudna Glava, East Serbia. 14 January 2016, Majdanpek, Serbia.

3.86. *mineralizacija*. 4 channel projection at Viva exhibition *burning hearts of a thousand tiny matters*. 1 – 5 February 2017, Ambika P3, London.

3.87. *mineralizacija* and *#copper #love #maintenance*. Viva exhibition *burning hearts of a thousand tiny matters*. 1 – 5 February 2017, Ambika P3, London.
3.88. *mineralizacija* and *#copper #love #maintenance*. Viva exhibition *burning hearts of a thousand tiny matters*. 1 – 5 February 2017, Ambika P3, London.
3.89. Website floor projection, *weheartcopperheartus.co*. Viva exhibition *burning hearts of a thousand tiny matters*. 1 – 5 February 2017, Ambika P3, London.

4.01. *postajanje-zemlja,* storytelling/re-enactment of *mineralizacija*. Performance documentation. Photo: Neda Mojsilović. 21 January 2016, Cultural Front Belgrade.
4.02. *postajanje-zemlja*. Performance documentation. Photo: Neda Mojsilović. 21 January 2016, Cultural Front Belgrade.
4.03. *postajanje-zemlja*. Performance documentation. Photo: Neda Mojsilović. 21 January 2016, Cultural Front Belgrade.
4.04. *postajanje-zemlja*. Performance documentation. Photo: Neda Mojsilović. 21 January 2016, Cultural Front Belgrade.
4.05. *postajanje-zemlja*. Performance documentation. Photo: Neda Mojsilović. 21 January 2016, Cultural Front Belgrade.
4.06. *postajanje-zemlja*. Performance documentation. Photo: Neda Mojsilović. 21 January 2016, Cultural Front Belgrade.

Conclusions

5.01. *burning hearts of a thousand tiny matters*. Viva show, exhibition view. Photo: Marika Troili. 1 – 5 February 2017, Ambika P3, London.
5.02. *412,57 particles per million of carbon-dioxide in the air of London*. Documentation from *all that is air melts into city*, presented at *burning hearts of a thousand tiny matters*. Photo: Marika Troili. 1 – 5 February 2017, Ambika

P3, London.

5.03. *0,955 US dollars for twelve point six kilograms of Parys mountain*. Research archive, *we ♥ copper & copper ♥ us,* presented at *burning hearts of a thousand tiny matters*. Photo: Marika Troili. 1 – 5 February 2017, Ambika P3, London.

5.04. *burning hearts of a thousand tiny matters*. Exhibition view. Photo: Marika Troili. 1 – 5 February 2017, Ambika P3, London.

5.05. *0,086 euros for eleven Chilean pines*. Printout of Directive 2003/87/EC of the European Parliament and of the Council of 13 October 2003 establishing a scheme for greenhouse gas emission allowance trading within the Community and amending Council Directive 96/61/EC. 2017. Research archive, *all that is air melts into city*, presented at *burning hearts of a thousand tiny matters*. Photo: Marika Troili. 1 – 5 February 2017, Ambika P3, London.

5.06. *burning hearts of a thousand tiny matters*. Exhibition view. Photo: Marika Troili. 1 – 5 February 2017, Ambika P3, London.

5.07. 'Shining breathing' with *burning hearts of a thousand tiny matters*. Photo: Marika Troili. 1 – 5 February 2017, Ambika P3, London.

5.08. 'Reassembling healing' for *burning hearts of a thousand tiny matters*. Photo: Marika Troili. 5.07. 1 – 5 February 2017, Ambika P3, London.

5.09. 'Reassembling healing' for *burning hearts of a thousand tiny matters*. Photo: Marika Troili. 1 – 5 February 2017, Ambika P3, London.

5.10. 'Rocking yoga' with *burning hearts of a thousand tiny matters*. Photo: Marika Troili. 1 – 5 February 2017, Ambika P3, London.

5.11. 'Rock'n'yoga' with *burning hearts of a thousand tiny matters*. Photo: Marika Troili. 1 – 5 February 2017, Ambika P3, London.

5.12. *burning hearts of a thousand tiny matters*. Exhibition view. Photo: Marika Troili. 1 – 5 February 2017, Ambika P3, London.

5.13. *burning hearts of a thousand tiny matters*. Exhibition view. Photo: Marika Troili. 1 – 5 February 2017, Ambika P3, London.

5.14. Meeting Östergårdsgrufvan. Kemiönsaari, Finland.

c. List of accompanying material

All documentation is available online on:
http://minoritarianecologi.es/

Materials can also be found on the USB stick. The folder titles follow the numbers of sections in the thesis.

Folders and files on the USB:

3 1 a confluence

confluence 0 1	Performance documentation.
confluence 0 2	Performance documentation.

3 2 b dancing ecologies

dancing ecology 0 10	Video, performance documentation, 4 min 12 sec.
dancing ecology 0 45	Video, performance documentation, 12 min 58 sec.
dancing ecology 0 70	Video, performance documentation, 6min 43 sec.
video stills	Folder with performance stills.

3 2 a grow buy cut sell

grow cut buy sell	Video, 11 min 34 sec.
video stills	Folder with video stills.

3 2 b black box white paper

black box white paper	Slideshow, performance documentation, 20min.
slideshow stills	Folder with stills from the slideshow.

3 3 all that is air melts into city

1 website *all that is air melts into city* website.

2 office gallery Installation shots from office/gallery

3 beginnings ends Documentation stills from the final performance.

3 4 counting live stocks

counting live stocks Video, performance documentation. 9 min 21 sec.

3 5 office of ecological labour

office of ecological labour Video, performance documentation. 5 min.

3 6 we heart copper hearts us

1 copper love maintenance

a installation *#copper #love machine*, installation shots. Galleri Augusta, Helsinki, June – August 2015.

b website *weheartcopperheartus.co*, website screenshots.

c performance *#copper #love #maintenance,* performance stills.

2 mineralizacija

a performance

mineralizacija

Video, performance documentation. 72 min.

screenshots

b exhibition Exhibition and *postajanje-zemlja* performance stills, KC Grad, Belgrade, 19—24 January 2016.

3 7 burning hearts

Folder with documentation of the Viva exhibition *burning hearts of a thousand tiny matters*. Ambika P3, London, 1 – 5 February 2017.

a exhibition

Installation shots.

b performance

Stills from the opening performance *earth minor*, 1 February 2017.

d. Acknowledgements

° This research, performances and knowledges are not only mine. Performances and knowledges have been produced through intra-active entanglements with many bodies. In the context of the doctoral research, i am to be held responsible and accountable for the content hereby presented. However, knowledges are shared with the bodies that intra-acted them with me: a new guinea, two gerbers, pine trees of Dalarna, carbon paper share, forty-six dracaena marginatas, an areca palm, molecules of carbon-dioxide travelling through the air of London between 1st and 14th of May 2014, fifty-one sheep in Čigota, twelve saribus rotundifolias, molecules of carbon-dioxide in Herbert Read Gallery on 2nd December 2014, undiscovered copper deposits in the surroundings of Hyvinkää and Mäntsälä, recycled copper at Niš, crystals of copper(II)-oxide at Bor, mineral-slag rocks at the Smelter at Bor, rocks at Klovakärrsgruvan and Östergårdsgrufvan and Mynydd Parys, eleven araucaria araucanas, and numerous other earth bodies that withdraw from being named. This thesis has been made with °earth, and it is *for* you.

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e. Author's declaration

I declare that all the material contained in this thesis is my original work.

f. Definitions

In the context of this dissertation, i use words such as ‘more-than-human ecology’, ‘posthuman ecology’, ‘minoritarian ecology’ and ‘flat ecology’ to indicate a performative dynamics of meeting among different bodies in which no body is sovereign over another. The differences in terms are nuances that indicate the situatedness of the current part of the narrative in respect to the possibilities of creating these ecologies of difference.

In order to try to loosen the burden of othering placed upon bodies that are different from the standard of ‘human’, i will use a variety of words such as ‘earth others’, ‘natural others’, other others’, or ‘nonhuman’, ‘inhuman’, ‘more-than-human’, ‘extra-human’ bodies. Wherever possible, instead of these generic terms, i try to address the bodies in their specificity. Following Rosi Braidotti, i hope that this work helps re-imagine nonhumans not as second to humans, but as other than nonmen.

In the text i refer to the collaborative works of Gilles Deleuze and Félix Guattari by using acronym DG. This is to indicate that they are a unitary polymorphous assembly, together in multiplicity of difference.

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minoritarian ecologies:
performance before a more-than-human world

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I fall in the dark through the dark
Waiting

Sending out the invitation, the signal, the sign
To you, the stranger, unlike anything in me
I open

Building an entrance
Building out of plasma
Creating a tunnel a passage a pathway
For you to travel through
…

— Essi Kausalainen, *Love Song*

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0. Introduction:
Cultures and natures

0.1. Assemblies and divides

> People are sitting in a circle in a woodland clearing, warm earth below, blue sky above, sun shining through leaves and pine needles. They have just returned from special individual places and have taken on the identities of other natural beings. .....
>
> Turning first to east, then to the other three directions, they invoke the powers of nature. They invite the beings of the Three Times—naming those who have nurtured the earth before, those who are saving it in the present, and those of future times for whom the earth is being preserved. Each being in turn speaks for itself and its kind, telling of its place in the earth's order. "I am rainforest; I am kangaroo; I am mountain; I am lichen". Then a few remove their masks and move into the circle's center to listen as humans to what is happening to the others.
>
> > I am rainforest..... You destroy me so carelessly, tearing down so many of my trees for a few plans....

This is a description of the Council of All Beings, a communal ritualistic exercise, "a ritual of despair and empowerment" developed by Joanna Macy, John Seed, and fellow deep/spiritual ecologists in the 1980's (in Merchant, 1992: 146). The Council of All Beings emerges from spiritual ecology, to later become a workshop methodology that "allows us to step aside from our human identity and speak on behalf of other life-forms" (Macy & Brown, 2014: 146), part of a wider set of practices that Macy calls "the work that reconnects". The Council is not a decision-making body, it is an affective exercise of heightening identification and compassion with nature. It uses key political procedures—a circular setting, speaking in place of another—and merges them with subjective

and ethical identification with nature. Humans first listen and embody other bodies' perspectives, and then they try to bring those that do not speak our tongues into the circle. Importantly, the circle, as represented by the successive movement of the speakers into the centre, is not oriented towards the (social) inside but is an opening towards the outside.

The Conference of Parties (COP) is an annual inter-governmental meeting whose main goal is to review the implementation of the UN Framework on Climate Change (UNFCC). Following the Rio Earth Summit in 1992, where the UNFCC was adopted, the meetings have taken place in various cities around the world, from Berlin in 1995 to COP21 at Paris in 2015. "The UNFCC….now has a near-universal membership of 195 parties" (UNEP, 2015). It is one of the largest assemblies in the history of mankind, but what does this 'near-universal membership' stand for? To which universe does it refer to? The meetings mostly take place in the conference rooms, and 'parties' are representatives of 195 governments. In all its comprehensiveness, *this great political plenary is but a tiny fraction of the world*. Non- or extra-human beings—birds, rocks, mushrooms, oceans, penguins, pines, multitudes of 'earth others' (Plumwood, 1993)—are not invited to the Conference of Parties. Fates of many of these bodies are being determined in their absence, without meeting them. I need not mention the many impasses and dead ends that COPs have encountered so far, what is most striking is the radical cut instituted between those who decide and those who do not have a word (including vast sections of humanity).

Conference, council or assembly has historically been one of the key mechanisms of human politics, a place where problems are brought to the circle to untie the knot. In many of its communal instantiations, the participating members are directly involved in the question, they do not represent another person. The participants and the community match on 1:1 scale. As many cultures grew in size, more complex institutions were designed, but assembly is still one of the sacred planes of politics. The basic premise for each council's operativity has generally been taken to be the ability to speak. In an assembly, the participants are qualified as *free* to use the ability to speak, to put forward

'matters of concern' (Latour, 2004). For their internal freedom, modern councils institute a cut between an inside and an outside, mostly leaving out all of extra-humanity. This is but one, albeit, in my view, highly important, of the procedures or protocols through which rifts or 'Divides' of modernity operate. Latour speaks about two 'Great Divides': one concerns nature and culture, and the other is the Great Divide between 'Westerners' and 'Them', all the other cultures (Latour, 1993: 12, 104).

Clearly, humanity is 'part' of nature, and human bodies are brimful with 'other' cultures, e.g. digestive enzymes (Neimanis, 2012). The divides are thus cultural practices: knowledge, economic, political, technical protocols. Beyond the two 'Great Divides', ecological feminist analysis finds out an entire 'web' of other divides that are connected with the first tow. Val Plumwood explains these operations as the 'logic of dualism' or the 'logic of colonisation' (Plumwood, 1993). In dualisms, the inferior side of the binary is inferior, and used to support the definition of the superior side, e.g.: man—woman, society—nature, mind—matter, us—them etc. (ibid.). From the outset, it should be clear that the divides are not embedded biologically, *the logic of dualism is a set of discursive and material protocols*.

At a more careful look, nature-culture divide is in fact a heavily trafficked zone. The other dimension of the divide consists in policing and control of the instituted boundary. Latour (1993) proposes that modernity concurrently enacts separation ('purification') *and* intermingling ('proliferation of hybrids') between cultures and natures. Latour individuates a formulation of this procedure in the dispute between Robert Boyle and Thomas Hobbes about the division of tasks between science and politics. In this reading, Boyle and Hobbes through animated discussion, arrive at a Modern Constitution settled along these lines:

> the representation of nonhumans belongs to science, but science is not allowed to appeal to politics; the representation of citizens belongs to politics, but politics is not allowed to have any relation to nonhumans produced and mobilised by science and technology. (1993: 28)

I do not wish to examine the historical correctedness of Latour's interpretation, what I wish to single out that representation is a shared trait between politics and science. Representation is a specific mode of engagement with the world that excludes by inclusion, it backgrounds the represented by bringing the represented to the foreground. Representation in the modern sense determines who is allowed to speak for the 'inferior'. The logic of dualism is a question, first and foremost, of hierarchy and power of representation.

Two modes of separation and hybridisation gain another light in view of another protocol that perhaps most heavily traffics between the social and the natural. Capitalism as a mode of production seems not to posit a separation between nature and culture, it imports (value) and exports (waste) across the line. However, capitalism is based on a hierarchical division of labour that operates not only on the social level, but also along the culture-nature axis. In Marx, capitalism runs on 'surplus value' accumulated from social labour, that is, from the physical and/or mental force of bodies. Through successive political economic analyses, this vision turned out to be too narrow and the real expanse of capitalist accumulation was tapped. Feminist theorists have revealed that the broader terrain in which capitalism accumulates value is 'social reproduction': cheap or unpaid labour performed mostly by women (e.g., Firestone, 1970; Mies, 1986; Federici, 2012). Feminist analysis further saw how the process of accumulation was based on devaluation and appropriation of woman's body by naturalisation and proletarisation (Federici, 2004). In ecological feminist analysis, 'natural' is thus seen as the primary stratum of capitalist accumulation (Merchant, 1980). From an ecosocialist perspective, Jason Moore has recently claimed that the real 'project' of capitalism lies in "appropriating the unpaid work/energy of humans and *the rest of nature*" [my emphasis] (2015: 72). This is an important proposition. In Moore's proposal, the principal goal of capitalism is the production of "Cheap Natures", areas of appropriation of energy, food, resources, etc. The "*view of Nature as external* is a fundamental condition of capital accumulation" (Moore, 2015: 15). Through a "double internality" capital "organises" nature, by externalising it organisationally and

appropriating it matter-of-factually. This is the 'state of exception' that Giorgio Agamben individuated as foundational of modern biopolitics: "the extreme form of relation by which something is included solely through its exclusion" (1998: 19). In Michel Foucault, biopolitics refers to techniques of power that "foster life or disallow it to the point of death" (1978: 111). Biopolitical techniques are intimately entwined with capitalism into a general system of 'administration' and 'governance' of life (ibid.: 115).

The roots of strategies of accumulation by exception stretch hundreds of years into the past, but we are witnessing a peak stage now. Michel Serres in *Natural Contract* (1996) sees this as a 'war' of civilization against nature. The key underlying factor behind ongoing climate change are 'anthropogenic' emissions of carbon-dioxide, released by burning fossil fuels (IPCC, 2013). However, before rushing to promote an abstract 'man' or '*anthropos*' as the global perpetrator or master (as with the notion of the Anthropocene, see 1.3.5.), we should be clear that we are referring to a specific set of discursive and material strategies, performed by determinate subjects (humans) upon determinate objects (other human or extra-human bodies). As feminist politics of location insists, bodies are differentially positioned and these differences must be accounted for (Braidotti, 2011).

This research, and my life as a white, male-born subject coming from a postsocialist part of South-East Europe, are specifically and differentially determined by the power of biopolitics. However, they are not entirely determined by this matrix. Foucault points out that life is not "totally integrated into techniques that govern and administer it; it constantly escapes them" (Foucault, 1978: 115). From my standpoint, through this research I seek possibilities of living together with other bodies amidst the damage wrought by the apparatuses of domination. Life, understood as power that comes before (*ante*) and goes well beyond the apparatuses of biopower, is the space of posthuman eco-aesthetics of intra-action.

0.2. Assembling posthuman ecologies

At the root of the word 'ecology' is ancient Greek *oikos*, which means 'household' and 'family', and is closely associated with *oikonomia*, 'economy'. Ecology as 'economy of nature' was the definition given to it by the founder of the discipline Ernst Haeckel in the mid-1800s. Some strands of environmentalism have translated this into the 'management of household' (Pepper, 1996: 184). Jean-François Lyotard discloses another genealogy which is less visible in the term *oikos*. Home, Lyotard argues, is not "the place of safety. The *oikos* is above all the place of tragedy" (1989: 97). Family/home is a place of the *oikeoin*, of the 'secluded': women, slaves, animals, plants, under the control of the master of the household, *domus*. Ecology thus refers to the secluded that are inside: "*an otherness* that is not an *Umwelt* [environment] at all, but *this otherness* in the core of the apparatus" [my emphasis] (ibid.: 100). Ecology talks about what is captured in the logic of domination exercised by the patriarchal and phallogocentric modes of thought and power relations. The secluded of the techniques of administration and governance of life is the subject of ecology. At the same time, for Lyotard, ecology is also a discourse:

> of the thing that has not become public, that has not become communicational, that has not become systemic, and that can never become any of these things. … [a logos] which is preoccupied, in the full sense of "pre-occupied" with listening to and seeking for what is secluded, *oikeion*. (ibid.: 105)

Ecology is becoming '(pre-)occupied' by 'anotherness' or 'difference'. Ecology as a 'discourse of the secluded' seeks modes of speaking with those who do not speak, or are not allowed to do so. Ecology in the modern context starts as a critique of power over life, and seeks affirmative or creative modes to render justice to the minorities that form the core of the apparatus.

The affirmative aspect of ecology can be understood through the notion of assemblage. Ecology as a 'discourse of the secluded' cannot proceed through circles in which 'free citizens' speak. Rather ecology can be imagined as a

commons "where each singularity can live out its own strangeness to the extent of its possibilities, and experiment with its own form of concatenation" (Raunig, 2013)[1]. Gerald Raunig here draws on the monistic philosophy of Baruch Spinoza from the late 1600s[2]. In Spinoza, humans, plants, animals, are 'modes' of existence whose essence is an 'effort' to persist in being (Bennett, 2010: 22).

> What it means to be a "mode"... is t*o form alliances and enter assemblages*: it is to mod(e)ify and be modified by others. The process of modification is *not under the control of any one mode*.... Neither is the process without tension, for each mode vies with and against the (changing) affections of (a changing set of) other modes, all the while being subject to the element of chance or contingency intrinsic to any encounter. [my emphasis] (ibid.)

With Spinoza, ecology can be understood as a practice of 'forming alliances' with other bodies. What is crucial is the ethico-politics of how freedoms and autonomies are mutually modified among different bodies. Not all the meetings produce alliances and assemblages. Only when meetings are "not under the control of any *one* mode", we can speak of 'collaborations' (Neimanis, 2012), 'confederations' (Bennett, 2010), 'associations' (Latour, 1988), 'assemblages' (Deleuze & Guattari, 1987). In this sense, these associations are where "lifeways —and non-living ways of being as well—[are] coming together" (Tsing, 2015: 24). These inter-bodily assemblages could also be called symbioses.

To imagine how the work of assemblage proceeds, I will claim that we cannot look at it through the lens of a representational ontological politics ('speaking for another'). As an alternative to this world-view, this research looks at sciences studies that postulate a posthumanist ontology based on performativity (Pickering, 1996; Barad, 2007). In a 'posthumanist space' (Pickering, 1995), human and other-than-human bodies perform together and apart. Through

1 Gerald Raunig is in these terms describing a real-life situation, that of the Occupy movement. For all its progressive nature, it should be noted that no natures were invited to the Occupy assemblies. This attests to the challenges an environmental politics has to deal with.

2 Spinoza's philosophy runs counter to dualistic ontologies that were shaped in the same historical period, and its nonanthorpocentrism has exerted great fascination on ecological thought (Sessions, in Merchant, 2008: 169-71).

scientific experiments, but also everyday chores, bodies engage in 'mangles of practice' (ibid.), sometimes producing new compositions and effects in the world. This is the link that I want to draw between a posthuman ecology and visual arts. To enact a performative eco-aesthetics is, I propose, *to participate in the performativity of the world*. Posthuman performative eco-aesthetics is a reassertion or intensification of the performativity of the world itself (Barad, 2003).

Performative understanding of the world brings another understanding of agency. In a modern outlook, matter has been interpreted as a pre-determined substrate. In Barad's performative ontology, matter is a dynamics of matter*ing*/materialisation (2007). Through the interpretation of quantum field theory, Barad proposes that matter appears as a vibrant 'murmuring' or 'tethering' of in/determinacy, a desiring experimentation with the possibilities for change (2012a, 2012b, 2015). This is in line with Spinoza's idea that modes are animated by 'desire', a sort of gravity pull towards compositions with other bodies. Following Spinoza, Gilles Deleuze and Félix Guattari say that bodies are "distinguished solely by movement and rest, slowness and speed" (1987: 254). The dynamics of freedom to move or to rest is at odds with modern biopolitical projects. Deers, lynxes, wolves and bears, together with humans, are stopped and hurt by razor fences that nation-states erect as I write (Neslen, 2016).

In-between the apparatuses that capture life, I have come to be touched by moving pulses of bodies. Through ecological artists, I learned about desires and struggles to move and rest of bodies such as: aronia berry, copper, mychorriza fungi, Southern Ocean currents, algae, bees, lichen, puffins, and many more earth others[3]. Through my own practice I have encountered and sensed similar desires of carbon-dioxide, dracaena marginata, sheep, copper minerals. Other naturalcultural thinkers introduced me to the desires of electrons, dogs, water,

3 In the spirit of assemblage, my thanks for generous mediations in these border areas go to, in alphabetic order, to Aleksandra Mitovski, Arendse Krabbe, Bartaku, Christina Stadlbauer, Elin Øyen Vister, Essi Kausalainen, Hanna Husberg, Helena Hunter & Mark Peter Wright, Tom Corby, Tuomas A. Laitinen.

matsutake mushroom, lightnings, and many many others[4]. Across the arts and humanities, and in close interaction with sciences, a number of practitioners via different media are thinking how 'we' *participate* in a 'more-than-human sociality' (Tsing, 2013). In philosophy and critical theory, these research orientations are called: critical posthumanism (Wolfe, 2010; Braidotti, 2011), new materialisms (Coole & Frost, 2010), feminist materialism (Alaimo & Hekman, 2008), feminist matter-realism (Bradiotti, 2011), object-oriented ontology (Harman, 2005; Bryant, 2011; Morton, 2013). Among many differences, what brings the above mentioned artistic and these theoretical approaches together is their profound re-imagining of the notions of agency and life. They provide venues for thinking 'life' beyond the regimes of power and capitalist accumulation, and to rethink the human subjectivity in relation to this different understanding of liveliness.

As a descriptor of this conversation, I believe that we can speak of a *posthumanist art—philosophy space of shared theoretico-practical experimentation*. Although, as shown, it is composed of many currents, I take a common notion of 'posthuman'[5]. It is a mode of thinking that comes "both before and after humanism" (Wolfe, 2010: xv). In my interpretation, 'before' stands for the entanglement of human bodies within the general dynamics of matter, and 'after' is a standpoint of thinking how to re-invent nature-culture engagements after the historically determined humanism and associated with modernism. Humanism and associated modernity have been cultural infrastructures for a relatively tight set of material and discursive practices which correlates closely to factors driving climate change (IPCC, 2013) and

4 Another assemblage, my thanks for getting to sense other-than-human existences is here due to Anna Lowenhaupt Tsing, Astrida Neimanis, Donna Haraway, Karen Barad, Vicki Kirby, among others.

5 Posthumanism, in part due to its name, is a movement in thought often associated or criticised for its fascination with cyborgisation of the bodies, as promoting a sort of a teleology of becoming *more-than*-human. For example, in a posthumanist classic, Katherine Hayles traces a genealogy of how, through the science of cybernetics, we have become 'virtual bodies' (1999). In his book *What is Posthumanism* Cary Wolfe, however, usefully distinguishes between two large narratives that belie posthumanism: one is concerned with technological 'upgrading' of the human (transhumanism), as such it is based on premises of rational humanism. The other avenue tries to re-invent thought *after humanism*. Rosi Bradotti's feminist posthumanism is concerned with an ethics of 'contamination' of human bodies with other bodies, impurities, queerness. It is in this sense that I will use the word 'posthuman' in my research.

geological strata modifications (Crutzen, 2002; Haff, 2013). In view of the unsustainability of these practices, I see posthumanism as a *critical* mode of thought that senses an urge to move away from anthropocentrism, androcentrism, phallogocentrism, racism, sexism, speciesism, ultimately fascism. Further, posthumanism *creatively* imagines other modes of 'worlding' that would be more collaborative with other species and nonorganic bodies (Haraway, 2003, 2008). Posthuman ecology is thus not a world devoid of humans (Weisman, 2007; Zalasiewicz, 2009), but a world that is not at sole disposal of the historically determined figure of the Human or Man.

The constitution of this posthumanist space is thus embodied and grounded in the material conditions of the Sixth Extinction, climate change, as well as informational/extractive capitalism and biopolitics. Posthuman or more-than-human ecologies would be locales decolonised from the modernist practices of domination of life. To work out these imaginaries, I will try to wed an immanent movement of critique of the present (Foucault, 1984) with experimentation with the possible, an inquiry in a "critical and creative" mode, in the spirit of affirmation (Braidotti, 2013).

These two analytical modes—the posthumanist space and the present modern predicament—are not two oppositional planes. 'After' humanism is not an overcoming or sublation (Hegel's *Aufhebung*), a 'progress', all distinctly modernist narratives. The *ethos* of this work is not oriented *contra* humanism, in the dialectical sense, nor is it oppositional in the tactical or strategic sense. Rather, it is situated within the apparatuses of modernism, but seeks to look 'diagonally' or 'anamorphically' (Dean, 2016), through and away, to tend towards 'other' insides: towards the secluded 'earth others'. It is especially to these minorities that ecological praxis needs to be accountable and responsible, because they are the most disempowered and voiceless. In the current organisation of academic and artistic labour, still very much oriented towards humanist achievements, it is very easy to lose sight of this. Therefore, I see my task not so much in elaborating post- or anti-anthropocentric systems of thought—I take advice from them—it is rather about imagining

'disanthropocentric' ways of inhabiting the world (Cohen, 2015: 11). With Philippopoulos-Mihalopoulos's proposal of 'spatial justice', posthuman ecology is a movement of 'self-withdrawal' from the territories occupied by humanism (2015). Posthuman ecology is thus not an 'exit', but more alike 'quantum leaps' (Barad, 2012), deep through and lightly away from the logic of modernity. Where do these leaps go?

The relation between the present social reality and posthuman ecological performance can be described in terms of a "practice of as if": a "technique of strategic re-location in order to rescue what we need of the past in order to trace paths of transformation of our lives *here and now*" [my emphasis] (Braidotti, 1994: 6). This practice takes place in the very here-now, but it *re-orients* the present, disposes it in a different manner, for other possibilities to come. It is a 're(con)figuration' (Barad, 2007) *and* a prefiguration (Boggs, 1977). Social apparatuses of Foucauldian biopower operate through an 'axiomatics' (DG, 1983) that translates life into code, representing it in a series of binaries in order to control it. This regime is set *as if* it were possible to capture life in the logic of dualism. This position is at radical odds with 'nature's queer performativity' (Barad, 2012), where we learn that matter is a lively (self-)experimentation with in/determinacy. My posthuman eco-aesthetics will be a practice of *another as if*: it is a practice, situated in the here and now, that performatively pre-enacts how 'social practices' would look and feel like as if 'we' truly lived in a 'more-than-human world' (Abrams, 1996), as if 'we' on daily basis tried to make symbiotic relationship with other bodies, as if 'we' deeply attempted to touch and be touched by difference without reducing it. Posthuman eco-aesthetics thus seeks to create possibilities for heterogeneous bodies, other-than-human and human, to generate assemblages of freedoms.

Based on the above, the thesis pursues the following questions:
In the context of bio-political/capitalist processes that functionally appropriate life,
with a performative understanding of life as an immanent force of

differentiation,
by using hybrid artistic—philosophical tools:
how to create co-performances between human and inhuman bodies, i.e. how to re(con)figure apparatuses of dualistic logic into spacetimes of composition in common with sentient and non-sentient others?
How to situate (translate, document, narrate) these co-performances in the contexts of visual art and research, and in the broader realm of culture?

The thesis is divided in three parts that correspond to three performative modes of this research[6]. Part I is a critical 'ontology of the present' (Foucault, 1984), a critical analysis that charts boundary-making protocols of modernity, starting from the culture—nature rift. Against this hegemonic discourse, this also traces recent philosophical discourses and art practices that propose alternative, nonmodern understandings of the world. Ontology of the present creates a set of analytical tools to identify how dualisms capture and appropriate life, and seeks for perspectives that see differently. Images that parallel this part of the text are derived from the fieldwork, and seek to show materialisations of the logic of dualism.

Part II is an 'analytics of the possible', a moulding of a set of concepts and frameworks that rework the boundary-making mechanisms identified in the ontology of the present. Analytics of the possible, as a discursive mode of doing research, works through intimate entanglement with artistic projects. Analytics is a diagramming exercise that works out how to situate naturalcultural co-performances ('infraphysics of becoming'). Images that parallel this section are from fieldwork and perform analytics of specific apparatuses of capture.

Part III is a description of the 'infraphysics of becoming', a visual and discursive narrative of art projects over the course of the research. The narratives involve

6 In line with the posthumanist performative understanding of discursive and material entanglement, the research is based in 'flat ontology' (De Landa, 2002), or what I call 'flat ecology'. In a flat ontological understanding, concepts as well as bodies differentially perform in a plane of immanence. For detailed elaboration of flat ontology of the research, see Part II, in particular 2.1.

contextual analyses of specific power apparatuses, and the situated performative actions with(in) them. Images in this part follow the text on the right, and are parts of the documentation of art projects. The projects can be found in the accompanying documentation.

The three performative modes have developed concurrently as a continuum of practice. Taken together, the three modes, as described in the three parts of the thesis, do not create a theory nor a methodology, they are a singular movement of entanglement of this research praxis with the world.

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Part I:

"Staying with the trouble[d]"[1]: an ontology of the anthropocenic present

1 This is a riff on Donna Haraway's (2010, 2014, 2016) call to "stay with the trouble", a timely injunction to reinhabit the territories of late capitalism. I will extend on this below.

1.01. Stansvik. Helsinki, Finland.

1.0. Quasi-modern quasi-human

This chapter poses the question, *how have modern humans called those other-than-them*? Some responses are: nature, landscape, environment, object, matter, nonhuman, Other, etc. These modes of naming, and the practices that they afford, have had massive impact on bodies, of both human and extra-human origin. To even start imagining environmental justice requires working through and against these hegemonic modes of thought.

Before moving on, it is important to understand what/who 'modern humans' refers to. This is a very complicated noun, but, to begin with, there is an intimate link between moderns[2] and humans[3]. 'Modern human' is not an identity category, it is an (ongoing) historical process. "We have never been modern" (Latour, 1993), the project has never been accomplished. On the other hand, "[n]ot all of us can say, with any degree of certainty, that we have always been human, or that we are only that." (Braidotti, 2013: 1). Thus, 'we' are never fully modern humans. However, in twenty first century Europe, and the world more broadly, it is difficult to ignore modern humans and their conceptual and material operations.

Bruno Latour describes the process of modernity as a work of 'purification', an apportioning of culture by way of cutting off nature. However, by instituting subjects through a manipulation of objects, moderns have also been "proliferating hybrids" (Latour, 1993: 7-8). Through their scientific and technological practices, moderns have entangled themselves more and more with 'nonhuman' agencies and powers creating mixtures of natures and cultures, 'natures-cultures' (ibid.: 104). In the process, moderns have become

2 I take that modern age starts with Humanism and Renaissance in medieval Italy, as well as Columbus's conquest of America. There is an uninterrupted trajectory of thought and material practices over these 500+ years, and roots of the present fallout of things must be sought having in mind that a certain set of ideas have been sinking into brains and bodies for a long time.

3 Here I am not referring to *anthropos*, or the species. The figure in question here is 'human' in the humanist and Enlightenment traidition, the subject position based on *cogito*, rationality that thinks itself (Descartes): *res cogitans* ('mental substance') as different from *res extensa* ('corporeal substance'), or things of the world.

1.02. Office. London, UK.

something between 'quasi-subjects' and 'quasi-objects'. Clearly, *the separation between nature and culture is a discursive boundary-making protocol*, and a particularly consequential one. This chapter will follow some of the procedures of purification of the social from the natural, whilst trying to outline transgressions from and hybridisations of these normative protocols. The core claim of this chapter is that the formation of modern humans is grounded in a process of othering, or identity affirmation by way of negation. This construction of the 'self' as oppositional and independent of the 'other' is the 'foundational fantasy' of the modern subject (Brennan, 2000).

Purification can be interpreted as a protocol based on the 'logic of dualism' (Plumwood, 1993). Following ecological feminist analysis of Val Plumwood, in the logic of dualism, "contrasting concepts (for example, masculine and feminine gender identities) are formed by domination and subordination and constructed as oppositional and exclusive" (1993: 31). Dualisms are thus not horizontal binaries or dialectical pairs. The superior side of the dualism performs a number of oppositional moves to separate his identity against the other side: 'backgrounding (denial)', 'radical exclusion (hyperseparation)', 'incorporation', 'instrumentalism (objectification)', 'homogenising (stereotyping)'. The 'other' is thus turned into an inferior other by instituting a *norm* or a standard against which to measure the difference or the degree of *abnormality*[4]. Some dualisms in question are, beginning with the superior side on the left: "culture/nature, reason/nature, male/female, mind/body, civilised/primitive, subject/object, master/slave" (ibid.:43).

Dualisms are "not just free-floating systems of ideas", they are also material practices "closely associated with domination and accumulation" (Plumwood, 1993: 42). In fact, Plumwood calls the logic of dualism also the "logic of colonisation" (ibid.: 41). "Domination must be seen as material and cultural, not as happening just at the level of ideas" (Plumwood, 1992: 228). Another crucial finding of feminist thought that is particularly relevant to my research is that

4 I am transposing here from Foucault's analysis of disciplinary power which proceeds through the production of anomaly (1977). His analysis was grounded in the social context of modernity, but I will go on to claim that it may apply to the operations in the nature-culture continuum.

1.03. Stockholm, Sweden.

dualisms do not operate in isolation from each other, they form a "web or a network" of "linking postulates … which create equivalences or mapping between the pairs" (Plumwood, 1993: 45). For instance, by mapping 'order' onto human, nature becomes a domain of 'chaos'. In the words of Black feminist sociologist Patricia Hill Collins, dualisms constitute "the interlocking nature of oppression" (Collins, 1986). The inferiorised are backgrounded, hyperseparated, objectified, incorporated *and* stereotyped in a tight mesh of material and discursive practices. Moderns have thus spun a "network of oppressions" (Plumwood, 2008:227-30) that has been historically extended to capture multitudes of natural- or "earth others"[5]. In this line of thought, "difference-from" the norm is inherently inferior to the standard identity (Braidotti, 2011).

The logic of colonisation has made a world that we inhabit, and these modern discursive and material operations cannot be wished away. I recognise, with McKenzie Wark, that:

> Pretty much all of our political, social and historical theories were made on another planet and may describe only that other planet. The differences may turn out to be significant. It was a planet with a different atmosphere, for example, one containing less carbon and methane. … The theories of that other planet assumed certain constants about the planet which on this one don't hold. (2015)

We need new theories and new practices to make our way through global warming, but, we must not forget that pretty much all of our political, social and scientific *practices* "made on another planet" are still determining *this planet*. It is possible to envisage other futures, but these cannot materialise without an

5 The multi-faceted intersection of oppressions has been discovered by feminist intersectional analysis. 'Intersectional theory' as praxis of critique and politics traces its origins in the Black feminist thought of the late 1970's and 1980's, to subsequently get adopted in other strands of feminism (see Górska, 2016:114-31). This mode of analysis has been transposed into ecofeminism to great results, as, for example, in the mentioned work of Val Plumwood (1993). Doing intersectional analysis is closely related to the feminist politics of location, speaking from an experience of oppression. I believe there is work to be done in order to productively transpose intersectional analysis in the naturalcultural context. This is beyond the scope of this thesis, however I do learn from and stand in solidarity with intersectional theory and politics.

1.04. Frihamnen port area. Stockholm, Sweden.

analysis of the present. This type of situatedness is what Michel Foucault called the critical "historical ontology of ourselves" (Foucault, 1984), or an "ontology of the present" (in McHoul & Grace, 1993: 60). In his essay *What is Enlightenment?,* following Kant, Foucault asks for an philosophical-experimental *ethos* of "permanent critique of ourselves" and "of our historical era" (Foucault, 1984: 49). This should not be interpreted as a negative stance of "rejection", instead:

> This philosophical ethos may be characterized as a limit-atittude. .... We have to move beyond the outside-inside alternative; *we have to be at the frontiers*. ... a practical critique that takes the form of a possible transgression. [my emphasis] (ibid.:52)

This approach is in tune with Rosi Braidotti's call for 'critical-creative' posthumanist enterprise (2013). Alternative worlding projects must be situated in the middle of the present, yet diagonally to the hegemonic narratives. In this chapter, while practising a critical ontology of ourselves, I attend to the multiple 'other presents', frontier stories, nonmodern alternative narratives that have emerged over the last 10 to 20 years. For an ecological praxis, it is crucial to embody a "double vision", to "learn from the outsider-within" (Collins, 1986), and perhaps to become an insider-outside the current mode of socio-political organisation.

Recent critical theory suggests that "there is no outside" to the Empire (Hardt and Negri, 2000), to global warming (Morton, 2013), to lawscape (Philippopoulos-Mihalopoulos, 2015). This might be true for modern humans but, from the point of view of more-than-human universe, there is a sheer infinity of outsides, of existential territories inhabited by other beings. There are also many different insides, such as noncapitalist, postcapitalist and nonmodern territories, differently positioned and (dis)connected with centres of capture (Gibson-Graham, 2006; Tsing, 2015). The logic of colonisation can never be fulfilled, it is incessantly seeking for new frontiers of appropriation (Moore, 2015). It is crucial to insist on *immanent heterogeneity of modernity and*

1.05. Falun disused copper mine. Falun, Sweden.

capitalism and *a multiplicity of world-making projects* (human and nonhuman) in order to 'notice' and learn other possibilities of cohabitation (Tsing, 2015). "Kant defines *Aufklärung* [Enlightenment] … as an *Ausgang*, an 'exit', a "way out" (Foucault, 1984:41). For Kant, it is a process of "daring to know" beyond the constraints posed by the *arbitrary limits* of the present. To test the arbitrariness of these limits is a primary task for an ecology oriented towards posthuman justice.

In this first Part of the text, modern dualistic protocols are dealt with under singular headings (nature, environment, object, etc.). However, in each section, the critique draws in other concepts that operate through intersectional and networked patterns. In parallel with this critical ontology, I examine how these ideas were adopted or contested in visual arts. My analytical approach follows concepts "transversally" (Guattari, 2000) across different domains and fields, examining their material effects, especially on other-than-human bodies. Interweaved with a critique of dualistic modernity, I will emphasise a number of alternative practices in arts and thought that shape the transversal field with which I engage.

1.06. London, UK.

1.1. Ecology

1.1.1. Science and/or philosophy

I position my analysis and praxis within the field of ecological thought. Ecology is a key discursive field that re-works the nature-culture divide, and a key conceptual interface through which humans think their situatedness within the environment more broadly. In this section, I will outline a brief history of the concept, explore several ecological philosophies of significance for this research, and see how ecology came to inhabit visual arts discourse.

The acknowledged founder of the term 'ecology' is Ernst Haeckel, the German biologist who defined it in 1866 as "the science of the relations of living organisms to the external world, their habitat, customs, energies, parasites etc." (Worster, in Pepper, 1996: 184). As Bateson later stated, "the unit of survival is organism plus environment" (Bateson, 1972: 489) or in James Gibson's words, "the words animal and environment make an inseparable pair as each term implies the other" (in Miles, 2014: 34). Ecology at its core is the science of relations between organisms, including those of humans with other-than-humans.

Ecology has concurrently developed as a science and as a world-view. Donald Worster in his classic *Nature's Economy* charts this multi-layered meaning:

> the question of whether ecology is primarily a science or a philosophy of interrelatedness has been a persistent identity problem. And the nature of this interdependence is a parallel issue: Is it a system of economic organization or a moral community of mutual tolerance and aid? (Worster, 1994:471)

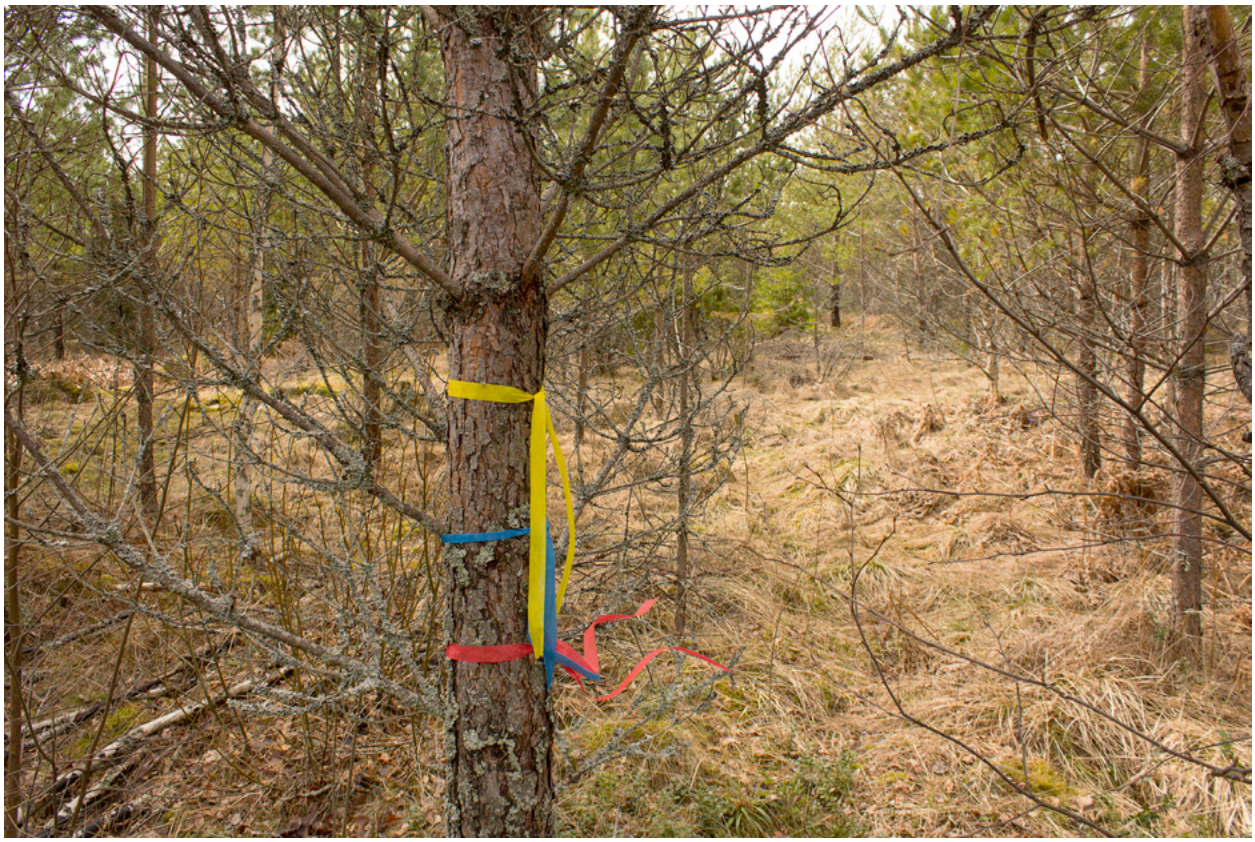
This double meaning neatly encapsulates the ambivalences of society's relations with the extra-human environment. My inquiry is primarily aesthetic and ethico-political, therefore the research will be grounded in environmental or ecological philosophies, rather than eco-science.

1.07. Outskirts of Bor, Serbia.

In philosophical-political sense, ecology "includes all the ways we imagine how we live together. Ecology is profoundly about coexistence" (Morton, 2010: 4). It is a radical questioning of who/what is an organism and who/what is environment (Goodbun, 2011; Morton, 2007). This questioning does not have a definite answer but instead is a *practice* of subject *and* environment. For Gregory Bateson (1979: 152-3), the relationship between two organisms is an "evolution of fitting together", creation of contexts in which the subjects involved change the boundaries. Fundamentally, a relation to other beings is a "practice" or process of "learning the contexts of life" (ibid.: 146). Ecology as a learning practice is thus thoroughly intertwined with politics, science, engineering, agriculture, architecture, economy, and with any and every field of human activity, but it is not reducible to any of them individually. From its origins in the 19th century, ecology developed in close relation with aesthetics, and some of its fundamental ideas came from Romanticism[6].

The expanse of ecological thinking is vast and beyond the scope of this research to review in its entirety. However, it is important to note two important tendencies that reveal the inherent tensions of the term. According to Donald Worster, since its origins in the 19th century, ecology implied two co-present but rather different views of nature—"arcadian" and "imperialistic" (Worster, 1994: 3-55), nature as an order to be preserved or to be managed by instrumental reason. In the 1930's and 1940's, eco-science tended to promote either 'conservation' or 'preservation'. This idea was based on postulating nature as the 'biological order' that humans disturbed (Worster, 1990: 2). In the 1950's and '60s, with the work of Eugene P. Odum and his concept of ecosystems, ecology shifted towards a quantitative analysis of flows of energy (ibid.: 4-6). In the 1970's and 1980's, in relation with chaos and complexity theories, there was a dramatic change in thinking towards a more complex understanding. Donald

6 The rise of ecological thought would have been difficult to imagine without the Romanticist ideal of 'nature', as explored in the poetry of, for example, William Blake or William Wordsworth (Coupe, 2000: 13-15), not to mention the representations of nature in the visual arts. Jonathan Bate, in his pioneering book of literary studies about ecology, speaks of "romantic ecology" (ibid.: 13). Several founding figures of Romanticism stood right at the nexus of science and arts, such as Goethe and Alexander von Humboldt (Pepper, 1996: 200).



1.08. Kemiönsaari, Finland.

Worster describes this shift as a change from an 'ecology of order' towards an 'ecology of chaos' (Worster, 1991), which does not adopt a teleological vision that nature tends towards a steady-state equilibrium. Each of these iterations in eco-science informed eco-philosophies, and vice versa. I avoid mapping scientific findings into ecological philosophy, and focus instead on the discourse of subject and environment.

Ethico-political tension is inscribed in the etymology of the word Haeckel chose for the discipline. 'Ecology' derives from the Greek word *oikos*, meaning 'household' but also 'economy' (Pepper, 1996: 184), or, as in Haeckel's original formulation, 'housekeeping' (in Stauffer 1957: 140-1). 'House' and 'housekeeping' imply a specific organisation of society and labour, class and gender, public and private. From this perspective, ecology goes beyond the economy of nature; *it is a politics of relations*. Ecological discourse is of interest to my research because it imagines more just ways of living together with radically different inhabitants of the earth. What I take from these tensions and debates is the 'transversality' of ecology (Guattari, 2000), a discourses that crosses and troubles the boundaries between the discourses of science, eco-aesthetics, philosophy, law, politics and other disciplines in rare extra-disciplinary conversations.

1.1.2. Radical ecologies

In this section, I review three radical 'green' philosophies of the 20th century, positioned at the nexus of eco-philosophy and environmentalism. These are important forerunners that an ecological praxis in the 21st century has a lot to learn from. This is not to forget other major figures in this rich tradition, but to assert alliances and continuities that bear significance for the current context. What sets deep ecology, social ecology and ecological feminism apart from the large sea of eco-thought is that they in various ways attempt to dismantle the modern logic of dualisms.

1.09. Areca palms. IKEA, London, UK.

Deep ecology, the term coined by the philosopher Arne Naess in 1972, asked for a fundamental change in relations with the natural world rather than a focus on individual issues. The key philosophical significance of Naess's work can be traced in his first two principles of deep ecology: "Rejection of the man-in-environment image in favour of the relational, total-field image" and "biospherical egalitarianism" (in Merchant, 1992: 117). Deep ecology is an elaborate ecological philosophy or 'ecosophy' based on following premises:

> (1) A human being is not a thing in the environment, but a juncture in a relational system without determined boundaries in time and space. (2) The relational system connects humans, as organic systems, with animals, plants, and ecosystems conventionally said to be within or outside the human organism. (Naess, 1989: 79)

Based on these premises, Naess develops an ethical system, where he proposes that humans should 'identify' with other entities and collectives, in order to enlarge the 'circles of interest and care' beyond the human ego. The aim is 'Self-realisation': "The egos develop into selves of greater and greater dimensions, proportional to the extent and depth of our processes of identification" (ibid.:173-4). Another powerful idea of deep ecology is 'biospheric egalitarianism' which means that *all entities have an equal right to thrive*.

Deep ecology has exerted large influence on the environmental movement at large, and inspired scientists such as James Lovelock and Fritjof Capra (in Merchant, 2008:124-5). However, it has also drawn important criticism, especially from ecological feminism, for its 'denial of difference'. Plumwood claims that deep ecology promotes "impartial identification with all particulars, the cosmos" (Plumwood, 1992:181), thereby not attending to the "very specific and local responsibilities of care", and prioritising reason at the expense of "respect, sympathy, care, concern, compassion, gratitude, friendship and responsibility" (ibid:172). Deep ecology opened a new field but perhaps too quickly created a cosmic narrative that uncritically presupposes a world-wide

1.10. Sirogojno, Serbia.

unity instead of explaining it. By doing so, it also postulates an abstract universal human subject and does not focus enough on differences in gender, class, race, ethnicity and structures of oppression. Whilst I admire its ambition, I believe a more situated approach is needed.

Social ecology, and many variants of ecosocialist thought, are one of the rich traditions where ecology meets movements for social justice. Here I engage with one of the key authors in this area, Murray Bookchin. Before proceeding towards Bookchin's vision, it is relevant to briefly summarise its predecessors. Karl Marx and Friedrich Engels were amongst the first critics of the capitalist mode of production and the relationships it establishes with nature.

> Nature is a man's *inorganic* body, that is to say, nature in so far as it is not the human body. Man *lives* from nature, i.e. nature is his *body*, and he must maintain a continuing dialogue with it if he is not to die. [original emphasis] (Marx, in Foster, 2000: 72)

For Marx, man is in a dialectical relationship with nature. However, Marx and Engels also posited that man stands alone from animals and plants because man engages in production: "What [men] are, therefore, coincides with their production, both with *what* they produce and with *how* they produce" (Marx & Engels, in Parsons 2008: 47). Ultimately, Engels asserts that man enters history through labour, thereby articulating a teleological conception of history as "a series of class struggles" against capitalist forces of production. This modernist stance assumes that technological development will perform a "leap from the realm of necessity into the realm of freedom" (Engels, in Parsons, 2008: 50). It is clear that Marx and Engels prioritised society in relation to nature and that the main focus of their analysis lies in creating a new social order[7]. But they planted the early seeds of radical green theory, as they criticised the making of "earth [into] an object of huckstering" (ibid.: 53). Perhaps the most significant

7 Works of, for example, David Bellamy Foster (e.g., 2000) recently re-read Marx's ecological positions, but I believe it would be hard to say that Marx's approach is not anthropocentric and humanist. That being said, his analysis of economic production as perhaps a crucial interface of society with environment is still immensely significant and can be put to work in the present context with requalifications (e.g., Moore, 2015; Wark, 2015).

1.11. Seat of Intercontinental Exchange, Inc., London, UK.

contribution of Marx to green theory is his notion of 'alienation', or the estrangement of the worker from "his/her labour", which is "inseparable from the alienation of human beings from nature, from both their own internal nature and external nature" (Foster, 2000: 72). This is an important early formulation of transversality of subjective and environmental ecologies. Alienation is also materially manifested in the division between countryside and town.

Marxist analysis has been furthered by Critical Theorists of the Frankfurt School, in particular, Adorno and Horkheimer's *Dialectics of Enlightenment*, where they introduce the idea of the 'logic of domination' or 'absolute mastery over nature' as a key project of modern reason (Eckersley, in Merchant, 2008). The Frankfurt School emerged from the critique of instrumental rationality, but eventually claimed that domination was a broader social project that involved social institutions, epistemology and world-view in general. Even though, according to Eckersley, Critical Theory may not have exerted a strong direct influence on the green movement or the New Left in general, Adorno and Horkheimer's postulation of the logic of domination paved the way for at least two key radical ecosophies.

Murray Bookchin's social ecology envisions an 'ecological society' (1980, 1990). Following Marxist and Frankfurt School traditions, Bookchin asserts that the domination of man over nature 'stems' from the domination of human by human (1990: 44-6). By doing so, Bookchin overturns the Marxist narrative that sees social domination as something that emerges from an enterprise to master nature. In Bookchin's view, "'nearly all ecological problems are social problems', not simply or primarily the result of religious, spiritual, or political ideologies" (1990:24). To answer this, "we must examine their social causes and remedy them through social methods" (ibid.). For Bookchin, *the key ecological problem is hierarchy*. He goes at great lengths to describe the emergence of hierarchy from what he calls 'organic societies'. On the other hand, Bookchin sees nature as nonhierarchical. The goal of social ecology is therefore to "extirpate the hierarchical orientation of our psyches, not merely remove the institutions that

1.12. Free newspapers. London, UK.

embody social domination" (1982: 340). Similarly to deep ecologists, Bookchin's writing is permeated with universalist assertions, which are highly contestable.[8] Without accepting the details of Bookchin's analysis, I find of great interest his individuation of nonhierarchy as one of the pre-requisites of ecology. Social ecology is closely aligned in this way with another radical ecology that developed from the mid-1970s on.

In ecological philosophy, the most consistent challenge to dualistic thinking has come from ecological feminism or ecofeminism, and the related but more recent queer ecology. The word 'ecofeminism' was coined by Françoise d'Eaubonne in her *Feminisme ou le mort* in 1974. Since then, ecofeminism has generated a plurality of positions and ideas that with difficulty can be summarised under one heading[9]. One potential but by no means over-arching mission statement of ecofeminism is Karen Warren's:

> 'Ecological feminism' is the name of a variety of different feminist perspectives on the nature of the connections between the domination of women (and other oppressed humans) and the domination of nature. (Warren, 1996:x)

The passage emphasises two key terms—domination and oppression—that are usually seen as concerning only humans. Ecofeminism introduces a major leap into liberatory theory and practice that has perhaps not yet been fully acknowledged. In ecofeminist analysis, patriarchy and capitalism are systems of oppression via the naturalisation of *certain parts of humanity* (especially, women) and *extra-humanity*. What links feminism with ecology is that "women are believed to be closer to nature" (King, in Plant, 1989: 19), which, as a consequence creates "the sort of logic of domination used to justify the

8 Bookchin's assertion of 'uniqueness' of the human species, and the somewhat Promethean claims that "nature *phases* into society" (1990:30) are highly problematic for a non-anthropocentric ecology. One interesting point to mention is also that, apart from higher intelligence, innate creativity, and consciousness, Bookchin also claims that *only humans* have developed domination and hierarchy, which are for him the worst ethico-political features and root of both social and environmental problems.

9 The generative multiplicity of ecofeminism can be observed in some of the classic edited collections: *Healing the Wounds. The Promise of Ecofeminism* (Plant, 1989); *Reweaving the World. The Emergence of Ecofeminism* (Diamond & Orenstein, 1990); *Ecofeminism. Women, Animals, Nature* (Gaard, 1993); *Ecological Feminist Philosophies* (Warrren, 1996).

1.13. Mynydd Parys disused copper mine. Isle of Anglesey, Wales, UK.

domination of humans by gender, racial or ethnic, or class status is also used to justify the domination of nature" (Warren, 1996: 24). This is the key point that ecofeminists share. Methodologies for how to change this state of things, and even what is oppression, vary widely. This is also why Warren insists on 'variety' and 'difference' in her definition of ecofeminism.

The centrality of ecofeminism for this research is its emphasis on difference. This comes from a profound real-life experience of second-wave feminism which was criticised by women of different ethnicities and backgrounds for making sweeping claims about a 'collective subject' woman (Combahee River Collective, 1977). Following a push towards pluralisation, ecofeminists have argued strongly against the 'unity' or 'homogeneity' of many eco-philosophies, insisting on ethics that does not try to reduce the other to the same. Based on this, ecofeminists have expressed serious reservations towards inclusive or rational ethics based on morality and rights, such as Tom Regan's 'animal rights' and Peter Singer's 'animal liberation' proposals[10]. Regan and Singer are criticised for their liberal conception of the moral subject which implies that animals become ethically valuable "in so far as they resemble individual human knowers and experiencers" (Cuomo, 1998: 95). Josephine Donovan and Carol J. Adams argue that "the feminist care ethic thus has rejected abstract, rule-based principles in favour of situational, contextual ethics", dedicating 'attention' to "the individual suffering animal" but also and always attending "to the political and economic systems that are causing the suffering" (2007: 2, 3). Instead of universalist and anthropomorphic arguments, ecofeminists insist on giving value to more local and more particular modes of relationality, such as care,

10 This is not to say that ecofeminists do not share the idea of animal liberation, quite the opposite. Ecofeminist literature abounds with analyses of animal oppression, and proposed vegetarianism and veganism as a political strategy (see, Adams & Donovan, 2007). One of the key ecofeminist anthologies is Greta Gaard's *Ecofeminism. Women, Animals, Nature*. To this, we must add Carol J. Adams founding text *The Sexual Politics of Meat: A Feminist-Vegetarian Critical Theory* (1990). Adams is one of the key figures for the continuity of ecofeminist debate at large. Together with Lori Gruen, they edited a recent anthology *Ecofeminism. Feminist intersections with other animals and the earth* (2014). In their co-authored chapter *Groundwork* they draw a long genealogy of connections between feminism, vegetarianism, veganism and animal rights. The book asks for a critical reappraisal of ecofeminist authors, who, in view of the authors, have been unduly sidelined in animal studies at the expense of Derridean heritage.

1.14. Hyvinkää County, Finland.

empathy, solidarity, friendship and love (e.g., Plumwood, 1993; Cuomo, 1998)[11]. Seeking commonalities and coalitions between various forms of oppression, even across the gaping nature—culture split, is a powerful ethico-political proposal of ecofeminism[12].

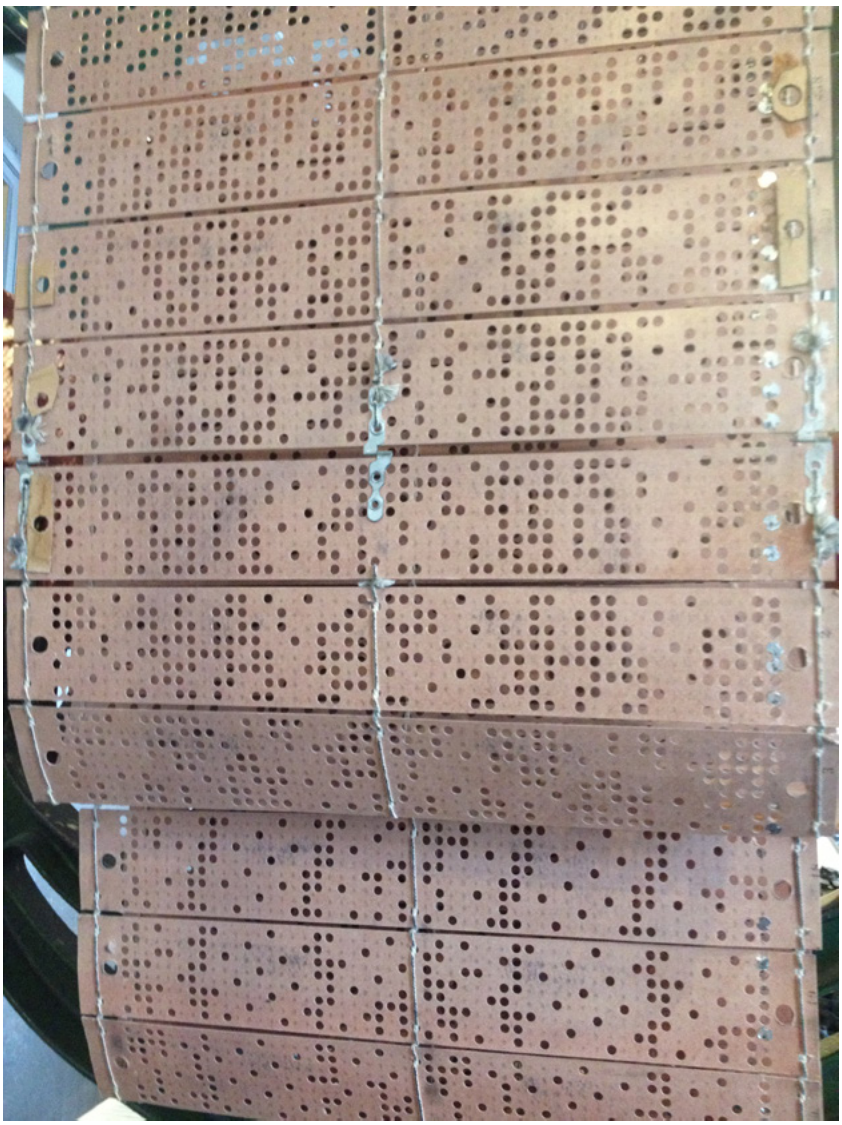
Women's presumed 'closeness' to nature has been a thorny issue for feminism at large, and one of the key political and theoretical struggles of feminism was to break off from this legacy of naturalisation. This process is described by Stacy Alaimo as "feminist theory's flight from nature" (2000: 1-23). In light of its explicit emphasis on the link between women and nature, charges of essentialism have been brought against ecofeminism since its inception, both from other strands of feminism and from the 'greens' at large. From this perspective, ecofeminist intervention seemed to go backwards, towards a more 'primitive' or 'archaic' vision of woman as bound with 'mother nature'[13]. As a response to this, Sturgeon claims that this conceptual linkage is a 'strategic essentialism' that has to do with the socio-political reality of environmental and feminist struggles (1997). However, in the postmodern feminism of the 1990s, biological sex, or nature, was pushed into background in favour of gender politics, where gender was understood mainly as a cultural performance. In this reading, "nature is static and culture is dynamic, making feminist change contingent on the systematic removal of woman from the category of nature" (Alaimo, 2000: 5). This is one of the key factors that led to the relative disappearance of ecofeminism as a force in feminism[14]. Nonetheless, ecofeminist ideas sprouted some important developments, reappearing in new guises in material feminisms and feminist environmental humanities. Authors such as

11 This emphasis on what is perceived as 'feminine' values has led to charges of essentialism from across the postmodern feminism, which in some way proved the ecofeminist point that value systems are skewed to give priority to rational values.

12 The transversal character of ecofeminism can be seen in the books that are also important contributions to postcolonial theory, especially the work of Vandana Shiva (Shiva & Mies, 1993; Shiva, 2005).

13 See numerous contributions on spiritual ecology and the Mother Earth religion in Diamond & Orenstein, 1990; and contributions in section 'Ecofeminist Spirituality' in Plant, 1989. Even the political economical analyses of Maria Mies and Vandana Shiva is based upon the premise that women are 'closer' to nature than men, and that, therefore, they are in a privileged position to struggle for its liberation (1993).

14 The disappearance of the legacy of ecofeminism has recently been challenged (Gaard, 2011; Adams & Gruen, 2014).



1.15. A ‘chain of cards’ in a power loom. Nörkoppings stadsmuseum, Nörkopping.

Catriona Sandilands (1999) and Stacy Alaimo (2000, 2010) have moved ecofeminism beyond fixed identity positioning. As a mode of analysis, a genealogy of ideas and an ethico-political imaginary and ethos, I believe ecofeminism holds enormous potential for posthumanist ecological imaginings.

Another coalitional thread of ecofeminism was envisioned in Greeta Gard's visionary article "Towards a Queer Ecofeminism" (1997). Queer ecology has recently come of age, Catriona Mortimer-Sandilands and Bruce Erickson's (2010) edited collection of investigations into the various relationships between queer and environmental politics, ranging from contributions that seek to destabilise the toxic description of homosexuality as 'against nature', through historical analyses of queer environmentalism, ecocritical readings of queer/nature entanglements in cultural production, up to the formulation of queer ecological politics. Mortimer-Sandilands and Erickson call for "a transgressive and historically relevant critique of dominant pairings of nature and environment with heteronormativity and homophobia" (ibid.:22). Association of queerness with 'unnaturalness' is the flip side of the pairing of women with nature, and attests to the power of nature as a tool for heterenormative and androcentric normalisation. In another text, Mortimer-Sandilands traces the connection between heterenormativity and the parks movement in the U.S. in the late 19th century, whereby parks were considered spaces for affirmation of both masculinity and heterosexuality, whilst also becoming spaces of contestation for queer-identifying people (Mortimer-Sandilands, 2005). Colonisation and imperial conquest have historically enacted forms of sexual and heteronormative oppression. Homoerotic and transgender practices among indigenous populations were among the causes used to justify their subjection, enslavement, or even extermination (Gaard, 1997: 126-9). Nature is thus a site through which identities of both natural others and human others had been determined as inferior. This makes 'nature' a space to be reclaimed and liberated (Sturgeon 1997, Alaimo, 2000). For queer ecologies and ecofeminism, "the redrawing of conceptual boundaries is intimately linked to the transformation of material practices involving both human and more-than-human natures" (Mortimer-Sandilands & Erickson,

1.16. An airport. London, UK.

2010:30). This intersection of analytical impetus and transformative intent is of great relevance to environmentally-engaged art, and it imbues the critical-creative modality of my praxis.

The ecology of difference of ecofeminism can also be read in relation to Félix Guattari's ecosophy. Developed in the 1980's and early 1990's, Guattari identifies the key factor in environmental crisis as what he calls Integrated World Capitalism and its productions of subjectivity (2000). Against this mode of production, Guattari pitches a 'generalised ecology' which operates 'transversally' across 'three ecologies': mental, social and environmental (2000). Guattari calls for a creation of new 'existential territories' through an ethico-politics and eco-art that would invite novel modes of subjectivation. Guattari's analysis of patterns of domination is close to ecofeminism, and is in affinity with the anti-globalisation and environmental justice movements that shaped in 1990's. In *Chaosmosis*, Guattari puts forward the idea of 'virtual ecology', which he describes as a mode of subjectivation that involves "Fluxes, machinic Phylums, existential Territories, incorporeal Universes" (1995: 31). Virtual ecology is an 'ethico-aesthetic paradigm' that traverses mental, social and environmental ecologies:

> Beyond the relations of actualised forces, virtual ecology will not simply attempt to preserve the endangered species of cultural life but equally to engender conditions for the creation and development of unprecedented formations of subjectivity that have never been seen and never felt. This is to say that generalised ecology—or ecosophy—will work as a science of ecosystems, as a bid for political regeneration, and as an ethical, aesthetic and analytic engagement. It will tend to create new systems of valorisation, a new taste for life, a new gentleness between the sexes, generations, ethnic groups, races … (Guattari, 1995: 91-2)

Guattari goes beyond the modern quandaries of nature and culture, and other modern binaries, towards the 'cosmic'. This ethico-aesthetic ecosophy, together with his collaborative work with Gilles Deleuze (1983, 1987, 1994), provides a

1.17. Mining and Smelting Combine Bor. Bor, Serbia.

fertile ground upon which to forge tools for eco-aesthetics and survival in the twenty first century[15]. Deleuze and Guattari's collaborations began as a critique of Freudian psychoanalysis and capitalism, and led them into a 'geophilosophy', or the philosophy of 'becoming-earth'. Their singular and joint projects merge themes of anti-globalisation and environmental justice. Furthermore, their materialist ontology is of a decidedly posthumanist nature, taking into account agency of various forms of life.

A wider understanding of the material modes of appropriation of nature is now available and key critical insights can be gained when these material processes are viewed transversally with the critical histories of modern thought, as deep ecology, social ecology, and ecofeminism have attempted[16]. The radical ecologies exposed here do not stop at analytics, they generate new patterns of thought and, sometimes, political action. This double vision, critical and creative, is an ethos that environmentally-engaged or -concerned art can draw upon and contribute to. Learning from ecofeminism and queer ecologies, contemporary ecological art should aim to concurrently reconfigure realms of meaning and material practices, and to help liberate differences of both humans and other-than-human bodies from the logic of dualism.

1.1.3. Eco-oriented art, a brief history

Art concerned with environment emerged in the same years as environmentalism, usually credited as starting with Rachel Carson's seminal *Silent Spring* in 1962. However, only since the 1990s has it evolved into more

15 The relevance of Deleuze and Guattari's project for ecological thought has taken some time to evolve. The pioneering study of Verena Andermatt Conley *Ecopolitics: The Environment in Poststructuralist Thought* (1997) analysed the implicit and explicit qualities of environmental thought in the work of Deleuze and Guattari. This work opened paths for an ongoing deep engagement with Deleuze and Guattari in ecological key (see Herzogenrath, 2008, 2009), and the ongoing investigations of eco-politics in the writings of Rosi Braidotti (2002, 2006, 2011).

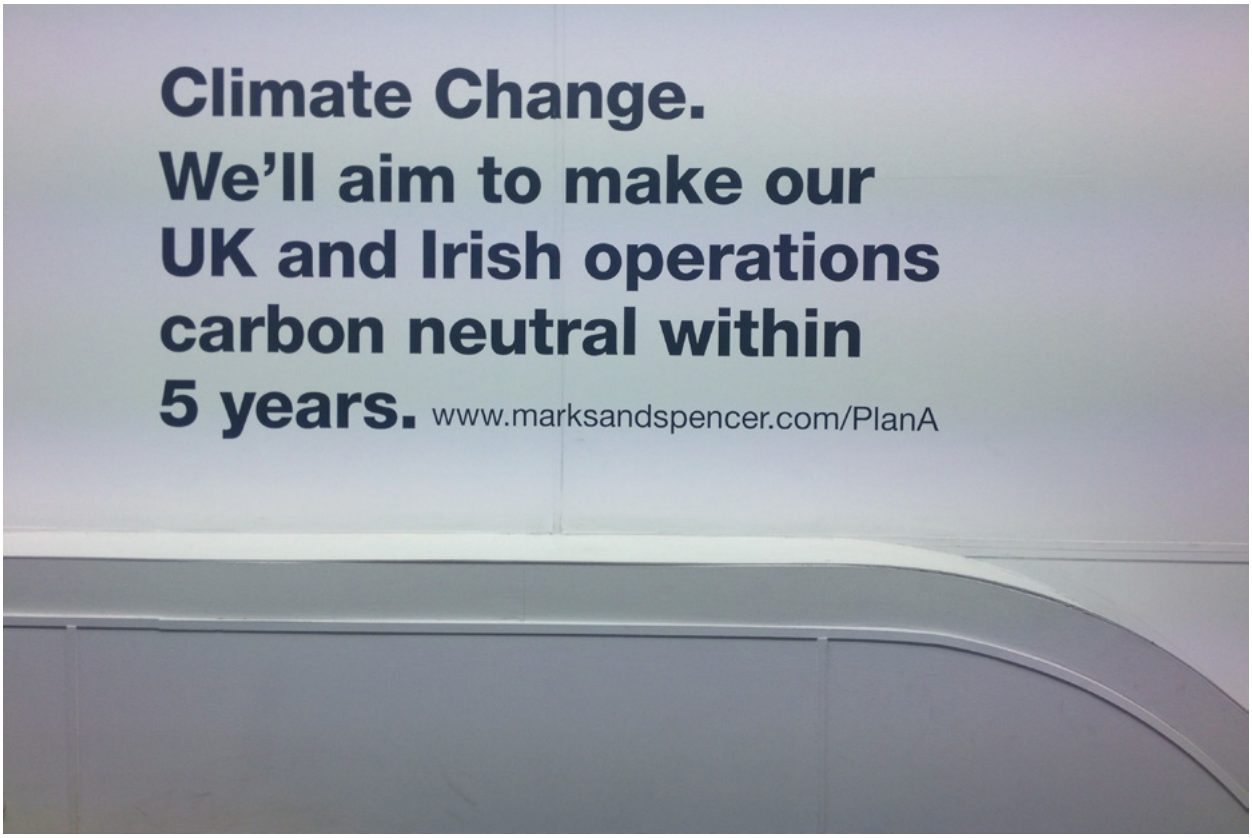
16 The literature that binds the histories of exploitation with environmental justice is growing by the day, but some of the classics in this area are Mies (1986), Mies & Shiva (1993), entire *ouevre* of John Bellamy Foster, Nixon (2011), Klein (2014), Moore (2015), Malm (2016).

1.18. London, UK.

precise definitions such as environmental art, eco-art, sustainable art, ecovention and so on (Bower, 2010). By now it can be said that ecological or eco-art is a firmly established field of work (Kagan, 2011; Weintraub, 2007, 2012; Brown, 2014). To provide a complete survey of all definitions, bearing in mind the differences among various artistic approaches, is not feasible and is perhaps unnecessary. Instead of following pre-established definitions, I propose that there is an artistic working *ethos* that is 'eco-oriented', which means that it is *disposed* or *inclined* towards the 'outside' of culture: nature, environment, animal, nonhuman, etc.

From my standpoint, I would like to underline two important characteristics of eco-oriented art: it is an ethico-politics of practice oriented towards caring, meeting, relating with earth others; it is a modality of work characterised by hybridity and transversality of media and sites. The first point means that eco-oriented art tries to be responsive/responsible towards humans *and* entities that are considered as non belonging to society. Its hybridity is connected with the complex entanglements that environmental issues pose, and thus art involves trans-disciplinary or inter-media elaborations. This section is a general introduction to this *ethos*, whilst the next section will focus more on specific practices.

A short origin story of eco-oriented art could begin with Land Art. Land Artists 'earthworks' initiated a breakaway from the gallery space and, often, from the city to remote locations. They were among the first to exemplify what geographer Ed Soja called a "spatialisation of cultural politics" (in Wallis, 1999: 28). This spatial politics is clearly expressed by Robert Smithson, who wrote that artists "must accept and enter into all of the real problems that confront the ecologist and industrialist" (Smithson, in Flam, 1996: 380). His approach to land was that of 'dialectical landscape', "the democratic dialectic between the sylvan and the industrial" (ibid.: 162). Other artists of the period focused on process, for example, Hans Haacke's ecosystems, Helen and Newton Harrison's *Survival Pieces* and Gustav Metzger's material environments. These works were methodologically responding to cybernetics and systems theories. Performative



1.19. London, UK.

practices ventured into the 'great outdoors', in various bodily engagements with the landscape[17]. In the 1970's environmental art spilled over into public art, community art, participatory art, and many other strategies that since the 1970s worked in what Rosalind Krauss (1979) called 'expanded field'. Some of the features of the works of the period were, in the words of Craig Owens, "appropriation, site-specificity, impermanence, accumulation, discursivity, hybridisation" (Owens, in Wallis, 1999: 38). The environmental artists of the 1970s were important in the developments of socially engaged and public art[18]. Eco-oriented art practices have early on embodied an understanding of transversality between social and environmental ecologies.

The 1992 Earth Summit in Rio de Janeiro marked a "radical rearticulation" of the global environmental movement, which moved from a homeostatic approach towards a movement for environmental justice connecting the North and South (McKee, in Feher, 2007: 552-5). In correspondence with this evolution in environmentalism, Yates McKee argues that goals and aims of environmental art significantly changed. "[T]he task of new environmental art would be to unsettle the self-evidence of 'environment' itself, addressing it as a contingent assemblage of biological, technological, economic and governmental concerns whose boundaries and agencies are perpetually exposed to conflict" (ibid.: 561). This redefinition of 'environment' strongly resonates with ecofeminism and Guattari's concept of 'three ecologies'. I would add that this

17 Walking as performative engagement with landscape was a key tactics in the works of Jan Dibbets, Richard Long, Hamish Fulton, Bas Jan Ader, and Stanley Brouwn. A wave of women artists challenged the cultural and political stereotypes that identified woman with 'nature' by means of performative actions or sculptures in natural environments, such as Mary Beth Edelson, Ana Mendieta and Carolee Schneemann. More than romantic explorations of nature, these practices put in question the regimes of cultural representation of environment.

18 'Eco-oriented' practices have inserted themselves in public spaces to contest the dominant politics, sometimes assuming tones of environmental activism. An iconic example is Agnes Denes' *Wheatfield - A Confrontation* (1982), the project that consisted in planting and harvesting a two-acre field of wheat in downtown Manhattan. Joseph Beuys was one of the key figures in the socially-engaged environmental art with his co-performances involving animals, rich natural symbolism, use of materials, and his lifelong commitment to teaching and political engagement in the nascent Green party of Germany. Following Smithson, land reclamation as artistic and ecological mode of intervention, was theorised and practised by Robert Morris, Nancy Holt, Alan Sonfist and others. Very strong environmental statements/interventions were created by Ant Farm Collective in the 1970's. Mierle Laderman Ukeles confronted the economics and politics of, for example, the waste disposal system of New York City in a series of works ranging from the 1977 until the present. Ukeles's work is especially relevant as it brings together questions of labour and ecology.

1.20. Klovakärrsgruvan. Kemiönsaari, Finland.

historical change in environmentalism corresponds with the public acknowledgement of climate change. From around the time of Rio 1992, ecological art was also put more firmly on the map of the now-globalised visual arts. A series of shows addressed and formalised what ecological art is, such as Barbara Matilsky's *Fragile Ecologies* (1992) at the Queens Museum of Art in New York, which is often considered to be the first exhibition that focused exclusively on ecological art (Spaid, 2002; Demos, 2009). Since 2000 there has been a proliferation of eco-oriented exhibitions[19]. A place of prominence in the genealogy should be given to dOCUMENTA 13 (2012), which is of relevance for the context of this research inasmuch as it institutionalised the shift towards a posthumanist understanding of ecology. It also promoted very close engagement between art and philosophy, to which I will return below. More recently, and in part as a result of an intense transfer of ideas between arts and humanities, there has been an emergence of post-ecological perspectives under the notion of the Anthropocene. I will treat posthumanist and Anthropocene vectors in eco-oriented art in the following sections, here I limit my analysis to several historically established concepts and themes of eco-oriented art.

One of the main topics of eco-oriented art has been 'sustainability' (Hildegard, 2004; Kagan, 2011). There are two different and sometimes connected approaches here: artworks that deal with the problem of sustainability, and artworks that so to say embody sustainable values, methods, and technologies. Spaid Sue's curated show *Ecovention* at Cincinnati is illustrative of the second sense: "the term ecovention (ecology + invention) describes an artist-initiated project that employs an inventive strategy to physically transform a local ecology. … Ecological artists also grapple with this impulse to build a more sustainable future" (Spaid, 2002: 13). In a catalogue of a large survey of

19 A non-exhaustive and evolving list of the major shows: *Ecovention: Current Art to Transform Ecologies* (2002); *Groundworks* (2005); *Beyond Green: Toward a Sustainable Art* (2006); *Still Life: Art, Ecology, and the Politics of Change,* the eighth Sharjah Biennial, (2007); *Weather Report: Art and Climate Change* (2007); *Greenwashing: Environment, Perils, Promises, and Perplexities* (2008); *Green Platform, Art Ecology Sustainability* (2009); *Radical Nature: Art and Architecture for a Changing Planet* (2009); *Earth: Art of a changing world* (2009-10) ; *Undercurrents: Experimental Ecosystems in Recent Art* (2010); *Adaptation: Between Species* (2010); *Dark Optimism* (2013) *Vegetation as a Political Agent* (2014); *7 000 000 000* (EACC, 2014); *The Ocean After Nature* (YBCA, 2016), *Beyond 2°C* (Museum of Contemporary Art Santa Barbara, 2016).

1.21. Garden centre. London, UK.

ecological art at the Barbican in 2009, T.J. Demos claimed that the mission of ecological art is to:

> contribute to the ongoing public engagement with the politics of sustainability, to advance creative proposals for alternative forms of life based on environmental justice in a global framework, and to do so until such art exhibitions can somehow meet the requirements of a just sustainability – these are the imperatives for a contemporary environmental art (Demos, 2009: 28).

More recently, the idea of ecological art as a vehicle of sustainability has given way to more layered cultural and political considerations. As Lorenzo Giusti in the catalogue of *Green Platform* pointed out, the "perspective of 'sustainable art' must leave room for the circulation of a broader ecological culture that, first and foremost, is presented as an ethical-aesthetic shift promoted on an environmental level and, at the same time, on a social level and in terms of mental processes" (in Giusti & Sensini, 2009). In the context of this research, sustainability, even though it has evolved from its original definition in Brundland Report of the World Commission on Environment and Development in 1987, is considered as fundamentally an anthropocentric concept, that does not seek to rework or displace the human—environment separation. Whilst sharing some aspects of the above definitions, imagining a more-than-human ecology implies a different standpoint.

Closer to the concerns of my research are the approaches that T.J. Demos calls "the post-natural condition" (Demos, 2012: 191). More than focusing on issues of sustainability or preservation, these approaches look at how nature is subsumed through "economic calculations and legal regulations" (ibid.: 194) and how they position themselves "into literally new terrain that is not only social but more specifically biopolitical and eco-financial" (ibid.: 197). In the introduction to a special issue of *Third* Text (2013), Demos furthered this critique and outlined a new space for a critical eco-aesthetics, linking it closely with the discipline of political ecology. By combining Guattari's 'three ecologies', Latour's 'politics of nature', Marxist cultural geography and the movement for

1.22. Bor, Serbia.

climate justice, Demos provides a strong transversal conceptual platform for an eco-aesthetics

> Political ecology based on the commitment to environmental sustainability, biodiversity, social justice, human rights, economic equality and democratic practice . . . identifies the overarching criteria for consideration of the artistic practices and critical positions considered in this issue. (Demos, 2013: 7)

In many ways my research overlaps with the concerns outlined above, however my objection to this viewpoint is that it shapes 'criteria' that are inevitably human. In a posthumanist space, as I will go on to claim, the whole vocabulary of ethics and politics should be opened up to re-orientation. Furthermore, in a posthumanist context, ethics and politics become locally accountable and the idea of universal or global criteria cannot easily correspond to the variety of inter-bodily engagements.

An understanding of ecology as an ethical engagement can be found in the exhibition statement of *Undercurrents,* organised by the Whitney Museum of American Art across different institutions and public spaces in New York in 2010.

> Ethical cohabitation—how to live together in a shared environment—is the problem that brings together the sociopolitical, cultural, and ecological within this exhibition. While ostensibly aiming to achieve harmonious balance, such relations are nevertheless inherently antagonistic and always unstable. Situated in this context, how does one choose to act? (Fournier et al., 2010: 9)

The complicated nature of everyday cohabitation with different bodies is where eco-aesthetics emerges from, and *from there*, it moves to analysis of broader social, economic and political patterns and institutions. This viewpoint can be transversally read with Malcolm Miles's formulation of eco-aesthetics:

> a matter of how the world is sensed and understood, and from that of the relations between subjects and objects of perception, and whether what are

1.23. Mona Mine. Isle of Anglesey, Wales, UK.

> taken as objects might themselves be subjects. Perhaps the relation of the subject to other subjects/objects is key to an ecological approach... (Miles, 2014: 3)

The question of the troubling of distinction between subject and object is of interest here. In a similar fashion, Timothy Morton outlines the primary task of eco-aesthetics as being to "undo habitual distinctions between nature and ourselves. It is supposed not just to describe, but also to provide a working model for a dissolving of the difference between subject and object" (Morton, 2007: 63-4). With the undoing of subject—object distinction, background and foreground as aesthetic propositions waver (ibid.: 175). Therefore, what modernly speaking, may have been aesthetic problems, actually have far-ranging socio-political implications, thus contributing to the critiques of the logic of colonisation of natures. A fully ethico-political conceptualisation of eco-aesthetics was proposed by Rasheed Araeen (2010), the founder of journal *Third Text*. Araeen sees artist's ego (subjectivity) as one of the key obstacles to ecological aesthetics. Ecoaesthetics, for Araeen, is a "collective work", "a continuous movement in life's natural processes" (2010). In other words, Araeen tells that art must go "beyond art". Araeen's call comes from the critique of modernist avant-gardes that posited to annul the division between life and art, and, in his words, failed to do so. I do believe that we are facing a similar problem, and that eco-aesthetics needs to be grounded in everyday life, and I recognise the necessity to look for allies, similarly to how Araeen turns to land and those who live on and work the land. However, I do think that this implies also "facing the inhuman" (Barad, 2012), on which I will expand further.

To conclude this section, I clam that located ethico-politics and the undoing of binary structures are key working problems for eco-oriented artistic practice that entangle mental, socio-political and environmental ecologies, as well as extra-human ecologies.

1.24. Stockholm, Sweden.

1.2. Nature

1.2.1. Arcadia and chaos

Nature, as a term, has been philosophically and aesthetically debated since Antiquity. In the words of Adrian Forty, "the distinction between the world created by man—'culture'—and the world in which man exists—'nature'—has been perhaps the single most important mental category ever conceived" (in Goodbun, 2011: 37). Nature determines so many cultural practices that it is not possible to announce a 'post-natural condition'. I propose we stay with this trouble a bit longer.

In a philosophical (metaphysical) sense, Kate Soper argues that "'nature' is the concept through which humanity thinks its difference and specificity. It is the concept of the non-human" (in Coupe, 2000: 125). Nature is that which is 'other' to the human or culture. Because it indicates a radical exteriority, we can see its ramifications in binaries such as city—countryside, *nomos—physis*, citizen—foreigner, polity—wilderness and so on. Although it refers to the 'outside', modern authors have postulated the concept of 'human nature', which is defined as our own natural essence. This puts modern humans in a strange position. On the one hand, nature's bestiality or carnality are despised and should be 'tamed' in order to become cultural beings, while, on the other, nature is sometimes seen as an ideal or a norm, something 'lost' to be 'found' anew. In this context, nature is a problematic signifier that intersects with another powerful dualism, that of mind and the body (Soper, 1995: 91-2). Specific understandings of human nature had been used to support, justify and further various forms of racism, sexism, and speciesism. 'Savages', 'primitives', 'undeveloped', 'barbarians', 'nonmoderns' have been variously construed as living in a 'state of nature'. In these cases, naturalisation supported material practices of inferiorisation, exploitation and submission.

The strange push and pull that operates across internal and external 'nature borders' can be explained through "nurturing and domination metaphors"

1.25. Östergårdsgrufvan. Kemiönsaari, Finland.

(Merchant, 1980: 3). As Francis Bacon asked in his scientific philosophy, in the mind—matter (nature) dualism, nature is to "be put in constraint, molded, and made as it were new by art and the hand of man" (in Merchant, 1980: 169). In Bacon's imagery, nature is an exquisite artisan full of secrets and plots, but this partial admiration turns into a fantasy of dominion, she is a "common harlot" to be "mined", "entered" and "penetrated" (in, ibid.: 167). Soper finds in the identification of nature with woman all the ambiguities that man has in his relation to woman, who is both mother and sexual partner, virgin and lover, thus igniting both attractions and repulsions, incestuous desires and feelings of security and protection (1995: 102-107). Nature is attractive, pure and noble, but that could lead a man to be seduced by the forces of chaos "to lose control".

Ecofeminist historical analysis of Carolyn Merchant (1980) traces transformation of nature from 'organism' into object devoid of agency through the development of a mechanistic world-view in the 16th and 17th centuries. The nature—culture binary was in this context closely related to the political and metaphysical problem of chaos versus order (Merchant, 1980: 128). The intersection of these various lines of dualisms converged on the bodies of hundreds of thousands of women who were persecuted as witches in that period. In an early modern society, obsessed with 'order', science and politics joined forces against natural 'forces of chaos', and the common medium became a mechanistic understanding of the universe, together with a number of ideological pseudo-scientific constructs. Silvia Federici mapped the grids of vices and virtues that essentialised feminine and masculine values (2004). True to the logic of dualism, feminine was here constructed against the imagined norms of the "nature of man" (Federici, 2004). Witchcraft, or magic that considered nature as animated entity, was considered against God, Nature and the State, as well as nascent capitalism (ibid.: 173). Another instance of intersecting dualisms converged in the colonisation of the Americas that was accompanied by sexual projections of notions such as 'virgin', 'mythic wilderness' and 'mysterious zones' onto the land and its inhabitants that could then be 'deflorated', 'penetrated' and finally 'possessed' (Alaimo, 2000: 13-4). These histories are entangled with the word 'nature' and cannot be forgotten or

1.26. Skomvær lighthouse. Skomvær, Røst archipelago, Norway.

erased.

The general turning of nature into 'resource' is still in full swing in the patterns of capitalist appropriation and accumulation. Animals have been variously depicted as mindless beasts or mechanisms, which made their historical and ongoing genocide easier. Jason Moore contends that capitalism is not based on surplus derived from labour relations, but first and foremost on "Cheap Natures: a rising stream of low-cost food, labour-power, energy and raw materials" (ibid.: 70-1).

> Every act of exploitation (of commodified labour-power) therefore depends on an even greater act of appropriation (of unpaid work/energy). Wage-workers are exploited; everyone else, human and extra-human, is appropriated. (ibid.: 72)

Moore singles out that capitalist appropriation works along 'the frontiers' where natures are internalised, whilst "the biosphere internalises the relations of capital" (e.g. Waste) (ibid.:99). The frontiers of appropriation, far from being only out there in the colonies, are ubiquitous. Feminist analyses have disclosed how housework is another 'cheap' or 'free nature'. Child-rearing is qualified as a 'natural' task that women are expected to perform naturally (Firestone, 1970; Mies, 1986; Federici, 2012). Maria Mies (1986) calls this process 'housewifization', the reduction of women's role as outside yet constitutive of capitalism, which is thus correlated to patriarchy. Despite a long history of feminist theory and activism, 'natural' work is still an omnipresent 'frontier' of appropriation.

Given this legacy and reality, should the concept of nature be relegated to the dustbin, an aberration of modern history? Is it possible to work with these and related terms outside of an axiomatics that binds human with polity, and nature with barbarian and beastly?

1.27. Musikhuset. Stockholm, Sweden.

1.2.2. Contesting natures

Recent critical theory has even challenged using the concept of 'nature' as a rallying point of ecological critique and politics. Slavoj Žižek equates the concept to an ideology from which humanity should wake up if it wishes to face the impending environmental catastrophe:

> Humanity has nowhere to retreat ... there is also no Nature qua balanced order of self-reproduction, but only one whose homeostasis is disturbed and derailed by human interventions. Not only is the big Other 'barred;' Nature is also barred. (Žižek, 2008: 56)

Far from plainly dismissing the term, Žižek calls for an end to the understanding of nature as refuge. Humanity is instead nested deeply *inside* the climate crisis.

In different terms, Bruno Latour suggests that a political ecology should "let go of nature" (2004: 9). Latour's position has to be viewed in light of his analysis of modernity where he describes the political/cultural project of modernity as a process of drafting a "Constitution – [which] defines humans and nonhumans, their properties and their relations, their abilities and their groupings" (Latour, 1993: 18). The main problem of modernity is that these categories are not and cannot be clear-cut, because the moderns constantly engage in practices of the creation of mixtures, "hybrids of nature and culture" (ibid.: 11). In this sense, "...the very notion of culture is an artefact created by bracketing Nature off. Cultures – different or universal – do not exist, any more than Nature does. There are only natures-cultures" (ibid.: 104).

Donna Haraway furthers the notion of natures-cultures and gives it a central place in her theorisation of post-modernity. In *A Cyborg Manifesto*, Haraway claims that boundaries between human and animal, organism and machine, and physical and non-physical have become 'leaky' (1991: 151-2). The figure of the 'cyborg' stands for hybridisations of natures and cultures that even humans under techno-scientific capitalism have become. Based on Haraway and

1.28. Seat of NASDAQ OMX Nordic. Frihamnen, Stockholm, Sweden.

Latour's analyses, Sarah Whatmore founds her "hybrid geographies" on a relational ethics "of/for a more than human world". As she describes, "hybridity disturbs the habits that reiterate the cumulative fault-line between human/subjects and non-human/objects" (Whatmore, 2002: 161). Even if the notion of hybrids at first seems to perpetuate the "leaky distinction" between nature and culture, its purpose is not to magically dissolve the dualism, but instead to point at the intricacy of human/nonhuman entanglements.

How nature is discursively constructed in literature and cultural studies has been explored by 'ecocriticism' (Glotfelty and Fromm, 1996; Garrard, 2004), also called 'green studies' (Coupe, 2000). Ecocriticism investigates the implications that cultural representations of 'nature' have for how humans relate to the environment. Lawrence Buell defined ecocriticism as a "study of the relation between literature and environment conducted in a spirit of commitment to environmental praxis" (in Coupe, 2000: 4-5). In the words of Kate Rigby, "ecocritics seek to restore significance to the world beyond the page" (in Iovino & Opperman, 2014: 6). Ecocriticism, through its engagement with cultural productions, refuses nature as a monolithic concept and instead actively deconstructs and destabilises it. Terry Gifford stresses that our "relationship with nature is a matter of unease" (2000: 175), and ecocriticism tries to capture and convey this uneasiness.

Ecocriticism has more recently developed a unique blend of aesthetic criticism and philosophical writing. This evolution is well exemplified through the work of Timothy Morton who weds ecocritical aestethic analysis with a new realist Object Oriented Ontology. Morton criticises 'ecomimesis' or nature writing (2007), and goes on to suggest, similarly to Gifford above, that ecological art needs to "hold the slimy in the view … rather than trying to make pretty or sublime pictures of nature" (ibid.: 157). This is what Morton calls 'ecology without nature' or 'dark ecology', terms denoting a profound imbrication with nonhumans from which there is no escape into 'arcadia' or 'wilderness'. According to Morton, abandoning nature as a concept may lead closer to an environmental ethics which thinks ways of "being together" (Morton, 2010:4)

1.29. West End, London, UK.

with ‘strange strangers’ (ibid.: 38-50; 59-97).

Serenella Iovino and Serpil Opperman describe the movement of ecocriticism “beyond the page” with the term ‘material ecocriticism’, an approach that “examines matter both in texts and as a text” (2014: 2). Jeffrey Jerome Cohen’s edited collections *Animal, Vegetable, Mineral* (2012), *Prismatic Ecology* (2013), and *Elemental Ecocriticism* (2015) are exemplary in this regard. The texts in the above collections cross metaphysical, ethico-political, aesthetic considerations with increased attention to reading the materiality itself, together but also beyond its representations in cultural manifestations. Materialist ecocriticism is characterised by often poetic or experimental style of writing. More than providing theories or critiques, it creates a literary eco-aesthetics unto its own. In this regard, I see this materialist new wave of ecocriticism as a companion in the shared posthumanist conversation.

Having in mind various positions above, I follow Stacy Alaimo, who asserts that nature as a term should be contested and critically adopted as a lead to explore areas in which dualisms are put to separate (2000). In my view, ‘nature’ is a powerful marker to where the processes of exploitation and appropriation have taken or are taking place. If eco-aesthetics is about bringing humans and nonhumans together, ‘nature’ remains an important discursive and material site, not as something to be ‘saved’ or a wilderness to ‘escape to’, but where violence and injustice should be repaired. As far as regards ‘our’ own practices, they are characterised by hybridity, the are never ‘pure’ and they should not be only cultural. Recognising the natural-cultural hybridity does not mean simply adding nature and stirring, it is a mode of taking responsibility and accountability for the mixes in which we participate, and the material effects these exert on bodies. How to create conditions of good life in naturescultures is a matter of responsible praxes, one of which may be of eco-aesthetic sorts.

1.30. Dam in construction. Sweden.

1.2.3. Arts of natures-cultures

In this section I will analyse artistic approaches that propose messier and hybrid troubled figurations of nature. In line with the previous discussion, I will call these practices natural-cultural, modes of hybridisation rather than distinction.

Practices of natures-cultures are different from artistic methodologies that 'import' nature into culture. This linear 'importation' modality can be illustrated by classical projects such as Jannis Kounellis' introduction of 12 horses into the gallery space (1969), or Mark Dion's placement of a cubic yard of jungle into a museum (1992). Olafur Eliasson's installations re-create 'natural' environments and atmospheric conditions 'indoors'. Henrik Håkansson staged a concert of a goldfinch at the Royal Academy of Music (2005) and in his other works, brought plants into museums. These practices are more about *re*-presenting nature in the seat of culture, than accounting for hybridisation.

Similarly, traditions of representation of nature are important modalities of negotiating the outside. The notion of landscape is one of the privileged interfaces in representational mode. In the modern sense, it is a "pictorial way of representing or symbolising surroundings" (Cosgrove & Daniels, 1988) and, as a geographical concept, "a portion of the earth's surface that can be comprehended at a glance" (J.B. Jackson, in Rose, 2002: 456). At the nexus of these points, landscape is a distinct "scopic regime" (Jay, 1988), a "way of seeing" (Thomas, in Wylie, 2007: 68), an epistemology and a politics based on the separation of the seer and the seen[20]. Recent human geography re-examined the notion of landscape and reformulated it in terms of experience, a "way of

20 In the modern context, landscape is a genre, but it is also a medium (Mitchell, 2002:5), a palimpsest of a modern world-view, of an epistemic and power settlement of roles between man and the environment, a "fixed relationship between object and subject, locating the viewer outside of the picture and outside of the relations being depicted" (Thomas, in Wylie, 2007: 68). Landscape in this context is one of the manifestations of modern epistemologies that privilege the eye of control, an 'imperial vision' (Mitchell, 2002), connected with colonial domination of lands and peoples. However, the modern tradition of landscape is not monolithic, and baroque landscape materialises a regime associated with "opacity, unreadability, and indecipherability" (ibid.:17), domain of mystery and secrets. Baroque landscape is a place of uncertainty, and the observer cannot fully comprehend and know all the forces at play. Another iteration of landscape is 'sublime', the aesthetic idea of a nature that surpasses the grasp of the man and puts the observer at an admiring distance.

1.31. London, UK.

being" (Ingold, 2000) or "dwelling" (Wylie, 2007: 179)[21]. The geographical school of thought known as non-representational theory (NRT) reformulates landscape as a site of the contiguous unfurling of more-than-human materiality:

> [an] admirable picture and an uncomfortable bed, something distant and intimate all at once, powerful image and patchy matter . . . Central to this is the tension of presence/absence, and of performing, creating, and perceiving presence. (Rose & Wylie, 2006: 475)

Landscape in this perspective is also a tension between surface and depth, or "fold" (Wylie, 2006). This understanding relies on the notion of the hybrid or posthumanist 'performativity' of matter and humans (e.g., Whatmore, 2002; Harrison, Pile and Thrift, 2004). A performative notion of landscape troubles another important modern epistemic and corporeal binary, the one between seeing and touching. This plurisensory quality of landscape is by definition of a performative nature, and this is how I will try to approach landscape in my own practice.

Photography and film are key landscape media in contemporary discourse. They often re-iterate the separation between the seer and the seen and thus do not directly contribute to non-dualistic modes of experience and thought[22]. However, more immersive approaches can be found in sound field recordings (e.g., Andrea Polli, Elin Øyen Vister, Katie Patterson)[23]. Crucially, sound practices rely on a performative engagement with landscape, either of the artist

21 Dwelling is "a poetic vision of the gathering together of earth and humanity as landscape" (Wylie, 2007: 179). Landscape can thus be seen as 'association' or 'partnership' between people and land, as the suffix *-skap* in its etymology embodies (Spirn, in DeLue and Elkins, 2008: 49).

22 Photographers as varied as Benoit Aquin, Daniel Beltrà, Erika Blumenfeld, Edward Burtynsky, Mitch Epstein, Nadav Kander, David Maisel, depict climate change consequences, industrial landscapes, patterns of the use of land, urban sprawl or decay, and so on.

23 Andrea Polli combines data with audio recording on-site, often in collaboration with scientists. She calls this method 'sonification', and Polli's sonicscapes re-materialise often fragile or remote ecologies (e.g., *Sonic Antarctica*, 2008). Elin Øyen Vister documents soundscapes of the islands in Norway, especially focusing on the sounds of sea birds. Hers is an extended temporal engagement with landscape, where she meets the other-than-humans, and the recordings are testimonies of these cross-species encounters. Katie Paterson's *Vatnajökull (the sound of)* (2007-08) consisted of providing a telephone number which, when dialled, connected the caller to a microphone submerged beneath a glacier in Iceland.

1.32. Parys mine. Mynydd Parys, Isle of Anglesey, Wales, UK.

and sometimes the listener is asked to move through landscape, as in the works of Christina Kubisch and Perdita Phillips[24]. These experimentations are of greatest interest for a posthumanist eco-aesthetics, however I will not dwell on them for long because this investigation is of a fundamentally performative-visual nature. Another approach to the frontier is through staging and inviting interaction, often by using technologies of interactive digital sensing. These projects, by virtue of technology, are often based on programmed feedback loops and thus create micro-ecosystems in which humans are invited to be more reflexive of their interactions with earth others[25]. However, their limitation is an often pre-determined loop, which ends up domesticating what is considered natural by making it accessible and comprehensible. Authors or designers of interactive contexts earn a central place in these transactions, therefore precluding the dissolution of preconceived hierarchical notions.

Of interest for this research are practices that are attendant to otherness, and do not seek to reduce difference. Ariel Guzik has been making instruments to communicate with whales and dolphins in the sea. Guzik attempts to reach out to another species, trying to "cross gazes" with this other "civilization" with which we humans are "in war" (Guzik, 2013). Furthermore, practices of experiencing the landscape via bodily engagement often embody a more-than-

24 In *Security* and *Electrical Walks* (2003 - ongoing), Christina Kubisch equips participants with special headsets that capture electro-magnetic waves omnipresent in the urban environment, but entirely out of our hearing spectrum. Perdita Phillips in *Sixth Shore* (2009-13) captures three different soundscapes embodying different ecological times around Lake Clifton in Western Australia. By recording "thrombolic time", "lake formation and seashore changes", "indigenous cultures", "bird migration and hooded plovers", and "futures", Phillips aims to "articulate competing agents . . . in a way that decentres the current environmental impasse to encourage new solutions to human–nonhuman interactions" (Phillips & Patchett, 2013: 115). Importantly, *Sixth Shore* created an experience that connected landscape with an expanded soundscape by inviting the audience to walk through the actual Lake Clifton landscape with GPS-equipped headphones.

25 Natalie Jeremijenko's *Amphibious Architecture* (2009) is a light installation on the East River and Bronx River that created an interface between fish and humans. "Instead of treating the rivers with a 'do-not-disturb' approach, the project encourages curiosity and engagement" (Shepard, 2011). Jeremijenko does not see any discontinuity between nonhumans, technology, and human societies, but encounters and care should be incited and facilitated (hence, the name of her art/design practice Environmental Health Clinic). Usman Haque's *Natural Fuse* (2009) is a participatory project that created a self-regulatory feedback mechanism connecting plants, humans and light bulbs. If some participants spent more energy, plants would get killed or, literally, fused. The project thus worked with humans' behaviour patterns by creating a systemic dependency of plants and humans mediated by technology. There are numerous other projects of human-nonhuman interaction.

1.33. Mäntsäla municipality, Finland.

human ethics, as in the works of, for example, Anette Arlander[26] or Laura Harrington[27]. These are performative modes of becoming-earth in the tradition of Ana Mendieta, where landscape is a meeting place of human and non-human *and* a mode of documentation or representation.

Deconstruction of the naturalness of nature has been one of the effects of bioart. According to one definition, "bioart is a new inter-disciplinary and inter-art paradigm that uses organic substance as the material of art, and methods of bio-technology and medicine as instruments of expression" (Beloff, Berger & Haapoja, 2013:6). Bioarts (in plural) are at the vanguard of hybridising the boundaries of natures and cultures from both sides of the binary, and are one of the most dynamic fields of ecological art (Eduardo Kac, Oron Catts & Ionat Zurr, Brendon Ballengée)[28]. While bioarts have commonly been associated with the laboratory, in more recent developments they move into fieldwork, into the landscape, as, for example, in the work of Bioartsociety (see, Beloff, Berger & Haapoja, 2013). The work of Critical Art Ensemble turns biotechnology into a 'tactical' media, a socially engaged practice intent on raising public awareness about the potential and dangers of these technologies, as well as intervening directly into its infrastructures and protocols. A number of research/exhibition initiatives have explored nature-culture interfaces of sciences, for example, the

26 Annette Arlander performs often multi-year performances in which she spends extended intervals of time in one spot where she returns. For example, Arlander sat "on a rock in the landscape, 13 times during a day and a night, with two-hour intervals" (*Days and Nights,* 2003-). In another ongoing multi-year performances she re-visits the same spot approximately once a week over the course of a year (*Animal Years*, 2002-).

27 Laura Harrington combines video and sound into depictions of landscape with attention to minute details and changes (e.g., *Liveliest of Elements*, 2015). Importantly, Harrington's practice consists in re-visitations of the same location over extended time periods in order to sense deeper times of living processes.

28 Eduardo Kac's *GFP Bunny* (2000) is one of the early examples of artistic production of genetically modified organisms, as it consisted "in the creation of a green fluorescent rabbit, the public dialogue generated by the project, and the social integration of the rabbit" (Kac, 2000). Kac theorised and practically introduced "transgenic art", which uses genetic engineering "to create unique living beings" (ibid.). Oron Catts and Ionat Zurr grew *Victimless Leather* (2004-13), a leather grew from the stem cells of a mouse. This project, beyond its scientific adventurousness, raised ethical questions about leather industry. In *Disembodied Cuisine* (2003), Catts and Zurr grew victimless steak from frog cells without killing the animals. In Brendon Ballengée's work, the approach is similar, but the results are the opposite. Ballengée confronts the current ecological crisis of species extinction with a practice of "species reclamation", bio-genetic recreation of species which are deemed extinct, thereby reverting the idea of evolution as a one-way history.

1.34. Hyvinkää, Finland.

Center for PostNatural History at Pittsburgh[29]. These are most interesting boundary interventions, and merit further exploration. The approach of this research is however oriented more towards an embodied practice.

Taking up the tradition of environmental art as remediation, a number of artists work with plant-growing to propose effective real-scale nature-cultures (e.g. Nils Norman, Camilla Berner)[30]. Gardening initiatives complicate the divisions between city and countryside, and sometimes patterns of labour, but are of less relevance for this research. In the avant-garde spirit of rural eco-communes, small-scale, often artist- or curator-run institutions rehearse nature-culture entanglements through 'off-the-grid' clusters that combine alternative agricultural practices, sustainable energy sources, and artistic initiatives[31]. Residencies in extra-urban locations have their specific issues of artist-as-outsider, social and environmental sustainability, but they provide unique formats for artists, still an urban majority, to expand the temporality of their work, something which is necessary for deeper engagements with nonhuman modes of living.

In recent eco-oriented art, nature is reconcieved not as an outsider, but as a complex terrain of struggle or cohabitation of agencies, human and other-than-

29 Center for PostNatural History at Pittsburgh has a mission to "acquire, interpret, and provide access to a collection of living, preserved, and documented organisms of postnatural origin". This research and exhibition practice studies "organisms that have been *intentionally* and *heritably* altered by humans", thus trying to fill the gap often left void by natural history museums.

30 Just a couple of illustrative examples in this ever-growing constellation. An important work is Mel Chin's *Revival Field* (1991-ongoing), where, on a toxic piece of land in Minnesota, Chin and his assistants adopted plants to extricate heavy metals from the soil. (This work of hybridisation can be put in perspective with Alan Sonfist's *Time Landscape* (1965-78-ongoing) which preserves a plot of land in lower Manhattan in the state of wilderness.) Nils Norman's works consist of proposals for permacultural developments of urban spaces, or radical design solutions, such as *Geocruiser* (2001-02), a greenhouse/truck, a piece of 'mobile propaganda' for alternative living. Similarly, Camilla Berner revitalised an empty lot in downtown Copenhagen as a wild plants garden in her *Black Box Garden* (2011). In this and other projects, Berner creates seed banks and plant collections.

31 Among many, some initiatives that I find important in Europe are, Kultivator in Sweden, Mustarinda in Finland, Nida Art Colony in Lithuania and Røst A.I.R. in Norway. In line with earlier avant-garde or 'back-to-the-land' initiatives, these institutions, or communities of practice, strive to erase the distinction between art and everyday life with focus on ecological practices. What, in my view, is distinguishing from earlier practices is that these organisations are now regionally and sometimes globally networked, using artistic channels to connect to other similar initiatives. One example is EU-funded project Frontiers in Retreat (2013-18), a network of eight 'remote' residencies in seven different countries.

1.35. Surroundings of Bor, Serbia.

human. Compared to the forerunners of the 20th century, there has been a marked move towards a more transversal engagement between disciplines, media and sites[32]. However, this does not mean that the role of the 'human' is decentred or unsettled. As I will argue in the following chapters, human must become other than itself for a more-than-human ecology to emerge. The relevance of nature for this research is a material-discursive area of passage to be worked with carefully, with an intense affective engagement and a renewed art of "noticing" (Tsing, 2015). It does not always mean traveling to the edges of (post-)industrial civilisation in the spirit of Romantic tradition. Nature-culture rifts and hybrids happen everywhere, in urban piazzas, research labs, as well as on the insides of our bodies. Aesthetic practices are modes of re-imagining these intimate and complicated cohabitations.

32 I avoid using the word 'complexity' here, since it is in my view, in this context, an ideologically charged notion. In ecological discourse it is sometimes used as a category towards which culture or art practices need to strive towards (e.g., in philosophy of deep ecology, or in the arts context, in Kagan's (2012) eco-art proposal). I believe that engagement always needs to be more careful and more local, by which complexity is not excluded but is not a feature that needs to be a final goal.

1.36. London, UK.

1.3. Environment

1.3.1. Centre / surroundings

Environment is a common denominator for a number of nature—culture interfaces and protocols, for example, environmental law, environmental ethics, environmental art, and environmentalism as a social movement. Environment is distinct from nature, it is a simultaneously narrower and broader concept. The distinction has been summarised in these terms:

> The term 'environment' in [a] narrow sense implies an environment for some creature or collection of creatures, whether plant or animal. Here, an 'environment' is 'environment' for something. But we also frequently use the term … to refer to the whole of the natural world—from ecosystem to biosphere—within which human beings and all other parts of the plant and the animal world have their being. (Connelly *et al.*, 2012: 20)

Environment is often equated with nature, however, it carries with itself a number of specific causal and onto-epistemic presumptions. As Andreas Philippopoulos-Mihalopolous argues, etymologically speaking, "e*nvironment* comes from the word *environs*, in its turn coming from the French words *en* ('in') and *virer* ('to turn). This implies an inside that stands erect and an outside that surrounds this inside and turns around it" (2011: 11). Understood in this sense, environment places the human at the centre, maintaining a 'centralised geography' like the pre-Copernican universe.

The word has been one of the preferred concepts of the environmental movement from the 1960s on. This is no place to discuss the specifics of how 'environment' has been conceptualised through a history of the movement, but it is of interest to point out some recent developments. The notion of environmentalism at large was criticised by Michaell Shellenberger and Ted Nordhaus in their provocative article 'The Death of Environmentalism: Global Warming Politics in a Post-Environmental World' in 2004. In a subsequent interview, they claimed that the notion of 'environment' is antithetical to the

1.37. Dracaena Marginata (dragon trees). IKEA, London, UK.

goals of the green movement:

> what we include and exclude in the category of 'the environment' is utterly arbitrary. The human animal is as much a part of the environment as a mahogany tree or a raindrop. Defining humans as outside of the environment is scientifically specious and politically suicidal. But if humans are part of the environment then the concept of the environment is meaningless. (in Andrews, 2006)

What Shellenberger and Nordhaus are referring to is the problematic ways in which the word has been put to use in public and political discourse. Erik Swyngedouw analysed how environmentalism contributed to a 'post-political' context, contributing to "consensualise climate change" through a projection of a common foe that "requires dealing with" (ibid.: 269). In this case, paradoxically, the environment becomes an enemy, a danger looming at the horizon, a constitutive mechanism of 'risk society'. In this analysis, environment as something 'out there' can be instrumentalised to externalise what is most intimately bound with human actions, especially operations of capitalist production. Swyngedouw proposes a reverse move, it "is not any longer about bringing environmental issues into the domain of politics … but rather how to bring the political into the environment" (ibid.: 254-5). This is a move towards the edges or the borders of the 'great outdoors', not to cross the threshold into some ideal outside (of capitalism, of modernity, or so), but to deconstruct the mechanisms by which the borders are erected and reproduced. Since 2011, things have changed somewhat, and environmentalism has reinvigorated under the banner of climate change (see below). However even recently, Bill McKibben, a prominent figure in the movement, wrote that "we're under attack from climate change" and we need to "mobilise" like in times of war (2016), thereby reasserting a certain discontinuity between humanity and environment.

1.38. Frihamnen, Stockholm, Sweden.

1.3.2. System/environment cybernetics

The erratic history of cybernetics is something of a doppelgänger to the development of ecology throughout the 20th century, as cybernetics has exerted significant influence on ecological thought. What is of interest here is how the cybernetic binary of system—environment may be an alternative to the nature—culture binary, and what the promises and forfeits of this approach are.

The Macy Conferences held in New York 1946-53, were a cross-disciplinary hotbed of the 'first-order cybernetics' (Capra, 1996: 64-5; Hayles, 1999: 50-83). Drawing on the early information theory of Claude Shannon, a group of researchers, most prominently Heinz von Foerster, John von Neumann, and Norbert Wiener, treated biological and technological systems in terms of feedback loops based on the circulation of information. In an important sense, cybernetics is perhaps the first modern science that tried to work horizontally across the division between nature and culture. At the same time, its peculiar mingling of science with engineering applications produced highly problematic ethico-political outcomes. First-order cybernetics was conceived as a 'science of control' or a science of 'steering' (taking from the Greek origin of the word *kybernetike* which stands for 'governance')[33]. Cybernetics attempted not only to understand biological systems better, but to create informational machines based on biological systems. This transposition was achieved by adopting an ontology based on information, in which it does not *a priori* matter if the system in question is a human body, an animal, or a computer. According to Shannon's information theory, information stands for "pattern, not a presence", the distinction between "signal" and "noise" (Hayles, 1999: 18). In Bateson's more general description, information is "a difference that makes difference" (1972: 315). In line with the pre-eminence of mathematicians in cybernetic circles, information was understood qualitatively, and cybernetic loops were 'open

33 As in the title of the founding book of the discipline, authored by Norbert Wiener, cybernetics was the study of "control and communication in the animal and the machine" (1948). Cybernetics can be said to be a forebear of modern-day management theory. This cross-over from systems theory to cybernetic management and politics is best illustrated in the life and work of Stafford Beer (Pickering, 2010: 256-61).

1.39. City of London, London, UK.

systems' that operated based on inputs and outputs, following Ludwig von Bertallanfy's general systems theory. The goal of the system was to reach a dynamic homeostatic equilibrium (a famous example in this sense was thermostat, which adapts to fluctuations in temperature, yet is a closed loop).

The passage towards a 'new cybernetics' is exemplified by the work of Gregory Bateson. In a joint interview with Margaret Mead, Bateson positioned the observer inside the observed system: "essentially your ecosystem, your organism-plus-environment, is to be considered as a single circuit" (in Brand, 1976). In what would then come to be called 'second-order cybernetics', the key proponents were biologists, which also markedly changed the emphasis. Biologists Humberto Maturana and Francisco Varela explained life through the key notion of 'autopoiesis', which stands for 'self-production' (1992: 43). Organisation of an autopoietic system consists of a boundary-making process and the production of its own components (ibid.:46-7). Systems "constitute and maintain themselves by creating and maintaining a difference from their environment, and they use their boundaries to regulate this difference" (Luhmann, in ibid.:144). A system selects its own "system-states" based on information that is generated *within the system.* Put differently, "systems or substances do not communicate with their environments ... systems only relate to themselves". (Luhmann, in ibid.: 148). A system "can see only what it can see" (Luhmann, in ibid.: 160). In Maturana and Varela's autopoetic cybernetics there is no such thing as information in the sense of a message transmitted among two entities: "Information, *sensu strictu*, does not exist" (in Hayles, 1999: 155). However, systems are dependent on other systems. Whilst they are organisationally closed, systems are 'selectively open' to their environments in terms of flows of energy and matter. The way systems survive is by maintaining organisation, which is linked to questions of the autonomy and individuality of the system. Systems engage in 'structural coupling' with other systems, which is "a history of recurrent interactions leading to the structural congruence between two (or more) systems" (Maturana & Varela, 1992: 75).

The key concern of autopoietic theory was how systems maintain boundaries,

1.40. Post office. Belgrade, Serbia.

which reveals a bias towards self-organisation and autonomy of a system over matter. These binaries are somewhat understandable from the disciplinary positions of Maturana and Varela, but they betray a hierarchical world-view. Maturana and Varela held that human societies are superior to other biological organisations because the components in them achieve the highest degree of autonomy (1992: 199). Niklas Luhmann's theory of self-referential systems (1995) attempts to extend general systems theory to explain complex social systems. Luhmann's elaboration of autopoietic theory creates a more complicated account of system/environment inter-relations and 'interpenetrations'. However, in Luhmann's system, there is no domination, as the systems are fundamentally self-descriptive. Though Luhmann's theory has been productively used in ecological thought, I find its basic postulates problematic in view of posthumanist justice.

A more dynamic conception of environment is articulated in Gregory Bateson's ecosophy. For Bateson, contrary to Maturana and Varela, "learning the contexts of life" is a process of learning through inter-action with other organisms and is a key practice of organisms. "Cross-species communication is always a sequence of contexts of learning in which each species is continually being corrected as to the nature of each previous context" (Bateson, 1979: 118). Following the cybernetic tradition, Bateson sees this 'continuous correction' as a 'sequence' of feedback loops which happen within the context. In this context, informational boundaries of entities may change through interaction and "an evolution of fitting together" (Bateson, 1979: 138) may take place. Bateson's informational analysis is based on an enlarged conception of mind, the so-called 'immanent mind':

> Mind is a necessary, an inevitable function of the appropriate complexity, wherever that complexity occurs. ... a redwood forest or a coral reef with its aggregate of organisms interlocking in their relationships has the necessary general structure. (Bateson, 1972: 488)

For Bateson, ecology is fundamentally an issue of epistemology, an 'ecology of

1.41. Mining and Smelting Combine Bor. Bor, Serbia.

ideas'. Bad and good ideas correspond to the larger interests of 'the unit of mind' an organism is partaking in:

> The unit of survival is *organism* plus *environment*. .... a very strange and surprising identity emerges: *the unit of evolutionary survival turns out to be identical with the unit of mind*. [original emphasis] (ibid.: 489)

Bateson was in his many lectures vocal in denouncing the 'epistemological fallacies' of the modern mind, and asked for a re-organisation of society to adapt better to the larger immanent mind. His is a powerful denouncement of the logic of dualism, however, it privileges one of the superior sides of modern dualisms i.e. rationality, mind, organisation. Guattari, who was an admirer of Bateson's work, points out that mental ecology is one of at least three ecologies, the other ones being social and environmental. These other ecologies, I believe, need not operate through the logics of mind and information.

Perhaps the most lasting impact of cybernetics has been the establishment of *an ontology of information*. Information is one of the less obvious yet crucial modern dualisms. Even outside of its binary instantiations in the digital, information in cybernetic tradition performs a cut between signal and noise, between what matters for a system and what does not. Even though cybernetics recognised a plurality of environments, they were all ultimately subsumed under the same operative logic thereby excluding a possible diversity of ontologies. Ontology of information has, thanks to the work of cyberneticians, permeated the social field as few other concepts have, impacting a number of sciences and models of social organisation. Attempts to reduce the world to information is an ongoing project of modernity (e.g., cartographic logic), but cybernetics has upped the game by claiming that *life operates informationally*. Through these claims, informational ontology came to shape the groundwork for a generalised 'society of control' which operates according to the 'numerical language' of codes (Deleuze, 1992). French radical collective Tiqqun may be right to say that the 'cybernetic proposal' (2001) has, through the spread of new

1.42. Stockholm, Sweden.

technologies of information and communication, turned into a program of total dominion. My aim here is not to dismiss information technologies, which have brought numerous scientific and social benefits, but to draw attention to the fact that information, when taken as ontology, historically gave support to a generalised project of informatisation or, more recently, 'datification' of the environment. Each bit of information is based on a procedure of exclusion, and this is something that I believe a more-than-human ecology should explore critically to see who/what is included and excluded. Ultimately, with its emphasis on epistemology, cybernetics institutes a representationalist ontology, a dualism between representation and represented that may not be open to different types of more-than-human collectivity.

Cybernetics of information has exerted considerable influence in visual arts, and continues to be a working method in today's eco-arts. Perhaps it would be impossible to imagine the contemporary society without information, and this is not my goal. My interest lies in accounting especially for what is *beyond (or outside) information*. This does not amount to refuting technology, but to re-imagining other, more hybrid and open, ways of acting with a more-than-human world.

1.3.3. Place and site-specificity

Important interfaces to describe the human—environment relation are notions of 'place', 'location' and 'site'. Geography, ecology and art meet in these notions. Site-specificity is a key component of eco-aesthetics, and in this section I will show how this notion stands in relation to the logic of dualism and with the contemporary globalised networks of information and capital.

In its geographical definition, place is "a meaningful location" (Cresswell, 2004: 7). Location stands to indicate a geographical position, a locale for "the material setting … the actual shape of place" (ibid.), and sense of place is "the subjective

1.43. Zlot cave. Serbia.

and emotional attachment people have to place" (ibid.). Place thus presupposes a physical location, and the presence of humans who provide this location with (social) meaning.

The above understanding of place as a grounded "locale" has been destabilised by the affirmation of 'postmodern space' (Soja, 1989), the space of global economic exchanges that creates 'time-space compressions' (Harvey, 1989). As Fredric Jameson exemplified in his analysis of the architectural experience of Bonaventure Hotel in Los Angeles, postmodern spatiality is a feeling of being 'out of place', "individual subjects [are inserted] into a multidimensional set of radically discontinuous realities" (Jameson, 1991: 413). This is a globalising space characterised by informatic–financial networks that radiate from 'global cities' (Sassen, 2007) and jointly constitute the 'space of flows' (Castells 1996: 442-446)[34]. In these readings, place is often pitched as the opposite of global networks, and is seen as a terrain of resistance. However, as David Harvey insists, by criticising Heidegger's concept of 'dwelling', a place can also mean an exclusionary "place identity" (1996: 295-99), which performs an insider—outsider separation. Different conceptions of place are perhaps needed to understand and work within the spatio-temporalities of postmodernity.

Michel de Certeau provides a cue of how to overcome place—network oppositionality:

> A place (*lieu)* is the order (of whatever kind) in accord with which elements are distributed in relationships of coexistence. It thus excludes the possibility of two things being in the same location (*place*). (de Certeau, 1984: 117)

De Certau provides a topographical reading of place based on a linear Euclidean geometry in which things cannot be juxtaposed. However, a place is dynamic, as it is never finally determined. Social narratives and 'spatial practices' are constantly engaging in processes of either "marking out boundaries" (ibid.: 122),

34 The key economic tension, individuated by Karl Marx, between city and countryside is more relevant than ever in postmodern space. Popular discourse has in recent years been flooded by the 'age of cities' ideologies, and the statistics revealing that the majority of global population lives in cities.

1.44. London, UK.

or creating points of contact or 'bridges' (ibid.: 126). A truly networked understanding of space can be found in Doreen Massey's 'global sense of place', the place as 'a meeting', 'a process' (Massey, 1994:154). Places "do not have boundaries in the sense of divisions which frame simple enclosures" (ibid.: 155), they are changing and permeable. Importantly, the links with the 'outside' constitute the place too. Massey claims that a place cannot exist in a vacuum or isolation; a sense of place "can only be constructed by linking that place to places beyond" (ibid.: 156). This is an evolution from place as opposed to the outside, towards an understanding of place as part of a network. Place is where physical location converges with a collective imaginary, a 'sense' of belonging, dwelling, cohabitation. Thus, place implies a politics of hospitality or of fencing off. However, all of the above notions have a distinct anthropocentric ring, as their meaning is created primarily through the presence, action and perceptions of humans.

'Site-specific' practice is one of the key historical attributes of eco-aesthetics, inasmuch as it implies working in the field or on ground. Since its inception, site has had a potentially networked dynamic. Robert Smithson laid out the dialectic of 'Site/Non-Site' to describe the tension between the location of his artwork (outdoors) and its representation (in the gallery). Non-Site functions as a "three dimensional logical picture", a 'dimensional metaphor' of the Site (Smithson, 1968). For Smithson, site is permeable and works in tandem with its (displaced) representation, prefiguring the dynamics of networked communication and global flows. More recently, James Meyer reworked this model into a distinction between 'literal site' and 'functional site' (Meyer, in Suderburg, 2000: 24). The literal site is a specific location, a topographic space. The functional site, on the other hand, is "a process, an operation occurring between sites, a mapping of institutional and textual filiations and the bodies that move between them. … It is an informational site" (ibid.: 25). One step further, Miwon Kwon traces the "unhinging of site specificity" whereby site is transformed "from a physical location … to a discursive vector—ungrounded, fluid, virtual" (Kwon, 2002: 29-30). According to Kwon, "it is not a matter of choosing sides … between space and place" (2002:166), and the task of site-oriented art is one of "demarcating

1.45. Seat of Sirogojno Company. Sirogojno, Serbia.

the *relational specificity* ... addressing the differences of adjacencies and distances *between* one thing, one person, one place, one thought, one fragment *next* to another, rather than invoking equivalences via one thing *after* another" (ibid.). For Kwon, site is a relational place, where "local encounters [can be turned] into long-term commitments" (ibid.). This is a topological view with a relational sensibility useful for eco-aesthetics. Location is uprooted into an ecology of meetings that produce space.

As a virtual extension or opponent of location stands 'network', a word which is often used to describe ecology. Physicist and ecologist Fritjof Capra explains a paradigm shift that ecological science brings in these terms:

> Nature is seen as an interconnected, dynamic web of relationships ... This web of relationships is described in terms of a corresponding network of concepts and models, none of which is any more fundamental than others. (Capra, in Merchant, 2008: 369).

If ecology is thus assumed to be a network ontology, Capra implies that an ecological epistemology must be correspondingly that of a network. The emergence of systems science has very important affinities with network paradigm, and both are close to ecological science. On the other hand, network also stands for technical infrastructures or organisational structures (Latour, 2005a: 139), or a physical organisation of space, a labyrinth (Eco, in Larsen, 2014: 30-1). Network is commonly represented in terms of tubes, wires, corridors, etc. Network as ontological and epistemological paradigm is often claimed to trouble or supersede modern thinking. However, before assuming that network is an alternative to mechanistic and dualistic thought, I wish to dwell on this for a while.

In the 1960s, the U.S. Ministry of Defense developed a packet switching information technology under the code name of the Advanced Research Projects Agency Network (ARPANET). In 1969, ARPANET, the forefather of the Internet, went online. According to Stephen J. Lukasik, then involved with the

1.46. Mäntsälä municipality, Finland.

project:

> The goal was to exploit new computer technologies to meet the needs of military *command and control* against nuclear threats, achieve *survivable control* of US nuclear forces, and improve military *tactical and management decision making*. Although not central to the decision to pursue networking, it was recognized that these capabilities were common to nondefense needs. [my emphasis] (Lukasik, 2011: 4)

Command and control, management and decision making are expressions closely related to the first-order cybernetics vocabulary. The development of the internet shares common lineage with cybernetics, both scientifically (information science) but also ideologically (control, management)[35]. Innovations in information architecture soon spilled into business organisation, and by the 1990s, Manuel Castells describes the 'network society' as modelled according to the information architecture, constituted of layers of 'circuits of electronic exchanges', 'nodes and hubs' (global cities, Export Processing Zones, ports, etc.), and "spatial organisation of the dominant, managerial elites" (Castells, 1996). For Luc Boltanski and Ève Chiapello, the main feature of 'the new spirit of capitalism' is its 'connexionism' or 'networkedness' (2005).

Alexander Galloway outlines three types of network organisation: centralised, decentralised, and distributed (2004). "Centralised networks are hierarchical. They operate with a single authoritative hub" (ibid.:30). An example of a centralised network may be Hobbes's Leviathan, a state with a sovereign at its head. "In a decentralised network, instead of one hub there are many hubs, each with its own array of dependent nodes." (ibid.: 31) Galloway claims that "decentralized networks are the most common diagram of the modern era" (ibid.). London Underground, for example, is a decentralised network. Lastly, a distributed network is a network with "no central hubs and no radial nodes. Instead each entity in the distributed network is an autonomous agent" (ibid.:

35 As the more recent developments have shown, for example, 'internet freedom' and 'free/opensource' movements, information technologies need not be based on military principle. "Information wants to be free", the slogan of technology activists, in my view better represents the essence of information technology.

1.47. Stenholmsgruvan. Kemiönsaari, Finland.

33). Galloway cites the internet as a distributed network, and compares its different spatiality and freedom to the figure of 'rhizome', as theorised by Deleuze and Guattari.

Transposing a biological phenomenon of rhizome as an underground web of roots, DG use this term to oppose modernist models of knowledge based on a tree. The first principle of a rhizome is that of "connection and heterogeneity: any point of a rhizome can be connected to anything other, and must be" (DG, 1987: 7). The second principle, that of multiplicity, discards the idea of network as a structure, a rhizome "is composed not of units but of dimensions, or rather directions in motion" (ibid.: 21) A rhizome is an event, a performance. This type of network does not circulate information, but connects heterogeneous bodies through conjunctions[36]. "There are no points or positions in a rhizome, such as those found in a structure, tree, or root. There are only lines." (ibid.:8) Rhizome is a network in motion.

Information networks of the day are based on protocols (TCP/IP) that *exchange* packets of information among nodes with specific address (identity). Differently from a rhizome, points based on a fixed address are crucial for the internet. Following DG, media theorist Franco 'Bifo' Berardi levels a critique of connective paradigm of contemporary informational capitalism:

> In order for connection to be possible, segments must be linguistically compatible. Connection requires a prior process whereby the elements that need to connect are made compatible. (2012: 123)

In Berardi's terms, connection indicates "the functional interoperability of organisms previously reduced to compatible linguistic units" (ibid.). Hence, packets or units must be homogeneous in order to be swapped, which recalls the

36 Deleuze and Guattari oppose "arborescent multiplicities" as "extensive, divisible, and molar; unifiable, totalisable, organisable", to the logic of "rhizomatic multiplicities", that are "libidinal, unconscious, molecular, intensive multiplicities composed of particles that do not divide without changing in nature" (1987: 33). The distinction between molar and molecular is key to DG's ontology. Molar stands for form and organisation, while molecular stands for free, non-functional, immanent composition of bodies.

1.48. City of London, London, UK.

monetary principle. The key point is that information networks establish a fixed topography of both nodes (addresses) and edges (connections), allowing selective degrees of circulation within pre-determined parameters. Following Berardi, contemporary technological networks are not open-ended rhizomes.

Actor-Network Theory (ANT) is a branch of science and technology studies developed from mid-1980s to analyse modes in which scientific and economic networks operate. The operative term 'network' in these theorisations indicates a number of 'translations' that through different practices are established between different objects (actors)[37]. Latour indicates that network is "the quality of a text", "a tool to help describe something, not what is being described" (2006:131)[38]. In other words, it is net-work, a *performance* of tracing connections among actors. For ANT, 'the social' is not a ready-made collection of humans and things, it is continuously made and remade through a net-work of actors' performances. John Law details that a network "is an accomplishment, a form of work, of effort, of great effort, in a place, with materials that are obdurate" (1999).

Actor-networks and rhizomes move the understanding of network as a material infrastructure or as an invisible web that holds organisms together, to a specific mode of *tracing* connections among heterogeneous bodies. It is crucial to make a distinction between at least three different meanings of network: as a model (network diagram), an ontology (ecology, information), and a performative methodology that traces relations among bodies. There are important points of departure between the three, and, if not qualified, there is a high risk of confusing a model for the world, a methodology for reality. "The map is not the territory", said Alfred Korzybski in 1931. However, in the modern outset, they are not independent of each other, which has important consequences for

37 One of the key contributions of ANT to ecological thought is undoubtedly the fact that it is one of the first *social* theories or methodologies that formulated any object as potentially an actor. Any nonhuman–animal, plant, inorganic entity–may participate in the formation of networks and to the creation of the social. I will return to the notion of 'actor' in Part II.

38 ANT theorists have applied this model to study various field of social practices, and often to systems that are not commonly understood as networks. Bruno Latour traces the circulation of reference in soil sampling in Amazon (1999: 24-79), Michel Callon follows the declination of population of scallops in St. Brieuc Bay and conservation strategies (1986: 196-223), etc.

1.49. Kettle’s Yard. Cambridge, UK.

ecological thought and art.

1.3.4. Maps and territories

Mapping as a mode of representation is a key interface for the creation of (social) ideas about the environment, and for the production of modern environment itself. The rise of modern cartography is inextricably linked with the affirmation of modern landscape and the modern State (Farinelli, 2003; 2009; Pickles, 2004). Furthermore, mapping as epistemology becomes a generalised representational model subtending the implementation of information technologies through quantification of space, time, and other environmental variables. In this section I will try to trace the oppressive sides of cartography and mapping, as well as decolonising and counter-hegemonic practices.

Mapping as a mathematical procedure is "a correspondence of two sets which to each element of one set assigns a counterpart in the other" (Fauconnier, in Farinelli, 2003: 78). Mapping (and navigating space with a map) is about 'establishing correspondences'. Beyond a visual interface, mapping is essentially a translation or a turning of the world into a 'space of representation' (Lefebvre, 1991). Cartography relies on an understanding of space as Euclid imagined it, i.e. as continuous, homogeneous and contiguous, and it perpetuates it in a flat plane. Mapping, broadly speaking, enacts a presumption that something can be translated into a discrete set of values. What happens in this procedure is that a gap is created between what is mapped and the map (or the mapper). In cartography, the looker is elevated into a God's perspective, a 'view from nowhere' (Haraway, 1991). While looking for correspondence, mapping creates a distance, a discontinuity or heterogeneity between the two sets. Cartography and mapping can thus be understood as a modern interface that re-enacts ontological dualism between man and environment. I am other than the mapped via the map. This modern settlement of cartography was re-examined

1.50. Mining and Smelting Combine Bor, Bor, East Serbia.

through arts and theory in the second half of the 20th century.

In the 1950s the avant-garde formation Situationist International opened a new line of cartographic inquiry with their discipline of 'psychogeography'. Situationists did not use maps to objectively describe the subject's surroundings, but to understand the impact of the environment (and the representation of the environment) on an individual. Kevin Lynch formalised a similar approach in 'mental mapping', a research method for understanding how subjects create their 'image of the city' (1960). Conceptual artists have since the 1960s, employed maps both as objectifying truth-generating instruments (e.g., in works of Land Artists, to locate and document the sites of remote intervention) and to trace a subject's path through landscape or cityscape[39]. In these subjective tracings, maps become vehicles of what Michel de Certeau called 'spatial practices' (1984), documents of traversing and living the city, activities that contest or obey the dominant forces (which officially map the space). From the 1980s on, the field of critical cartography, in a similar fashion to cultural geography's deconstruction of landscape, examined how "maps *make* reality as much as they represent it" (Crampton & Krygier, 2006: 15). These subjective cartographies disclosed that maps are not as distant from the territory as Korzybski presupposed.

Further entanglement between map, territory and experience happened both through technological advancements and critical practices. Since Geographical Positioning System (GPS) technology became available for civilian use in 2000, a range of artistic practices have sought to subvert the dominant representations by creating cartographies that are categorised as 'subversive' (Crampton & Kryger, 2006: 17), 'alternative' (Abrams & Hall, 2006), 'subjective', 'emotional' (Nold, 2009), 'radical' (Bhagat & Mogel, 2008), 'tactical' and others (Dodge, Kitchin & Perkins, 2009; Wood, 2010; Pignatti, 2011). With digital maps, there is profound shift in perception:

39 For example, Richard Long's or On Kawara's performative walks. Tehching Hsieh documented his *One Year Performance 1981-82 (Outdoor Piece)* via meticulous tracing of his daily wanderings throughout one year which he spent living outdoors in New York City.

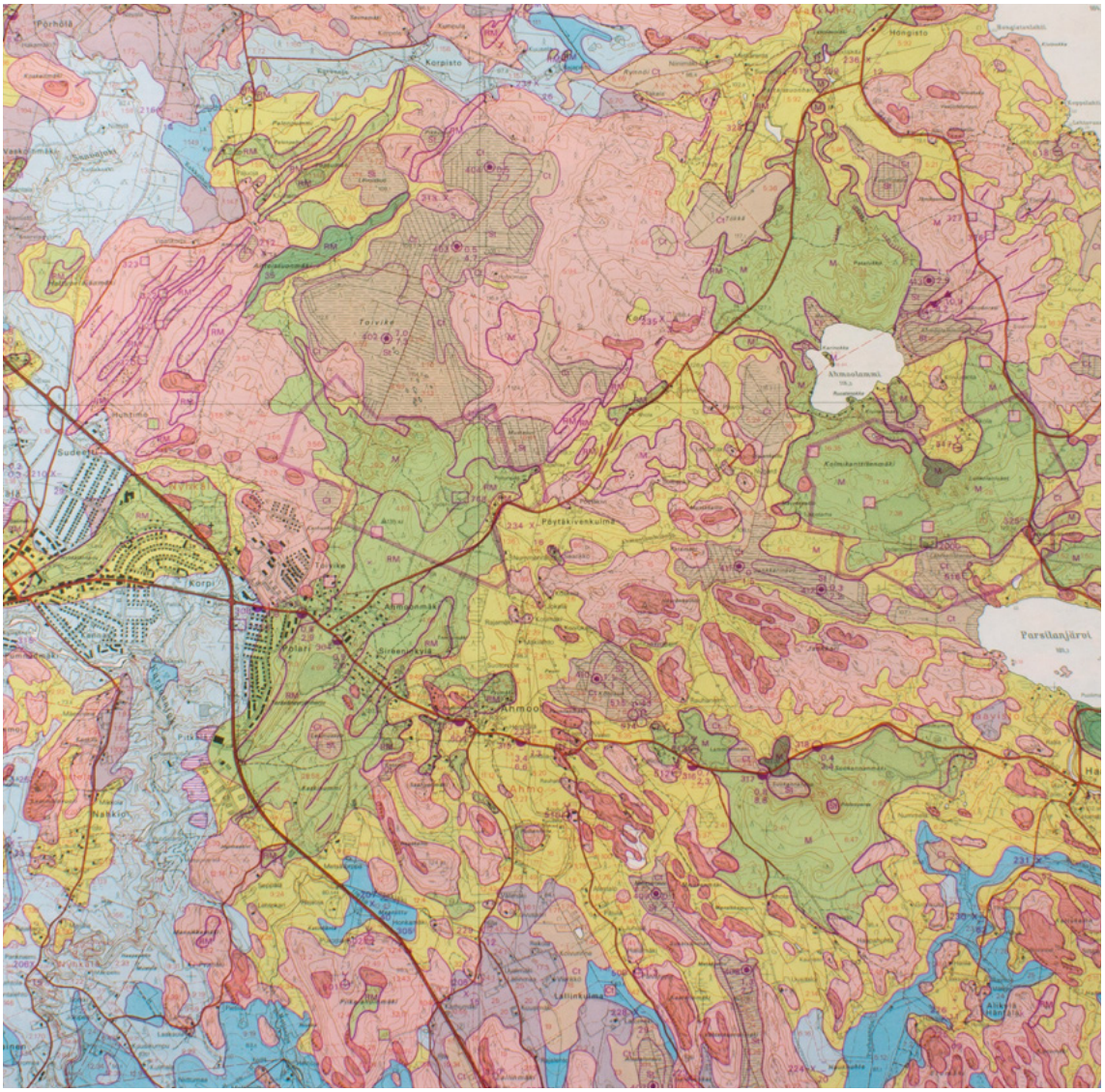
1.51. Hyvinkää municipality, Finland.

> the advent of maps that tell you where you are on them represents a profound epistemic break from the entire history of cartography to date … our conceptions of lived, bodily space and the simultaneity and capacity of time are almost casually transformed by our everyday use of networked artefacts. (Greenfield, 2012)

However, even if mapping became widely accessible and individualised, the question remains, is the gap between representation and lived experience effaced? Who benefits from the knowledge accumulated? Even when we are using digital maps, we "dwell in a permanent out-of-body experience, displaced from our own locations, seeing ourselves as moving dots or pins on a map" (Varnelis & Meisterlin, 2008). Through digital mapping, space is experienced more closely as a map, but a separation still exists, as everyone trying to use GPS sooner or later finds out.

Beyond cartography, I would like to focus now on the generalisation of mapping through 'pervasive', 'ambient' or 'ubiquitous computing', or the Internet of Things (IoT). In the IoT, objects become intelligent and they "'feel' and 'react' to the environment independently" (Murer, 2010) through the use of sensors which translate/map certain variables into data, that can then be used to make smart objects perform certain actions. Similar to smart artefacts, the human body has become a terrain for practices of mapping that involve sensing various physiological processes, the practices of the 'quantified self'[40]. Ultimately, the

40 'Quantified self' is an umbrella term embraces projects coming from fields of new media, design and visual arts, as well as consumer industry, which 'track' the functions of the body over time. An important early example that sits at the nexus of cartography and self-quantification is Christian Nold's *BioMapping* (2005 -). In the many iterations of the project across different cities, Nold invites participants to perform casual strolls through a neighbourhood carrying a galvanic skin response device which measures the levels of sweating at fingertips, which is then taken to be a measure of the wearer's stress level. Based on this data, Nold assembles "bio" cartographies of neighbourhoods, giving insight into how people emotionally react to the built environment. In a more detailed and personal manner, Nicholas Felton in *Feltron Annual Reports* (2005-2012) measures/documents his own life by compounding GPS data with a variety of quantitative and qualitative information about his daily activities, ranging from social encounters to his sleeping patterns. Significantly, many of these elements have been taken over and used commercially. 'Self-quantification' has become a new hype for health and fitness purposes. There is a number of apps, and dedicated tracking devices that measure jogging performance, soundness of sleep, diet, etc. These developments may be read from various perspectives, as a final step towards voluntary self-control or as a move towards techno-subjectivities, as well as various positions in-between.



1.52. Geological map of Karkilla (detail). Geological Survey of Finland.

goal is to engineer a utopian 'smart city', a design in which city as topography and its data mapping converge to create interactive feedback loops of call-and-responses between technological artefacts and humans (Greenfield & Shepard, 2007; Nold & van Kranenburg, 2011; Greenfield, 2013). But before accepting that this is a smooth process, I will look into the possible divergences between territory and mapping through the concept of network.

The question of mapping a network was posed by Jacob L. Moreno, who in 1934 developed the technique of 'sociometry' to display relations within a social group (Caldarelli & Catanzaro, 2012: 10). This extension of mapping with graph theory came to be known as a 'network diagram'. The basic components of a network diagram are nodes (subjects) and edges (lines which connect them). A good example of a network graph is the map of the London Underground, in which topographical distances are sacrificed for a topological connectivity. The development of network science, and its applications, demanded a new form of visual literacy, which can be broadly called 'visualisation' of networks (Abrams & Hall, 2006; Lima, 2011). For all its visual efficiency, the network diagram, however, has significant limitations, which are of special relevance in ecological context. Galloway and Thacker identify three main problems with the application of graph theory to the representation of networks: 1) the question of agency (nodes are transformed into objects); 2) 'diachronic blindness', "it is an approach that focuses on fixed 'snapshot' modelling … a fundamentally synchronic approach"; and 3) "internal complexity and topological incompatibility. … networks always contain several coexistent, and sometimes incompatible, topologies" (2007: 33-4). In a volume dedicated to "cartographies of networks", J.J. King concludes that "when looked from above, *the network is illegible*" [original emphasis] (King, in Abrams and Hall, 2006: 49). The question of agency and topological heterogeneity are of interest for a posthumanist ecological approach which is grounded in difference among bodies (see Part II).

The key problem with mapping from ecological perspective has to do with the ontology of representation. As long as a map or graph is understood as separate

1.53. Bor, Serbia.

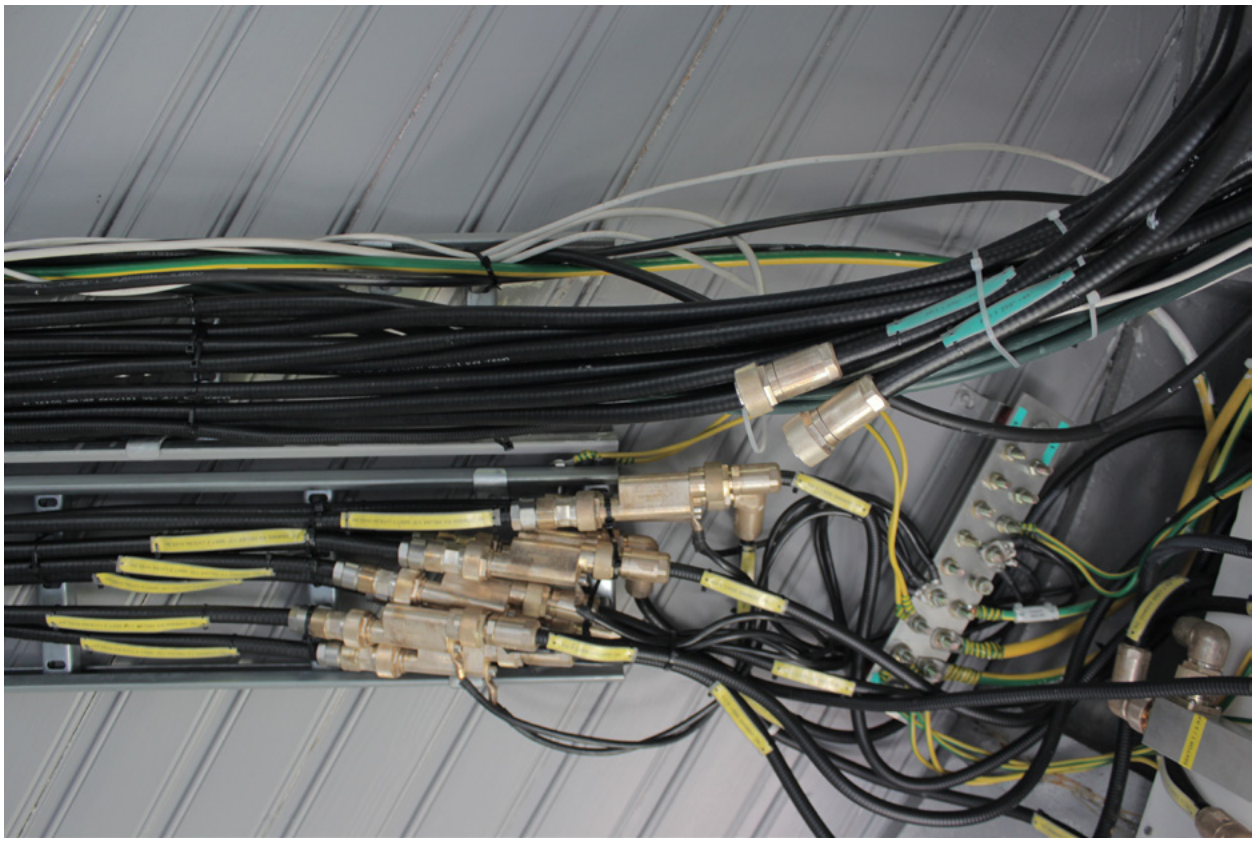
from reality it represents, the relationship is that of correspondence. The geographical school of NRT observes that there is an incompatibility between ecologies of human and nonhuman agencies, and modern modes of representation (cartography, network graphs, etc.). To understand how they interact, representations are taken to be "performative in themselves; as doings":

> Representations thus do not have a message; rather they are transformers, not causes or outcomes of action but actions themselves. Not examples, but exemplary. In this sense representation is perhaps more usefully thought of as incessant presentation, continually assembling and disassembling, timing and spacing; worlding. (Dewsbury et al., 2002: 438)

According to NRT, there is no discontinuity between representation and agencies of the world. Similarly, Tim Ingold traces a distinction between map-making (representation) and mapping (as performativity). For Ingold, map-making refers to inscribing signs on a map, while mapping is a performative gesture, an "inscriptive practice" (ibid.: 231). When we move towards the idea of mapping as a mode of inscribing or 'tracing' (with ANT), mapping becomes a mode of positioning or situating oneself with regard to other entities in the environment. Going beyond inscription, for Deleuze and Guattari mapping "fosters connections between fields" within a network (1987: 12). However, in modern outlooks, representation and reality are distinct, which allows maps to exert power-over the bodies mapped. Map—mapped is another hierarchical dualism, which, when used by the powers to be, gives privilege to the map and mapper. It is then that representations are "not examples, but exemplary". Mapping as performance is instead an immanent practice that connects dots.

This power nexus between mapper and map has been a critical focus of various practitioners who worked with network visualisation methods to disclose the oft hidden patterns of power or economic/political organisation[41]. In media arts,

41 In visual arts, an early precursor was Mark Lombardi who, in the 1990s, made *Narrative Structures*, drawings of political and economic conspiracies and abuses by using the visual technique of network



1.54. Skomvær lighthouse. Skomvær, Røst archipelago, Norway.

Information Visualisation has critically reworked the postulates of scientific visualisation into more dynamic and affective modes of presentation (e.g., Corby & Baily, Autogena & Portway, Active Ingredient)[42]. Participatory and community mapping projects use different modes of data gathering involving local communities[43]. Adjacent and overlapping with these approaches is the area of environmental and 'citizen sensing', practices that use digital media but also bodies as sensors to gather data that may be used to intervene in urban or environmental policy (Jeniffer Gabrys, Christian Nold, etc.)[44]. These alternative mappings and information visualisations question the modern gap between representation and the world. In community mapping, for example, the participants use analogue or digital tools and physically move through space. Performativity is emphasised by the fact that the work of mapping is open-ended, never fully accomplished as the network being mapped keeps on changing. For example, mapping urban orchards means tracking the trees week after week as they ripen, often followed by group fruit-picking actions. According to Tom Corby, these types of practices of re-presentation create

graphs. Bureau d'Etudes today produces cartographies of "contemporary political, social and economic systems", with the intent of "[r]evealing what normally remains invisible and contextualising apparently separate elements within a bigger whole, these visualizations of interests and cooperations re-symbolize the unseen and hidden" (Bureau d'Etudes). Burak Arikan makes cartographies of social networks in educational, political and art-world networks. Jane Tsong's *the los angeles water cycle: the way it is, not the way it should and one day will be* draws the paths of water in L.A. "from toilet to tap" (in Bhagat and Mogel, 2009: 101). There is a plenitude of other examples that go beyond the limits of this thesis.

42 Tom Corby and Gavin Baily's practice visualises complex environmental data in form of live-feeds with aim of conveying "the ecological complexity ... as *pattern* and *felt* experience rather than quantity and measure", an aesthetics of "systemness" (Corby, 2011). Lise Autogena and Joshua Portway's *Black Shoals Stock Market Planetarium* (2001/04) depicts a night sky in which the centres of brightness are stock exchange companies. The cosmography is further populated by evolutionary creatures that feed on the stars, creating an ecology of artificial life and capital. *A Conversation between Trees* (2011) by Active Ingredient brings together environmental data gathered via makeshift sensors installed on trees in Sherwood Forest, Nottingham and Mata Atlantica in Brazil.

43 These projects often deal with ecological concerns or problems relating to urban environment: road damage (mySociety and Young Foundation's *Fix My Street* (2007-ongoing)); the quality of cycling lanes (Abraham Polsky's *USE/LESS Schema* (2010)); urban orchards (*The London Orchard Project* (2009-ongoing) and *Not Far From the Tree* (2008-ongoing)); street trees (*TreeKit* (2011- ongoing)); the appearances of birds (British Trust for Ornithology's *BirdTrack*) and bees (Friends of the Earth Trust's *The Great British Bee Count* (2014)).

44 This is a vibrant emerging field. One of the leading research projects is *Citizen Sense* (2013-), led by Jennifer Gabrys at Goldsmiths. One of the early practitioners in this area is Christian Nold with his *Bio Mapping* (2004-) projects, in which participants, wearing sensors, measured physiological responses to the experience of traversing urban environment. In Eric Paulos's *Participatory Urbanism* (2007), a group of taxi drivers in Accra, Ghana, has been invited to install carbon monoxide sensors on their cabs in order to gather data about levels of air pollution in the city.

1.55. Stockholm, Sweden.

"landscapes of feeling, arenas of action" in which "objective and subjective, informational and aesthetic components" (2008: 467) question the limits of representation. Contrary to scientific visualisation focused on clarity, these images "produce embodied, affective, sensory experiences that elude rational description and measurement" (ibid.). In this sense, performative mappings are in fact meetings with places or nonhuman entities, they themselves start becoming a network of agencies and things.

Even if there is a more intimate inter-relation between representation and the world, can it be said then that the power relation of 'map or be mapped' (Paglen, in Bhagat and Mogel, 2009: 45) is dissolved in these affective or performative practices? I wish to stress this question because non-human entities do not produce their own mappings, therefore they will always be on the side of the 'mapped'. However, in an ecology understood as a 'mesh' of life, "there is no definite background and therefore no definite foreground" (Morton, 2010: 28). This is a challenge for any representational practice based on translation of the world into a visual language of plane, points and lines. Representation *per se* is not wrong, but the way it is practised does produce different material effects on the world. How to account for these effects is one of the questions that informs my practice.

Finally, when Christopher Columbus set out to sail, map in hand, he did not 'believe' that he would find a New World. He set out to turn the world into space, a code that could be governed through protocol. For him, and many other moderns that followed, representation comes before the world, it readies matter for appropriation and subjugation. Therefore, it is crucial to see if specific informatisation/datification/networking practices seek to understand a world or to shape it to its own image, and whether or not these two projects can be distinguished at all. When used in a dualistic fashion, mapping is not an interface with the environment, it becomes a protocol of domination. Suffice to say that with mapping oftentimes comes naming[45]. It matters little if the island

45 David Abram (1996) argues that evolution of writing from pictographic, where there was a degree of resemblance between the sign and the referent, to phonetic, as an abstract code of arbitrary denomination, contributed to the perceptual and sensual cutting off of humanity from the

1.56. Museum of Wool. Sirogojno, West Serbia.

is ‘really’ India or America or San Salvador. For moderns, it is what it is said to be, until a more powerful re-mapping/re-naming/re-branding gathers ground. Similarly to the concepts such as nature, mapping/naming as a relation between the mapping subject and the mapped/named is one of the crucial and ubiquitous boundary-making projects that eco-aesthetics needs to attend to. As much as it may sound strange from the present perspective, a more-than-human ecology might wish to think about how a subject can get named/called by what was thought to be an object.

1.3.5. Anthropocene

From sites and networks, I will now zoom out to gaze at the globe, not only spatially, but also temporally. What we see is not the calm ‘blue marble’ of early space exploration, but a tumultuous world which has recently been described as the age of Anthropocene. The term was suggested by atmospheric chemist Paul J. Crutzen (2002) to hypothesise that the Earth has entered a new geological epoch—the Age of Man—because human activity is deemed to have created a stratigraphic record in geological strata. Since 2009, the Anthropocene Working Group has been developing a proposal to submit to the International Commission on Stratigraphy in order to formalise the epoch. Without expecting the scientific verdict, the concept has stirred great debate across arts and humanities.

> Beyond the stratigraphic discussion, the Anthropocene can be felt as a call to re-imagine the human through biology and geology. It is a call, in other words, to place our industrialized present—a present that consumes time itself—within a temporal frame that is at once evolutionary and geologic. (Davis & Turpin, 2015: 6)

landscape. A similar line of thought could be applied to the general field of semiotics. However, with Abram, language, especially orality, still participates in larger ecologies is means to access the more-than-human.

1.57. Stockholm, Sweden.

Put in these terms, the Anthropocene looks like a promising interface for thinking beyond the nature–culture binary. I will dedicate this section to understanding the leverage of this concept for a posthumanist ecology.

A lot of debate is currently centred around when the planet would have entered the Age of Man. Most proposals date the beginning of the Anthropocene to some phase in capitalist or technological development, either the invention of agriculture, Columbian Exchange, the Watt steam engine, or the nuclear bomb[46]. The concept on the one hand implies a realisation of anthropogenic mastery over the Earth, but also signals a possible end of (human) history amidst climate change and the Sixth Extinction. The Anthropocene is thus closely related to the 'Great Acceleration' in the use of resources and related 'forcings' on the Earth system (Steffen *et al.*: 2015)[47]. Indeed, Crutzen and his colleagues see the concept as a wake-up call to humanity. However, an aura of narcissistic Prometheanism and inevitability accompanies the term[48]. Eileen Crist points out that the discourse of the major proponents of the Anthropocene is marked by a sense of teleological determinism, "the inability to change historical course" (ibid.: 138)[49]. The Anthropocene is *making the present into*

46 According to paleoclimatologist William Ruddiman, the beginning of the epoch matches with the expansion of agriculture some 8,000 years ago, and the impact it subsequently created in terms of deforestation, patterns of settlement, etc. (Turpin & Davis, 2015: 5). Simon Lewis and Mark Maslin claim that the Anthropocene begins in 1610, the date of the Columbian Exchange, or the largest movement of population in Holocene, as well as the first round of globalisation in terms of trade (2015). Crutzen himself aligns the start with the invention of Watt's steam engine in 1776, which also causes an uninterrupted rise in the CO_2 which continues to the present day (Crutzen, 2002: 23). Lastly, the stratigraphic mark of the Anthropocene might be localised "in the irradiated soil that is immediately apparent in the sedimentary records following the bombing of Hiroshima and Nagasaki, and at the test sites on appropriated Indigenous territories" (Davis & Turpin, 2015: 5). According to the recent report Anthropocene Working Group presented to the International Geological Congress, majority of experts in the group voted for the beginning of the 'nuclear age' (1950) as the beginning of the new age (Angus, 2016).

47 The 'Great Acceleration' is associated with a series of graphs published by the International Geosphere-Biosphere Programme (IGBP), published in 2004, representing the "post-1950 acceleration of the human imprint on the Earth System" (Steffen *et al.*, 2015: 82). According to the authors of the paper, the graphs are "an iconic symbol of the Anthropocene" (ibid.).

48 As an illustration, one of the key figures in the promulgation of the thesis, geologist Jan Zalasiewicz, claims that "[w]e are so adept at using energy and manipulating the environment, that we are now a defining force in the geological process on the surface of the Earth" (in Crist, 2013: 132).

49 What some of the Anthropocene-related scientific authors propose are disaster narratives, e.g. Alan Weisman's *The World Without Us* (2007) and Jan Zalasiewicz's *The Earth After Us: What Legacy Will Humans Leave in the Rocks?* (2009).

1.58. Mining and Smelting Combine Bor. Bor, Serbia.

history. Namely, the Anthropocene Working Group is looking at what they call 'technofossils', man-produced artefacts, to stratigraphically index the epoch.

> Through their attempt at naming and measuring the epoch of man, studying cities and subways as fossils in real time, and conjuring future geologists from outer space to study a world in which this civilization has completely vanished, these geologists have called our entire civilization and its requisite way of life a ruin. (Dyer & Wakefield, 2014)

This is no news for environmentalists, it is merely what ecologists have been repeating in different ways at least since Henry David Thoreau's *Walden* in 1854. Because it now attempts to scientifically estimate the depth of the human imprint upon Earth, the Anthropocene discourse causes interesting ripple effects between humanities, hard science and public discourse.

It is more revealing to look at what the concept conceals. Going back to the very special understanding of 'human' as a historically determined concept, who is this *anthropos*, the geological mover? Dipesh Chakrabarty looks for the perpetrator:

> One could object, for instance, that all the anthropogenic factors contributing to global warming—the burning of fossil fuel, industrialization of animal stock, the clearing of tropical and other forests, and so on—are after all part of a larger story: the unfolding of capitalism in the West and the imperial or quasi-imperial domination by the West of the rest of the world. … If this is broadly true, then does not the talk of species or mankind simply serve to hide the reality of capitalist production and the logic of imperial—formal, informal, or machinic in a Deleuzian sense— domination that it fosters? Why should one include the poor of the world—whose carbon footprint is small anyway— by use of such all-inclusive terms as *species* or *mankind* when the blame for the current crisis should be squarely laid at the door of the rich nations in the first place and of the richer classes in the poorer ones? (2009: 216)

1.59. Finsbury Square, London, UK.

The mainstream Anthropocene discourse is another instance of environmental racism, this time by Western science (see note 57). Beyond race and ethnicity, mainstream Anthropocene glosses over the gender disparity in vulnerability to climate change, a key problem extensively explored by, for example, ecological feminists (e.g., see Cuomo & Tuana, 2014). On these grounds, Kate Raworth provocatively suggested an alternative naming, Manthropocene (2014)[50]. The internal differences under the umbrella term *anthropos* are a crucial question of environmental justice, because the North still does not want to accept a major share in climate change mitigation. To emphasise the speciesism and other dualisms the Anthropocene incorporates, a number of alternative namings have been proposed: Anthrobscene (Parikka, 2014), Capitalocene (Malm & Hornborg, 2014), Chthlucene (Haraway, 2015), Eurocene or Technocene (Sloterdijk, in Davis & Turpin, 2015: 328), #misanthropocene, Plantatiocene (in Haraway, 2015: 162-3). These scholars, together with Chakrabarty, refuse to forget the impact of capitalism, colonialism, imperialism and modernity. Chakrabarty, and Latour (2015), demand that this situation of crisis, embodied in climate change above all, calls for new patterns of thought that would see *beyond* the history of capitalism (Chakrabarty, 2009: 221)[51]. It seems that the Anthropocene is not really setting them out. While recognising important work that is performed around the concept, I find it more important to hold in sight the inequalities of gender, class, race and ethnicity.

To destabilise the dominant narrative of Anthropocene, a creative approach is a quest for 'posthumanist' or 'alter-Anthropocene imaginaries' (Neimanis, Åsberg & Hayes, 2015). McKenzie Wark sees the Anthropocene as a call to humanities

50 Raworth points out that in the Anthropocene working group, in the initial line-up there was only 1 woman out of 29 scientists. In the expanded group, 5 out of 36 scientists were women. This is not only a characteristic of the scientific treatment of the Anthropocene. At the Sonic Acts festival at Amsterdam dedicated to *Geologic Imagination* (and closely related Anthropocene), in the packed programme of day 1, including various thinkers, philosophers, media and sound artists, there was only one "female agent" (Jones, 2015). It should be noted that large majority of prominent authors that brought the Anthropocene into the spotlight are white men. For all its outspoken progressiveness, there is a danger of once again putting Man as a central agent of history.

51 Of course, Chakrabarty's argument is well known in environmental justice movement since at least the Rio Summit in 1992 (e.g., Nixon, 2011).

1.60. Hyvinkää municipality, Finland.

to trouble the established disciplinary divisions:

> Rather than 'interrogate' Crutzen's Anthropocene … perhaps it is better to see it as what it is: a brilliant hack. The Anthropocene introduces the labour point of view – in the broadest possible sense – into *geology*. Perhaps the challenge is then to find analogous but different ways to hack other specialised domains of knowledge, to orient themselves to the situation and the tasks at hand. (2015: 216)

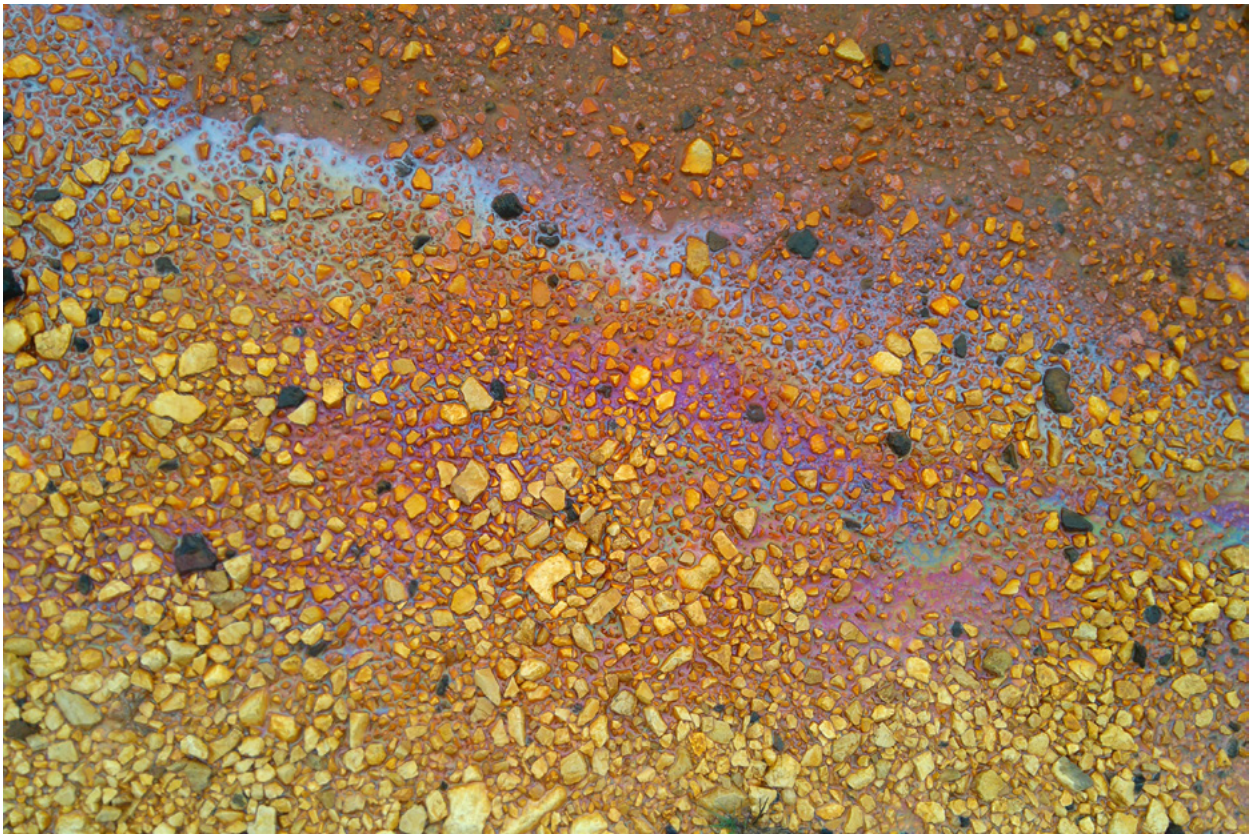
One of the critical responses has been the 'geologic turn' in cultural studies and visual arts (e.g., Yusoff, 2013; Cohen, 2015; Parikka, 2015)[52]. 'Deep time', a term introduced by geologist James Hutton in 1700s to indicate geological time, is now widely used in arts and humanities (Yusoff, 2013; Parikka, 2015)[53]. With a focus on climate change, Neimanis and Loewen Walker have introduced the notion of 'thick time' which highlights "transcorporeal stretching between present, future, and past" (2014). The fact that the contested epoch originates from geology, a science that is closely implicated with patterns of extraction (and, thus colonisation and imperialism), is remarkable. However, there is a lot of work to be done to decolonise the concept itself, and especially to decolonise the institutions it stems from[54].

In the context of art, the Anthropocene has galvanised a number of artists and curators (Davis & Turpin, 2015). The headliner of the discourse was the Anthropocene Project (2013—15), a two-year research platform bringing together scientists of various stripes and artists and scholars at Haus der Kulturen der Welt (HKW) in Berlin (Klingan *et al.*: 2015). The Anthropocene

52 In the UK context, I would like to single out the research project *Rock/Body: Performative interfaces between the geologic and the body*, convened by João Florencio and Nigel Clark of the University of Exeter. While sharing interest in geology, the project instead focused on "concrete bodies in order to problematise such universalising conception of humanity" (Florencio & Clark, 2016).

53 In the arts context, of interest is exhibition *Imagining Deep Time* (2014), curated by J. D. Talasek, at National Academy of Sciences, Washington, D.C.

54 This position is inspired by *Decolonising the Anthropocene* workshop, organised by the Centre for the Study of Democracy, University of Westminster, 27 November 2015. The variety of positions and post-colonial perspectives of the speakers, in particular of Olivia Rutazimbwa, and the discussion that ensued between the speaker, discussants and the audience, were a true eye-opener in a period when the Anthropocene seemed to be a default narrative in which to situate my work.



1.61. Bor, East Serbia.

Project was an innovative platform whose rhizomatic expansion directly and indirectly spawned numerous art projects, three exhibitions at HKW, and other initiatives across the continent[55]. A follow-up research project Technosphere, following the term proposed by P. K. Haff, began in spring 2016 at HKW. Numerous other exhibitions, symposia and research initiatives use the concept as a catalyst, an extraordinary response that attests to its imaginary efficacy[56].

In the arts, the Anthropocene can perhaps be a boundary concept indicating the sunset of an aesthetic epoch. Irmgard Emmelhainz claims that the age of the Anthropocene has been marked by the transformation of the world into pictures, however "*images* of the Anthropocene are missing. Thus, it is necessary to transcend our incapacity to imagine an alternative or something better." (2015). We do not know how to represent or experience the Anthropocene, since the representing subject is what is being represented. The observer and the observed merge or collapse in a self-portrait extending through geological time. Aesthetics, a modern discipline of the sensing subject and the sensed thus in a certain sense comes to an end. This might be a good thing, if we contemplate the depth of complicity of aesthetics with modern dualistic ontology.

As a critical concept, I do not see how the Anthropocene can be conducive to more-than-human justice. Why I am sceptical towards this epochal advent is synthesised in the words of Karl Marx:

> It is not the unity of living and active humanity with the natural, inorganic conditions of their metabolic exchange with nature, and hence their appropriation of nature, which requires explanation, or is the result of a historic process, but rather the *separation* between these inorganic conditions of human

55 One of the sequels was a research exhibition *Anthropocene Observatory*, curated by Territorial Agency, Armin Linke, and Anselm Franke at BAC, Utrecht (2015).

56 A selection of recent exhibitions that explicitly reference the Anthropocene: *Surface Earth,* Röda Sten Konsthall, Göteborg, 2016; *The Forces Behind Forms*, Museums Haus Lange and Haus Esters, Krefeld, 2016; *CHANGING CIRCUMSTANCES*: *Looking at the Future of the Planet*, FotoFest 2016 Biennial, Houston; *Exo-Evolution*, ZKM, Karlsruhe, 2015-6; *Placing the Golden Spike: Landscapes of the Anthropocene*, INOVA, Milwaukee, 2015; The *Great Acceleration*, Taipei Biennial 2014, 2014-5; *The Whole Earth*, KHW, Berlin, 2013, etc. The list is growing by the day.

1.62. Mynyyd Parys, Isle of Anglesey, Wales.

> existence and this active existence... (in Foster, 2000: 159)

The Anthropocene seems to perform the task of unifying culture and nature under the patronage of humanity and, with this move, it conceals too many rifts, shallow and deep. Importantly, it unifies humanity under a single banner of culpability. In the current socio-political context, species thinking can hardly be liberatory. Posthumanism, if it is not to be a refashioned humanism, needs to be a local discourse, attentive to differences, something that the Anthropocene is not. For this and other reasons cited above, I will leave the anthropocene aside in my research, attentive to the conversations around it, but focusing on alter-Anthropocene narratives. The merit I do ascribe to the concept is that it has provoked artists and social theorists to dedicate more attention to the Earth, however it is not the first in that lineage[57].

1.3.6. Art in global warming

The recent Assessment Report of the United Nations International Panel on Climate Change (IPCC) documents a multiplicity of 'anthropogenic forcing' factors that, with different degrees of likelihood, contribute to the processes of atmospheric temperature change, ocean temperatures, sea level rise, oceanic salinity, ice sheets and glaciers melting, extreme climate events, sea level pressure, and others (IPCC, 2013: 869-71):

> From this combined evidence it is *virtually certain* that human influence has warmed the global climate system. (ibid.: 871)

In the probabilistic language of the report, 'virtually certain' amounts to 99-100% probability, the highest on the 'uncertainty' scale used by IPCC (2010: 3). Climate change or global warming is strongly correlated with the anthropocene, but of quite different weight because of its accumulated evidence and the

57 In philosophical context, it must be noted that Deleuze and Guattari have already performed this work with their 'geophilosophy' (1987, 1994).

1.63. “Children of smoke.” Bor, Serbia.

political procedures set in motion around it[58]. Global warming is a front of (in)decision for global governments, as well as for the growing climate justice movement. In direct response to global warming, environmentally-minded art has evolved rapidly since the first show specifically centred on the topic, *Weather Report: Art and Climate Change*, curated by Lucy R. Lippard at the Boulder Musem of Contemporary Art in Colorado in 2007.

As this short survey will reveal, art institutions have become unique grounds for art concerned with global warming, either through institutional or counter-institutional practices. Tue Greenfort, in what Luke Skrebowski called "ecological institutional critique" (2013), reveals imbrications of artistic institutions within ecologies and intervenes in their organisation, if only for the duration of the show. Greenfort's work *Exceeding 2°C* (2007) at Sharjah Biennial 8 at U.A.E., raised the temperature of the air-cooling system of the museum by 2 degrees. The money saved on the electricity bill was used to purchase a patch of rainforest in Ecuador[59]. Amy Balkin works in a transversal field between law, politics, finance and environment. Among other projects, *Public Smog* (2004–) is an ongoing series of works that consist in creating "parks in the atmosphere" by purchasing carbon emission stocks and 'retiring' them, thus 'liberating' the atmosphere from further emissions:

> PUBLIC SMOG is a park in the atmosphere that fluctuates in location and scale. The park is constructed through financial, legal, or political activities that open it for public use. (Balkin, 2006)

In parallel to the real withdrawal of emissions, Balkin conceptualises this into a site, a public space, a status that atmosphere does not hold in the current socio-

58 Regarding the term, I follow Timothy Morton's incitement to insist on 'global warming' instead of 'climate change', since the latter implies a certain linearity and conceals the extent of disruption (2013). Moreover, I believe it is beneficial to maintain the globe in the concept, because this is a truly globalising shift, in part caused but very different from economic globalisation. Lastly, globe is an unsolvable puzzle for mapping projects of modernity (Farinelli, 2003, 2009). No visual protocol of projection has been able to represent the planet without one or another kind of distortion.

59 In the second instalment of the work at EACC in Spain, Greenfort worked with the host institution to lower the heating by two degrees in the winter period, and to acquire another patch of greenforest with the money saved.

1.64. Mining and Smelting Combine Bor. Bor, East Serbia.

political settlement. Since 2004, Balkin has been collecting signatures to demand UNESCO to include the atmosphere in the World Heritage Sites list. With a similar transversal and expanded temporal ethos, in the wake of the Hurricane Katrina disaster in New Orleans, Mel Chin launched a complex project *Operation Paydirt* (2006–), a multi-layered artist/activist initiative to remediate the lead poisoning in the soil of New Orleans.

Artistic, industrial and policy-making institutional forums are territories in which artivist[60] practices try to divert discussions towards topics of environmental justice. What is of interest here is the choice and diversity of sites of intervention. Adbusters use internet and publishing networks to perform 'culture jamming', i.e. renegade advertisements[61]; the Laboratory of Insurrectionary Imagination uses various institutional contexts, commissions and public space for artivist interventions[62]; SUPERFLEX work with local communities to create alternative economical solutions[63]; and Yes Men perform 'identity corrections' of companies through uninvited interventions at corporate conferences and gatherings, and through online strategies[64]. Liberate Tate is an artivist organisation whose goal is to demand from the Tate museums to cease

60 Artivism as merger of 'activism' and 'art' is a commonly accepted term both in popular discourse and academia.

61 Adbusters have for decades staged advertisement and branding stunts, as well as publishing a magazine on art and politics. Theirs is a long commitment to the issues of environmental and social justice. Among others, a meme they launched is considered to be one of the sparks that led to Occupy Wall Street in 2012 (McKee, 2016: 82).

62 The artivist 'affinity of friends', facilitated by John Jordan and Isabelle Frémeaux, Laboratory of Insurrectionary Imagination (Lab of ii) has been staging important climate justice actions. At the fringes of UN Conference on Climate Change in Copenhagen in 2009, Lab of ii organised a Bike Bloc, an act of civil disobedience by using over two hundred 'Double Double Troubles', machines welded from discarded bicycles. At the recent COP21 summit at Paris, Lab of ii launched 'Climate Games', a mobile app that helped participants engage in civil disobedience aimed at disrupting the workings of the 'Mesh', "austerity-dictating politicians, fossil fuel corporations, industry lobbyists, peddlers of false solutions and greenwashers" (Climate Games, 2015).

63 Among numerous art-ivist projects of SUPERFLEX, e.g. at the margins of the UN Global Climate Change Conference in Copenhagen in 2009, the group organised a group hypnosis sessions, *Experience climate change as a...,* which aimed to induce participants into perceiving global warming from the perspective of different animals either already extinct or at risk of extinction. Otherwise, SUPERFLEX often work with local communities to find empowering solutions to very real everyday problems.

64 Yes Men have intervened in various public forums (e.g., at GO-EXPO, Canada's largest oil conference), camouflaged as corporate representatives, but bringing in admonishing news of the impact on the planet.

1.65. Östergårdsgrufvan. Kemiönsaari, South-West Finland.

their sponsorship agreement with British Petroleum[65]. Not An Alternative, artivist and theory collective, performs 'institutional corrections with their initiative *The Natural History Museum* (2014 -), a travelling display that corrects the usual natural history museum narrative that neglects the human influence on ecosystems[66]. While Liberate Tate peform *imromptu* occupations of the museum, Not An Alternative insinuate them from within. Art institutions are understood to possess special symbolic value, strategic places from which to induce wider socio-cultural impact.

To some extent continuing the trajectories of Occupy movements and the Climate Camp actions, formats of assembly and camp have become a method of trans-disciplinary ecological inquiry. *Case Pyhäjoki – Artistic reflections on nuclear influence* (2013) was a ten-day expedition organised by artist Mari Keski-Korsu in a village in northern Finland where works on a new nuclear power plant were commencing. A group of about 20 artists and researchers, through a number of workshops and events, tried to engage with the community to critically reflect on the project. From a connected constellation of people, organised by Brett Bloom, *Breakdown Break Down* (2015) is an 'embodied learning' camp collaboratively developing skills that will be necessary to decolonise 'petro-subjectivity' or "de-industrialise our sense of self" (Bloom, 2015). This is in tune with Guattari's call to untangle the modalities of the production of subjectivity away from those inherent in Integrated World Capitalism (2000). Mobile or nomadic gatherings should be added to this list of activities. Hayley Newman's *Milton Keynes Horizontal Vertical* (2006) was a 39-hour group bus trip through the modernist grid of Milton Keynes until the fuel ran out. Road trips, public tours, or explorations of obscure or hidden sites

65 Contrary to the more traditional 'importation' of 'nature' into the museum as artwork, Liberate Tate used a tactics of bringing into the institution undesired objects such as oil (puddles) or a blade of a wind generator. In March 2016, BP ended its 26-years long sponsorship of the Tate. Both BP and Tate denied that this decision was in any way influenced by the actions of Liberate Tate. It is to be mentioned that Liberate Tate is part of a wider national network Art Not Oil, whose aim is to free cultural sector from fossil fuel industry funding.

66 Not An Alternative is a collective that emerged in 2004, and has had prominent part in Occupy Wall Street, as well as in subsequent Occupy Homes, with their banners and signage as well as "symbolic and tactical infrastructure" (in McKee, 2016). In one of the displays of their 'corrected' Natural History Museum, they ask: "Will the story of the 6th Mass Extinction ever include the role of its sponsors?"

1.66. Mining and Smelting Combine Bor. Bor, Serbia.

of industrial or techno-military sites is a common thread connecting diverse groups and projects such as Center for Land Use and Interpretation[67], Dark Ecology[68], Temporal School of Experimental Geography[69], etc. Some are more research-oriented while others are more practice-based in the spirit of Trevor Paglen's 'experimental geography' (2009). To various degrees, these initiatives share an interest in geography and the modes of production of space, attending and 'witnessing' the invisibilised sites of global economic and political power networks, and the connected environmental degradation and pollution.

Climate change as discourse springs from climate science, correspondingly arts and science collaborations and interactions are one of the privileged working methodologies. With a focus on the UK context, some important platforms are Arts Catalyst[70], Culture and Climate Change[71], Cape Farewell[72], Finnish Bioartsociety[73] and its Hybrid Matters 'field laboratory'[74], Invisible Dust[75], and

67 The Center for Land Use and Interpretation (CLUI), founded in 1994 at Los Angeles, is "a research and education organisation interested in nature and extent of human interaction with the surface of the earth".

68 Dark Ecology was a three-year research project (2014-6) set up by Hilde Methi, the curator of Sonic Arts festival in Amsterdam. Dark Ecology consisted in group field visits and commissions in the Barents region between Norway and Russia, one of the emerging resource frontiers.

69 Temporal School of Experimental Geography (TSOEG) is a network of artists and researchers gathered around joint interests in landscape and fieldwork. Although the network is not set up to explicitly tackle environmental issues, many projects are of eco-oriented character.

70 Arts Catalyst are one of the forerunners in the UK of art, science and technology commissioning. Operating for more than 20 years, they facilitate the production of projects that push the boundaries of respective disciplines in terms of complexity, research and topics.

71 Culture and Climate Change has facilitated a number of events and publications engaging artists and climate scientists. A recent initiative is Climate Change in Residence: Future Scenarios (2016-7), a cross-institutional artist-in-residency programme involving a number of research centres across the UK. The platform offers modalities to artists a mode to engage with climate science on a systematic and deeper level.

72 Cape Farewell is a high-profile research project launched by artist David Buckland in 2001, bringing together artists and scientists to respond to climate change. Among numerous activities, since 2003, Cape Farewell organised "eight expeditions to the Arctic, two to the Scottish Islands, and one to Peruvian Andes", "physically sailing to the heart of the debate".

73 The Finnish Bioartsociety is an arts and science network, with focus on biosciences, biotechnologies and bioethics. It was set up in Kilpisjärvi Biological Station in the northern part of the country. One of the key initiatives is Ars Bioarctica Residency at the station.

74 Hybrid Matters is a biannual 'field laboratory' working on art & science and bioart nexus in sub-Arctic region of Finland and Norway, initiative set up by Finnish Bioartsociety. A group of artists and scientists spends one week together at the University of Helsinki Kilpisjärvi Biological Station, the outcomes of the process are artworks, publications and exhibitions.

75 Invisible Dust is a not for profit organisation and artist network, based in London, commissioning artworks in at the crossroads of arts, technology and science, and organising exhibitions and events. Its mission statement is to explicitly tackle issues around the environment and global warming.

1.67. New Cross, London, UK.

the River School[76]. Joint fieldwork or labwork is central to these initiatives. The sites visited are strongly charged geopolitical knots or ecosystems that are sensitive to climate change. Despite a variety of ethico-political agendas, what these projects and initiatives share are alternative disciplinary associations, and modalities of production of transversal knowledge and modes of art-making.

A site of privilege where humanity purports to meet and respond to global warming are the United Nations Conferences of Parties (COP), held annually since 1995 in different cities across the globe. Arts have gradually played an ever more important role through both invited commissions and uninvited or grassroots artivist interventions. The connections between art and the Climate Change Conferences merits a study on its own. However, briefly, it can be said that if Copenhagen represented a 'coming of age' of climate-change-minded art, the recent COP21 meeting in Paris (2015) was 'the tipping point' for the climate movement and for environmentally engaged art (Drabble, 2016). Interventions ranged from high-profile pieces by art stars, to a constellation of one-off shows around town, as well as a 'conference of creative parties'. Following Beth Carruters's injunction, Barnaby Drabble concludes that "culture (not science) is the field in which tools for dealing with the current ecological crisis might be fashioned" (ibid.). Drabble however admonishes that there are vast differences between institutional, private and state-funded initiatives, as well as independent and grassroots practices, "differences that must provoke discussion" (ibid.).

One of the key parables of recent eco-oriented art from my perspective is a necessity to create transversal networks of sites and bodies, that seek to move outside the logic of the hegemonic protocols of decision-making and power. If the 'spatial turn' in arts in the 1990s was ignited by patterns of urban development (Deutsche, 1998), the space of intervention has now expanded from urban centres to 'frontier' or remote locations. As an illustration, Basia Irland's *Ice Receding/Books Reseeding* (2008 –) engages communities along

76 Set up by the Translocal Institute at Budapest, the River School (2013-5) invited artists, scientists, environmental philosophers and other concerned parties to investigate ecologies of Danube River.

1.68. Klovakärrsgruvan, disused copper mine. Kemiönsaari, Finland.

rivers to create ice books filled with seeds that are then launched into the water thus seeding downstream. This work embodies the situated/dispersed nature of the environmental crisis, and a need for distributed local associations and alliances. Site, instead of losing significance in the context of presumably unlocalisable global warming, instead re-emerges as a space of confrontation, protest, research and artistic practice.

By way of conclusion, early notions of environment as a unitary homogeneous container have, especially in the context of global warming, materialised into a geography of difference, where the impacts of networks of capital and violence, as well as of climate change processes, are differentially felt. There is no relation of exteriority between the site and the global, only an irreducible heterogeneity of situated embodied 'fragilities' (Connolly, 2013). This differential situatedness of environmental injustice demands an embedded and embodied eco-oriented art practice. Eco-oriented art has a lot to learn from the struggles for climate justice, the ways they occupy spaces and times, and the transversalities they establish between various sites and platforms.

1.69. Sirogojno, Serbia.

1.4. Object

1.4.1. "Objects wrapped in objects wrapped in objects…"

Up to this point, this ontology of the present mostly remained in the realm of subjectivity and its modes of relations with the world. In other words, we have looked from the perspective of the human subject towards various boundaries created by modern protocols. In this section, there will be a change of perspective through a detour into the existence of objects. By entering into the field of new realist, neomaterialist and posthumanist philosophies, we will look from the frontier back at the moderns. In the remaining sections, while keeping an eye on other modern protocols, I will give more space to alternative notions of objecthood, materiality and the nonhuman. These understandings seek to release inferior sides from the chokehold of modern dualisms.

The dynamic between subject and object is constitutive of Western metaphysics and the philosophy of science. The subject–object 'split' is one of the most ubiquitous modern protocols. Individuating something/one as 'object' has immediate ontological, epistemological, as well as ethico-political implications. 'Object' is a possibility for (human) action "upon". Object is that which does not hold agency, thus it may become a tool, a means to an end, an instrument of pleasure and satisfaction. Feminism has extensively unpacked the notion of 'objectification' as a way of subordination and exploitation of women and other humans. Theresa Brennan, following psychoanalysis, claims that objectification is a key moment of construction of the ego (2000: 19). In the context of capitalism, through a general proliferation of commodities, this 'foundational fantasy' of the 'contained subject' becomes a social reality (ibid.: 31). Subject thus founds reality. In this framework, object has strong associations with nonhumanity and the nonhuman world, whose 'freely mobile energy' is "bound in commodities" (ibid.: 87). The subject's foundational fantasy thus encloses/contains both subject and object as commodity. Holistic ecosophies have attacked this modern interface by refusing objectification. However, this approach often uncritically subjectifies what were considered as objects, thereby humanising or anthropomorphising nature. There is another way of going about

1.70. City of London, London, UK.

this crucial dualism with promising routes for rethinking both natures and cultures.

Object-Oriented Ontology (OOO) or Philosophy, introduced by Graham Harman, elaborated by Levi Bryant, Timothy Morton, and Ian Bogost, creates an ontology in which objects are all there is. Objects in the OOO are not passive, they possess reality beyond their relations with the outer world. "The object is a black box, black hole, or internal combustion engine releasing its power and exhaust fumes into the world" (Harman, 2005: 95). Harman confers a full autonomy to objects, "a private inner reality that no other object ever exhausts" (ibid.:228). Importantly, OOO thinkers insist that humans are just another object among others (ibid.: 244). Harman strips humans from any ontological privilege through a trenchant critique of 'philosophies of access', phenomenologies that start with the human subjectivity to 'access' the world. OOO envisages a 'democracy of objects' (Bryant, 2011) in which even the tiniest molecule advances the same rights to ontological consideration as the largest animal.

OOO is a significant attempt to cancel out the hierarchical dualism between human subjectivity and the objective world. It is part of a group of philosophies that has emerged contemporaneously, and has been grouped under the name of Speculative Realism (SR)[77]. Despite the many differences, what connected the participating philosophers was an impetus to go beyond 'correlationism', the term that Quentin Meillassoux explains as "the idea according to which we only ever have access to the correlation between thinking and being, and never to either term considered apart from the other" (2008: 5). The efforts of Speculative Realists and associated philosophies is to access the "*great outdoors*, the *absolute* outside of pre-critical thinkers" [original emphasis] (ibid.: 7). SR and OOO, with their distinctly non-anthropocentric thought, are of potential interest for posthumanist ecological philosophy. What is of particular

77 The portmanteau denominator Speculative Realisms was coined in the occasion of a conference at Goldsmiths College in April 2007. The conference was moderated by Alberto Toscano, and featured presentations by Ray Brassier, Iain Hamilton Grant, Graham Harman, and Quentin Meillassoux. Successively, most of the philosophers, apart from Harman, have abandoned the label.

1.71. Mining and Smelting Combine Bor. Bor, East Serbia.

interest is OOO's espousal and formulation of flat ontology, a philosophical position that claims that "all things equally exist, yet they do not exist equally" (Bogost, 2011: 11). From this perspective, any body, and even relations not involving humans, are worthy of consideration and they 'exist' in the same way that humans do. Flat ontology opens venues for a novel attentiveness to the world, a certain *ethos* or even poetics. This position, however, should not be equated with a flat ethics (Bryant, 2012). Although I recognise that some OOO texts, with their bias on extra-humans, lend themselves to this reading. Beyond the issue of ethics, however, I believe there is space for rethinking eco-art and eco-politics in light of flat ontology.

Of interest to environmental thought is Harman's depiction of the world as made of "countless strata of reality: objects wrapped in objects sealed in objects frozen in objects, extending above, below, and within the theater of human consciousness" (2005: 23). There are many environments, and humans are part of some while not having access to others. However, an obstacle to a productive use of Harman's ontology in ecosophy comes from his privileging of substance over relations, which deprivileges the capacity for change (Shaviro, 2014: 36). Whilst not following other aspects of his theory, I will adopt one of his central notions, that of 'withdrawal' (see 2.2.2.).

Timothy Morton, coming from ecocriticism, productively moves OOO towards creating an ecological/ethical vision of 'dark ecology'. One of Morton's interesting proposals are 'hyperobjects', "things that are massively distributed in time and space relative to humans" (Morton, 2013: 1). Hyperobjects are black holes, global warming and oil, but also a plastic bag. Morton develops a deeply ethical stance which situates humans *inside* of hyperobjects. Dark ecology goes against the phenomenological vision of reality to demand a real engagement with dimensions that are beyond our experience, such as 'absolute past' and 'future futures' in which hyperobjects dwell (ibid.: 61). Contrary to the modern relational ontologies of eco-thought, Morton constructs an ecology less based on what we know (epistemology), and more on the spatio-temporal 'undulations' and interference patterns that inter-body encounters produce.

1.72. Stockholm, Sweden.

Ian Bogost pushes OOO further by proposing 'alien phenomenology', inquiry into how things other than us experience the world. "In short, what is it like to be a thing?" (Bogost, 2012: 10). This is a task for 'speculative fictions' or the 'ontography' of things, a methodology geared at "draw[ing] attention to the countless things that litter our world unseen" (ibid.: 50)[78]. It may seem like a simple shift, but Bogost (following Harman) turns attention towards how other-than-humans make their worlds with other others. Both authors propose an expanded sense of phenomenology, which takes into account life experiences different from those of humans. A similar question was posed by Thomas Nagel when he asked "What is it like to be a bat?" (1974). Nagel recognises that we humans will never know "what it is like for a *bat* to be a bat" (1974: 439), because the structure of bats' bodies is radically different to ours. However, Nagel warns that we should not "deny the reality or logical significance of what we can never describe or understand" (ibid.: 440-1). This is an important opening, and there is a strong ecological ethico-political charge in recognising radical alterity. How to live with the alterity is an open question, and OOO, apart from Morton, does not work in this direction.

In postulating that objects are beyond "human access" whist posing the question "what it is like to be a thing?", OOO runs the danger of "of reinstall[ing] a humanist and masculinist sense of a disembodied subject" (Alaimo, 2014: 15). There is a sense that, even more than decentring, OOO performs a too quick yet smooth leap of human subject from its skin onto the 'other side'. With Rosi Braidotti, I agree that Speculative Realists:

> are really speaking from nowhere … however important it is that we concern ourselves with a-subjective and non-human matter, the politics of locations of the subject is something we cannot let go. (Braidotti & Vermeulen, 2014)

OOO imaginatively conveys an image and a poetics of a cosmos of lively things, but how to dwell with(in) it is a matter of "experiments with forms of affirmative

78 Ontography is suggested by Graham Harman (2005).

1.73. Old Pit. Bor, Serbia.

relational ethics" (ibid.), which must always be conducted from the viewpoint of the ontology of a (post)human subject.

1.4.2. Object-Oriented Philosophy and visual art

Object-oriented philosophies and speculative realisms have been a great source of inspiration for a number of practices over the last decade. This creativity has been facilitated by a close interaction with Harman and Morton, who were frequent guests at art institutions and symposia. The import of OOO for art was mainly to re-examine the status of the artwork and its relation to humans. The downside was that some aspects of the philosophy were taken perhaps too literally, and the philosophy was related mostly to a new wave of sculptural (object) productions[79]. Whilst productively raising questions about the agentiality of objects and the decentring of the human, the problem is that this often backgrounded a number of other bodies and processes.

The focus of a group of artists connected with OOO has been to foreground the inter-mingling of natural and techno-materialities[80]. Morton's 'hyperobjects' are apt words to describe sculptures made of cutting-edge resins, plastics, microfibers, epoxies, rubbers, pigments, etc.. This so to say 'dark ecology' aesthetics has been instrumental in defamiliarising and estranging the position of the human in front of the artwork. The upshot is that ecology has become a widespread term to refer to a number of practices that do not necessarily explicitly deal with what is understood as environmental issues. This could be an interesting move towards a Guattari's 'generalised ecology', however, the aesthetics of these practices often seemed to devalue the social ethico-political

79 Stefan Heidenreich has emphatically claimed that OOO served as an "ideology" for a recent wave of art that privileges the materiality and objecthood (2016, 2016).

80 As an example, many practices in the following shows were explicitly linked to Object-Oriented Philosophy: *Speculations on Anonymous Materials* (2013), *nature after nature* (2014), *Geographies of Contamination* (2014), curated by Susanne Pfeffer at Fredericianum, Kassel. Before that, a number of works in dOCUMENTA(13) (2012) were put into relation with SR and OOO, and the key philosophers of the movements were invited speakers to the expansive symposium programme of the exhibition.

1.74. Zlot cave, Serbia.

dimensions of the works[81].

A show that in my view productively responded to OOO was *And Another Thing* (2011), because it traced a larger narrative of objectification, going from minimalism to body art[82]. In Katherine Behar and Emmy Mikelson's curatorial statement, they write that: "*The artworks on view do not treat humans as subjects*, nor even as objects, but simply as things, like everything else" [my emphasis]. What Behar and Mikelson reveal are the more problematic notions of objectivity, as in the feminist corporeal works of Valie Export and Regina José Galindo. This is an important point since considerations of gender, race, class, ethnicity and ability are markedly absent from object-oriented philosophies and from most of artistic practices that privilege objecthood.

It must be acknowledged that the recent OOO-inspired and 'post-internet art' (Kholeif, 2013), together with abundant symposia and publications that accompanied them, have contributed to a spreading of a number of post-anthropocentric ideas, some of which border with more ecologically attuned philosophies. This contribution should not be underestimated, but more nuanced readings and qualifications that engage artists and philosophers is necessary. In the context of art, where objects have since always deserved especial consideration, there is a risk of re-commodifying and reifying artworks, which shows the risk of how an ontological flattening may not reconfigure the dualistic models of thought but may merely reshuffle it from one side to the other. Perhaps this is the outcome of relating OOO to object- and not process-oriented practices, instead of experimenting with speculative modes of relationality that these philosophies postulate.

81 Some critiques of OOO and other new realisms along these lines can be found in "Questionnaire on Materialisms", a collection of articles in *October* (Joselit, Lambert-Beatty & Foster, 2016).

82 The exhibition was part of a larger programme about 'Thingness' (2011-13) at Vera List Center for Art and Politics in New York. Katherine Behar has further organised a conference on Object-Oriented Feminism (2010) and edited a book of the same title (2016, forthcoming).

1.75. Southern Finland.

1.5. Matter

1.5.1. Lively, vibrant, generative, carnal materialities

Closely kinned with the concepts of 'nature' and 'object' is 'matter'. In Aristotle's *Metaphysics*, matter was one of the four 'causes' inherent to any object, together with form, efficient and final causes. In Aristotle's formulation however, the material cause is linked to the passive and feminine, whereas efficient and formal causes were associated with the male principle (Merchant, 1980: 11-16). This gendered view of matter was espoused by Plato and his followers, where Ideas were thought to be masculine, and the phenomenal earthly world of nature and matter were considered feminine (ibid.: 10). However, since Antiquity and up until early modernity, world-views in which matter was thought to be dynamic and androgynous were present in Europe. From ancient gnostics and Stoics up to the medieval alchemists and vitalists, this 'minor' tradition regarded matter as active and permeated by life (ibid.: 19-29). It is only in the 17th century, and with the affirmation of modern physics, that matter was turned into an inert and inanimate object. Mechanistic philosophy established that the world is made of particles in motion, but motion was assumed as an impetus external to the particles, a thesis which was given its most elaborate articulation in Isaac Newton's physics. Even then, one of the key scientists and philosophers of the period, Gottfried Leibniz held that "all matter must be full of animated, or at least living, substances" (in Merchant, 1980: 283). His contemporary, Spinoza believed that matter possessed innate will to power, striving, or *conatus* (Deleuze, 1990).

Eventually, the mechanistic understanding of the body overcame vitalist understandings and Descartes turned the body into 'brute matter' "that the unfettered will can now contemplate as the object of its domination" (Federici, 2004: 139). This devolution of the body into the (feminine) realm of matter created a 17th century "conflict between Reason and the Passions of the Body" (ibid.: 134), where women were aligned with Passions, a classification that was used to justify witch-hunts. The intersection of lower classes, passions, and

1.76. Mining and Smelting Combine Bor. Bor, Serbia.

magic (organistic world-views of materiality, space and time), as Federici explains, turned into a death sentence for hundreds of thousands of witches, a large majority of which women (2004). Moreover, this inferiorisation of the body allowed for its mechanisation, creating a class of "body-proletariat" (ibid.: 151) and the conditions for 'primitive accumulation' or transition to capitalism. Mechanistic science or the idea of matter as inert prevailed in mainstream Western thought until the early 20th century, when, in line with the advances primarily in physics, it was challenged by Henri Bergson's vitalism and Alfred North Whitehead's process philosophy. However, the deep-seated stigma of matter will take longer to unsettle.

Most systematically, matter has been reanimated from its modern inertness in recent feminist philosophies. Genealogies of this re-emergence are rhizomatic, and feminist posthumanist philosopher Rosi Braidotti classifies these approaches under 'matter-realism', 'radical neomaterialism', or 'posthuman feminism' (2011: 163). These positions are closely related to the 'post-anthropocentric' or 'material turn', of which perhaps most vibrant expression are 'new materialisms' (Coole & Frost, 2010). One of the forerunners of this philosophical shift is the nomadic vitalism of Deleuze & Guattari (1987, 1994). The bridge with new materialisms is to be found in the work of Rosi Braidotti and Manuel De Landa, who coined the concept of "generative matter" (1997). For Braidotti and De Landa, matter is an 'active principle' in and for itself, a position that they derive from Spinoza, who claimed that "mind is the idea of the body, making the body necessarily the object of the mind" (Tuin & Dolphijn, 2012: 95). In *Vibrant Matter*, Jane Bennett develops motifs from Spinoza and DG into the figure of 'thing-power', "the curious ability of inanimate things to animate, to act, to produce effects dramatic and subtle" (2010: 6).

Across the differences in approach, new materialists can be said to share Karen Barad's call to give "matter its due", to investigate "how matter comes to matter" (2003, 2007). A key feature of new materialisms is anti-dualism, and a focus on immanent corporeality, as Rosi Braidotti stresses with her 'bodily' or 'carnal' materialism (2006). At the root of Braidotti's feminist matter-realism is

1.77. Geological test samples. Mining and Smelting Combine Bor. Bor, Serbia.

gendered 'mater' (mother in Latin):

> it is the primary matter and the foundation stone, whose silent presence installs the master in his monologic phallogocentric mode. The feminism of sexual difference argues that women have borne both materially and symbolically the costs of the masculine privilege of autonomous self-definition: they have been physically and symbolically dispossessed of a place from whence to speak. (Braidotti, 2002: 23)

Matter, and its entanglement with nature, are here re-appropriated into a new alliance, with significant implications for ecological thought. Through the work of Elizabeth Grosz and others, recent feminist materialisms rework the logic of dualism individuated by ecofeminisms from the standpoint of philosophy of difference, thereby avoiding possible essentialisms that emerged in early ecofeminism. Through their affiliation with post-structuralism, identity gives way to multiplicity and peformativity. An adjacent, and related area of research, is 'affect theory' which emphasises the materiality of the body through pre-conscious and extra-discursive asignifying processes of the body (O'Sullivan, 2001; Gregg & Seigworth, 2010; Massumi, 2015)[83]. Another feature of new materialisms that is of great relevance to ecosophy is their transversal or 'diffractive' methodologies that work across the binaries of modern dualisms, as well as disciplines, often bridging the gap between humanities and hard sciences (Tuin & Dolphijn, 2012)[84]. Transversality, anti-dualism, and matter-realism of new materialism shape a distinctly ecological *ethos*.

In philosophy, I believe that it is in the new materialist orbit that major innovations in ecological thought are currently taking place. As Diana Coole and Samantha Frost put it, "foregrounding material factors and reconfiguring our very understanding of matter are prerequisites for any plausible account of

83 Affect is one of the central concepts in Deleuze and Guattari's philosophy, and this very special understanding will permeate the analytical framework in Part II.

84 Disciplinary transversality of new materialisms furthers the traditions of sociologies of science, such as Actor Network Theory (e.g., Law & Hassard, 1999; Latour, 2006), and science studies of Andrew Pickering, Isabelle Stengers and others. Key work in this sense is Donna Haraway's genre-defying critical epistemology of science (1989, 1991, 1997).

1.78. City of London, London, UK.

coexistence and its conditions in the twenty-first century" (2010: 2). Through radical re-conceptualisations of materiality and corporeality, new materialisms revitalise some of the *impasses* of the ecological thought of the last century (e.g. holism, organicism, etc.). Stacy Alaimo (2010) postulates a 'transcorporeality' of humans and nonhumans, which affords novel perspectives on issues of environmental justice. Nancy Tuana works out an 'interactionist' ontology to assert the "the viscous porosity of the categories 'natural', 'human-made', 'social', 'biological'" (2008: 189). In her article 'Viscous porosity: Witnessing Katrina', Tuana reads environmental injustices in the case of the hurricane that hit New Orleans in 2005 through 'viscous porosity' between human and nonhuman agencies (2008). New materialist approaches are one of the driving forces behind the burgeoning 'environmental humanities', a field of study

> by which fundamental concerns within the humanities—such as, "meaning, value, responsibility and purpose" (Rose et al. 2012, 1)—can be brought to bear on questions of the environment through the deployment of humanities modes of enquiry. (Neimanis, Åsberg & Hedrén, 2015: 69)

Environmental humanities, through their materialist outlook, bring together issues of social and environmental justice within the context of climate change. By espousing posthumanist understandings of the body, environmental humanities rework issues of environmental justice as permeating both human and extra-human bodies (e.g., Neimanis & Walker, 2014).

A distinctive feature of new materialisms of especial significance to this work is its critique of representationalism. This implies critical revaluations of the perceived primacy that was afforded to discourse and language in the critical theory of the late 20th century, in favour of a 'double vision' that looks at material and discursive entanglements[85]. Ontological distinctions between data

85 With 'perceived reading' I am referring to the reductive synthesis of post-structuralist thought. It is popular to quote Derrida on saying that "there is no outside of text", in order to dismiss this tradition as absurd or idealist. Arguably, some of the insights of postmodernists, as in works of Jean Baudrillard on simulation seem to be quite at odds with a materialist or ecological purview (see Andermatt Conley, 1997). On a deeper level, however, post-structuralist philosophies of difference are key for the development of new materialisms. Karen Barad (2007), for example, develops her materialistic philosophy through a critical and creative engagement with the work of Michel Foucault

1.79. Electrolysis. Mining and Smelting Combine Bor. Bor, East Serbia.

and object, discourse and reality, fact and value, map and territory, are key postulates of modern rationalist epistemology. In her sweeping critique of representationalism Donna Haraway posits that "bodies as objects of knowledge are material-semiotic generative nodes" (1991: 200). 'Material-discursive entanglement' is a key conceptual figure in Karen Barad's posthumanist agential realism (see 2.1.2.). Entanglements of the materialities and discourses put in crisis various representational protocols that have been historically established in order to police the "leaky distinctions" (Haraway, 1991: 151-2) between the two supposedly distinct realms. In the modern outlook, a question such as "can nature speak for itself?" is, strictly speaking, unresolvable if not unthinkable. Through performative neomaterialist ontologies, this and other related questions can be radically re(con)figured.

1.5.2. New materialisms and visual art

Aligned with new materialist and posthumanist orientations, a growing number of curatorial and artistic practices over the last decade have attempts to give matter 'its due'. What is meant by this is that matter, the other-than-human, is recognised as an agent unto itself, sometimes even the protagonist of the artwork. There have been several publications that explicitly work on imagining new materialist methodologies for visual arts (Barrett & Bolt, 2013; Barrett & Bolt, 2014), as well as provide new materialist readings of artistic practices (Tiainen, Kontturi & Hongisto, 2015). In this section, I will focus on reading artistic practices that, in my view, have a (new) materialist orientation, some of which openly engage with philosophical currents, but not necessarily so.

One of the privileged pathways by which matter has surged into the foreground of artistic practice is via digital media. Concurrently with an important stream

and Judith Butler, both commonly considered linguistic constructionists. Susan Hekman maps important materialist aspects in Foucault and even in the linguistic luminary Wittgenstein (2010). Vicki Kirby rewrites the very idea of language by extending Jacques Derrida's grammatology to embrace nature (2010).

1.80. Pen. Ethno Museum, Sirogojno, Serbia.

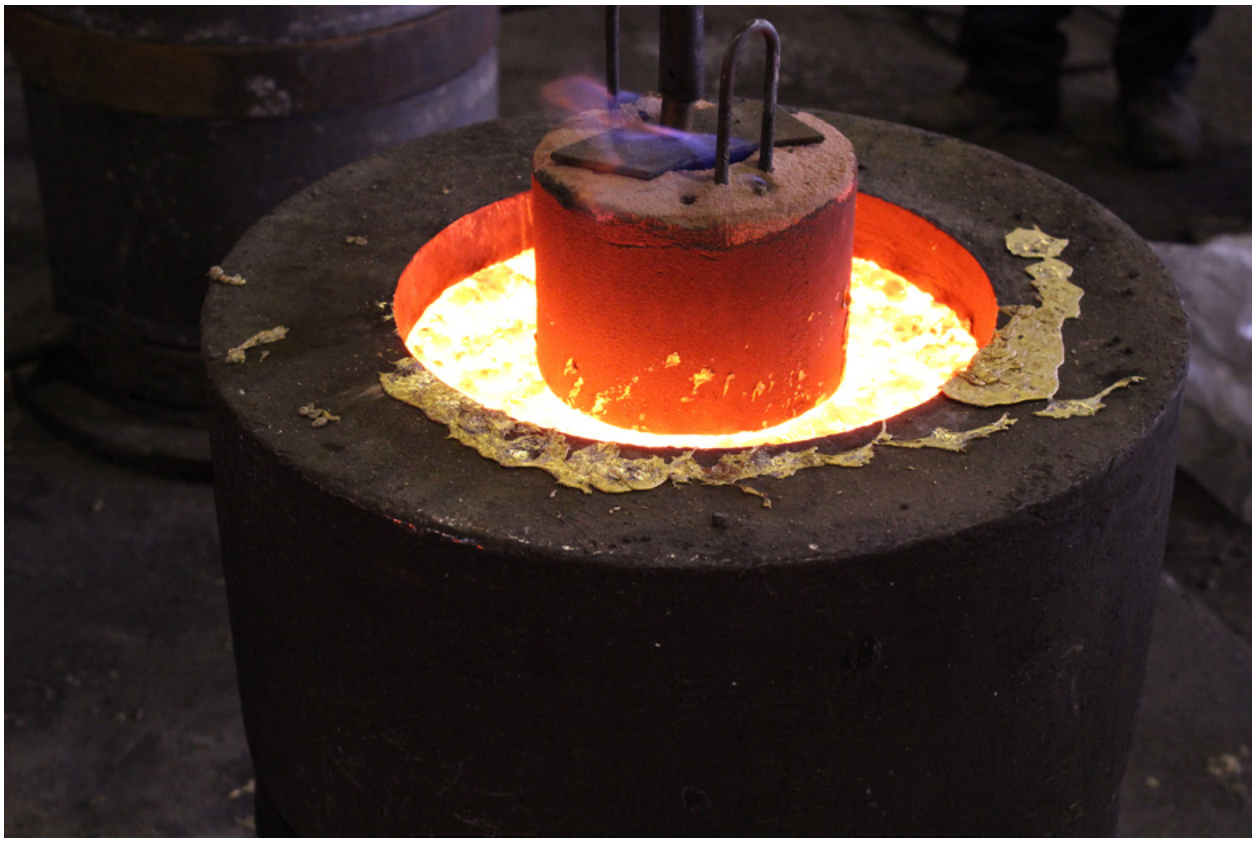
of research dealing with materiality of media and infrastructures (e.g. Mattern, 2013; Easterling, 2014), artists have looked behind the screen into hardware. Medium becomes agent, in a materialist translation of McLuhan's statement 'medium is the message'. Martin Howse, Ryan Jordan and Jonathan Kemp's arts-research project *The Crystal World* (2011-2) is an important early work of media materiality, an exploration into the transformative possibilities of minerals concealed inside the computer case[86]. In a similar fashion, Revital Cohen and Tuur van Baalen, in *H / AlCuTaAu* (2014), "construct" "an artificial ore" by mining discarded computers[87]. Graham Harwood and Matsuko Yokokoji (YoHa) disclose the entanglements of histories of labour and environment through the creation of alternative computing machines[88]. These artists intervene into the material bodies of information technologies and make novel assemblages of components, sometimes functional machines, but crucially new chemical/conceptual agglomerates. Jussi Parikka and Garnet Hertz describe this art methodology as 'media archaeology', a resurgence of geological elementality through and against apparatuses of capitalism, to become 'zombie media' that "do not die" (in Parikka, 2015: 165-77).

Artist film is an important medium for telling stories of matter. A certain

86 The project was part of Jonathan Kemp's PhD *The Crystal World: Executing a new media materialism* (2013). The project consisted of a number of workshops in which the participants were first invited to recover minerals and metals from hardware (ibid.: 67). After that, the materials were used to create "re-crystallisation" "in novel arrays" (ibid.). Finally, these newly crystallised structures and components were to be "re-purpose[d] and embedd[ed]…within wider geological and geophysical systems" (ibid.). These complex operations were set up in motion in order to 'liberate' the crystals from "the digital crystallisation of the flesh by capital [which] limits futures to the point of exhaustion" (ibid.: 56). This is a blend of art and technology in search of genuinely posthuman molecular alliances, something that I will pursue in my own project *mineralizacija* (see 3.6.d.).

87 In the catalogue text for another artificial ore, *B / NdAlTaAu* (2015), Cohen and van Baalen lay emphasis on the history of capitalist circulation of materials: "Mined out of soil, designed in the United States, made in China, destroyed in England" (in Samman & Ondreička, 2015: 59).

88 In their *Tantalum Memorial* (2008), YoHa with Richard Wright, create an electromagnetic telephone exchange which rings the members of a Congolese diaspora telephony network and asks them to record a message. The project brings forth the 'Coltan Wars' that took place in Congo since 1998, killing hundreds of thousands, and centred around the key commodity of IT communications, the coltan ore. *Aluminium* (2009) is a graphic book and film about the social history of aluminium. *Coal Fired Computers* (2010), in collaboration with Jean Demars, is a computer powered by a steam engine revealing reliance of contemporary high-tech on obsolete energy sources such as coal. One is reminded of Steve McQueen's *Caribs' Leap / Western Deep* (2002) video installation which interweaves a colonial history of the local Carib resistance to French colonists in Grenada in 1651, and the 3-km long descent into the Tautona gold mine in South Africa.



1.81. Mining and Smelting Combine Bor. Bor, East Serbia.

matter-realist approach of a recent wave of film-making can be encapsulated in Otolith Group's remarkable description of their film *Anathema* (2011), which "re-imagines the microscopic behaviour of liquid crystals undergoing turbulence as a sentient entity that possesses fingertips and eyes enthralled by the LCD touch-screens of communicative capitalism" (Otolith Group, 2012). The film-based works of the Otolith Group have been merging documentary form, fiction and speculation to summon futurist post-colonial and post-capitalist imageries[89]. Ursula Biemann follows the elements as they circulate across various networks and planes of meaning, representing various points of view, some of which are decidedly nonhuman[90]. Biemann's is a quest for a posthumanist vocabulary both in form and trans-disciplinary methodology, as her works blend science, philosophy, geopolitics and social documentary, grounding the process with a deep attention to site-specificity and nonhuman bodies. Biemann presents a perhaps unique convergence of new materialist and posthumanist philosophies with environmentally and politically-engaged art. Artists working with a similar ethos are, among others, Tuomas A. Laitinen[91], Hanna Husberg[92] and Amie Siegel[93].

89 The Otolith Group's themes vary widely, but some productions have a strong environmental focus. *Radiant* (2012) follows the invisible traces of post-Fukushima nuclear fallout. *Medium Earth* (2013) intertwines the earthquake prone geology of California with the unconscious of persons who believe they can predict earthquakes.

90 Biemann's earlier works were investigations into global geographies of capital, with emphasis on commodities and migrants flows. In recent works, Biemann interweaves multiple strata – political, scientific, philosophical – to create documentary realities with speculative and sometimes science-fiction atmosphere. *Egyptian Chemistry* (2012) follows the waters of the Nile, in a mesh-up of scientific interviews, field measurements, and philosophical musings. The project, as presented on the online platform of World of Matter, features a number of videos and an expansive research archive. *Deep Weather* (2013) starts with aerial imagery of tar sands oil fields in Alberta, Canada, to then move to Bangladesh, where it follows local inhabitants building flood defences. The voice-over speaks in semi-whispering time in first-person, representing the Earth. *Forest Law* (2014), in collaboration with researcher Paulo Tavares, follows several legal cases that indigenous populations of the Ecuadorian Amazon have raised against oil and mining companies.

91 Following the material circulation of copper across the globe, Laitinen's four-channel video installation *Conductor* (2014-15) traces the flows of copper across the globe creating a complex environment of sound and vision. *Powder of Sympathy* (with Jenna Sutela, 2015), examines the mythical and chemical characteristics of copper, thereby adding mental dimensions to the material story of the element.

92 Hanna Husberg's films delve into the thick of matter to unravel elemental cosmologies, combining site-specific film-making with poetic-scientific texts. Her recent focus is on the atmosphere (*In the Vast Ocean of Air*, 2016), water, salt and cynanobacteria, or blue-green algae in (*Being With*, 2015). Husberg situates molecular-material stories into the current geopolitical contexts and contestations, thereby looking at complex matters from both social and extra-human perspectives.

93 In *Quarry* (2015), Amie Siegel traces the transformation of marble stone from the moment of its

1.82. Slag. Mynydd Parys, Isle of Anglesey, Wales.

This strand of film/research-making marks the passage into a post-environmental perspective in which naturalcultural entanglements run so deep that is impossible to simply 'document' them with traditional media. To achieve this deep description, these artists implement hybrids of social critique and free-form speculation and futurism, molecular-elemental imagery with poetic texts attuned to the language of recent ecocriticism or new materialism. The end results are multi-sensory poems in which extra-human bodies are agential protagonists co-constituting human stories. Differently to environmentalist documentary films, artist films or video essays in a matter-realist register move through and sometimes even beyond objective facts to dramatise the present and imagine alter- or counter-narratives, either in utopian or dystopian direction. These works are powerful nonmodern stories that contribute to renewing the language of ecological art with posthumanist visions and vocabularies.

Forensic Architecture is a trans-disciplinary research group initiated by Eyal Weizman, working on issues of social justice by producing new legal evidence through the procedures of forensics, scientific methods to make "objects address the forum", to make them objective 'testimonies' of injustice (Weizman, 2010: 11)[94]. World of Matter is an "international media, art and research platform that investigates contemporary resource ecologies" (Biemann, Mörtenböck & Mooshammer, 2013: 76). The group proposes to bring the question of resources into the aesthetic-philosophical discourse, in order to "de-familiarise understanding of natural resources, taken not as discrete entities but rather in

mining to its architectural coolness adorning Manhattan luxury condos. Siegel's focus is on the speculation or economic value-production process, but the conductor of the story is not discourse of advertisement or language, but shining surfaces of marble itself. The viewer can feel the violence of extraction, and remain captivated by the beauty of the material silently absorbing histories of social labour and the Earth when immobilised in high-end design furniture.

94 The activities of this group are primarily concerned with the issues of international war crimes and social justice, but they have also performed environmental justice research projects: Nobil Ahmed's investigation on environmental poisonings by arsenic, Godofredo Pereira's inquiry into the water contamination caused by a copper mining operation in Chile. Adrian Lahoud develops a 'forensic climatology' to analyse two cases of genocide in Sahel, trying to support the case of the Sudanese diplomat Lumumba Di-Aping who accused the developed nations of climate genocide at the COP meeting in 2009. The website of the project is a rich source of documentation, as well as the publication (2014) and the exhibition at HKW, Berlin (2014).

1.83. Wool spinning manufacturing. Sirogojno, Serbia.

terms of complex human and non-human ecologies" (ibid.: 78). In the position statement of the group and in individual works, there is a shared effort to take matter seriously while at the same time not losing sight of environmental justice. This situatedness invokes a meeting of politically-engaged art and ecological art. Among the works of the World of Matter group, the above mentioned Ursula Biemann's *Egyptian Chemistry*, Paulo Tavares's *Non-human Rights,* compellingly interweave dimensions of social and environmental justice.

A number of recent shows and events have to various degrees centred matter and decentred the human in the process[95]. These recent projects follow in the wake of several important precedents. A pivotal role in establishing a materialist-oriented curatorial practice was played by Bruno Latour, with a trilogy of co-curated shows at ZKM, Karlsuhe[96]. From a consonant intellectual milieu emerged a multi-part research-exhibition *Animism* (2010-12). Curated by Anselm Franke, *Animism* traces how the concept of animation has troubled the boundary-making project of modernity:

> The exhibition is conceived as a topography of the 'middle ground' that opens up if we suspend the division between the 'Great Divides' of modernity. The works of art in the exhibition are like 'crossings', as they pass from one side of the abyss to the other, from object to subject, from one 'subject position' to the next, or from one ontological register to another. They 'map' what happens if the iron cages of subject and object are broken open. (2012)

A number of works on display, spanning from 1900 to the present day, reveal

95 Among many others, the recent Tate Modern display *Materials and Objects* (2016) which shows contemporary art of the last hundred years by reading the materials they are made of. *Rare Earth* (2015) brings together researchers and practitioners around the topic of rare earth elements. Sonic Acts festival at Amsterdam has dedicated 2015 edition to *Geological Imagination*, gathering a core group of thinkers and artists to try to represent the Anthropocene. *Matter Fictions* (2016) maps out the past, present and future ecologies of human-matter relations under the following headings: "Decolonisation of the Sign", "Out of the Grid", "Molecular & Territories" and "Recoding the Earth".

96 *Iconoclash* (2002) examined the crisis of representation in arts, thereby inaugurating some of the key new materialist topics in the arts. *Making Things Public: Atmospheres of Democracy* (2005b) tackled the issue of representation with emphasis on politics and science. Importantly, one of the goals of the show was to introduce non-Western conceptions of representation. The project has continued with another large show dedicated to imagining strategies to "recalibrate our detectors, our instruments, to feel anew where we are and where we might wish to go" — *Reset Modernity!* (2016).

1.84. Östergårdsgrufvan. Kemiönsaari, Finland.

the nonmodern lines of inquiry that existed in parallel to the mainstream of modernism[97]. dOCUMENTA(13), curated by Carolyn Christov-Bakargiev, had a stated emphasis on naturalcultural practices and recent currents in neomaterialist and speculative philosophies. Beyond these topics, the above shows share a research characteristic in that they are platforms or 'assemblies' of objects and humans (Latour, 2005b), accompanied by wide-ranging events programmes and ample catalogues with scholarly and artistic contributions. Rarely have philosophy, science studies, and humanities been in closer dialogue with visual arts, breaching the established modern divisions of labour.

The exhibitions and projects outlined in this section place emphasis on the matter*ing* power of matter, how it becomes a gravity pull for social practices *around* it. These practices are of similar affiliation with the above mentioned object-oriented art-philosophy interactions. However, there are significant ethico-political differences among the artists and thinkers. In any case, these object- and matter-centred works represent an important move towards accounting for the boundary-making projects of modernity, which is an imperative for a posthuman eco-aesthetics.

In this section, I have focused more on research and audio-visual modes of negotiating materiality. In line with materialist feminisms, the key site of naturalcultural hybridisation is the body itself. Meeting bodies radically other is the topic of the following section.

97 Among other projects, Jimmie Durham's *Museum of Stones* (2011/12) neatly displays ordinarily looking stones into a standard museum display case. However, stones are lying on bread cutters and look like pieces of bread. Organic turns into inorganic. *Assembly: Animism* (2011) by Agency is an archival collection of judiciary cases in which things are vortexes around which disputes concerning copyright, authorship, and agency are resolved. Law as a boundary-making practice of what acts and what does not matter.

1.85. Jussarö disused iron mine. Jussarö, Finland.

1.6. Nonhuman

1.6.1. "Other than nonmen"

Nonhuman, inhuman, unhuman, other-than-human. Ultimately all the above dualisms come to this 'non' or 'other', the red ribbon of all the small and Great Divides that humans may reassert against that which is radically else, including other humans. Nonhuman marks the edge of the human project, inasmuch as it has taken shape through the carving out of a human space within a larger universe of nonhumanity. It intersects with the concept of nature, but it is an even more drastic cut, since historically it was postulated on many occasions that 'we' are part of 'nature'. Few would have categorised themselves as nonhumans.

Nonhuman is the radical outsider, or the radically outsided. However, nonhumanity comes in degrees. I will begin with our allegedly closest kins among the nonhumans – animal (that we are). Many animals are systematically enslaved by humans, some are killed in the wild, some imprisoned for human curiosity, yet others spend their lives navigating the interstices of the ever-thickening webs of human legislations, market logistics, arms trade, etc. Of course, many beasts are almost family members, almost persons, almost right-holders. From "Aesop to La Fontaine to contemporary Hollywood animation films" (Braidotti, 2011: 452), critters have been some of the favourite moral metaphors of what is good and what is evil in humans.

That animals are inferior to men is a belief first systematically formulated by Aristotle, who organised living beings in hierarchical order based on their innate capacities[98]. Plants are lesser than animals and humans because they presumably do not have consciousness. One level up, animals are inferior to men because they behave according to instinct, rather than reason. Considering

98 Aristotle should also be credited as one of the originators of the scientific study of life. About a quarter of his vast corpus is dedicated to the study of living beings, especially animals. However, Aristotle also demonstrates the extent to which biology has since its inception been entangled with ethical, moral and political speculations.

1.86. Copper rod plant. Mining and Smelting Combine Bor. Bor, Serbia.

that until the 16th century Aristotle's writings were a key scientific philosophy of Europe, this hierarchy of the living for a very long while impacted the fates of animals in the mainstream of Western thinking[99]. In the 20th century, Martin Heidegger, a philosopher acutely aware of the world outside the human, dedicated an essay to 'the essence of animality'. However, he concludes that animal is "poor-in-the-world". Animals do not have a world because they are "captivated" but they still rank higher than stone, which is "wordless" (Iveson, 2010). The progression of the animal in human ontology has been slow.

One day, a philosopher met 'a little cat'. In his rightfully acknowledged piece *The Animal That therefore I am*, Jacques Derrida recounts an encounter with his cat. He is naked, and 'the little cat' is staring at him. He is ashamed, and "ashamed for being ashamed" (Derrida, 2008: 4). To find another human–animal settlement, Derrida criticises the homogenising subsumption of all the animal world under the generic term 'the Animal'. In frustration with this tradition, he coins an alternative word *l'animot* (ibid.: 41). However, in the process, 'the little cat' wanes in the background, and here I am following Donna Haraway's critique that he did not learn more about this cat than before the encounter:

> The question of suffering led Derrida to the virtue of pity, and that is not a small thing. But how much more promise is in the questions, Can animals play? Or work? And even, can I learn to play with *this* cat? Can I, the philosopher, respond to an invitation or recognize one when it is offered? (Haraway, 2008: 22)

Donna Haraway offers a way out of Derrida's philosophical quandary of

99 The permanence of animals as preferred subjects of taxonomy was perfectly encapsulated in Jorge Luis Borges's story *The Analytical Language of John Wilkins*, where he mentions "a certain Chinese encyclopedia entitled 'Celestial Empire of benevolent Knowledge", wherein one can find a following classification of animals:

> In its remote pages it is written that the animals are divided into: (a) belonging to the emperor, (b) embalmed, (c) tame, (d) sucking pigs, (e) sirens, (f) fabulous, (g) stray dogs, (h) included in the present classification, (i) frenzied, (j) innumerable, (k) drawn with a very fine camelhair brush, (l) et cetera, (m) having just broken the water pitcher, (n) that from a long way off look like flies. (1993)

1.87. Mäntsälä county, Finland.

l'animot that "'doesn't respond'" (Derrida, 2008: 112). The more profound question might be quite different: *am I able to respond*?

Haraway opens up to another way of worlding in which humans are 'companion species' or 'kins' with a great variety of nonhuman creatures, engaging in relations of 'significant otherness' even with technological and nonorganic bodies (1997, 2003). Haraway's invitation is: "Who are my familiars, my siblings, and what kind of livable world are we trying to build?" (1997: 52) This is a dramatic expansion of territory not only of philosophy, but first and foremost of ethico-political cohabitation:

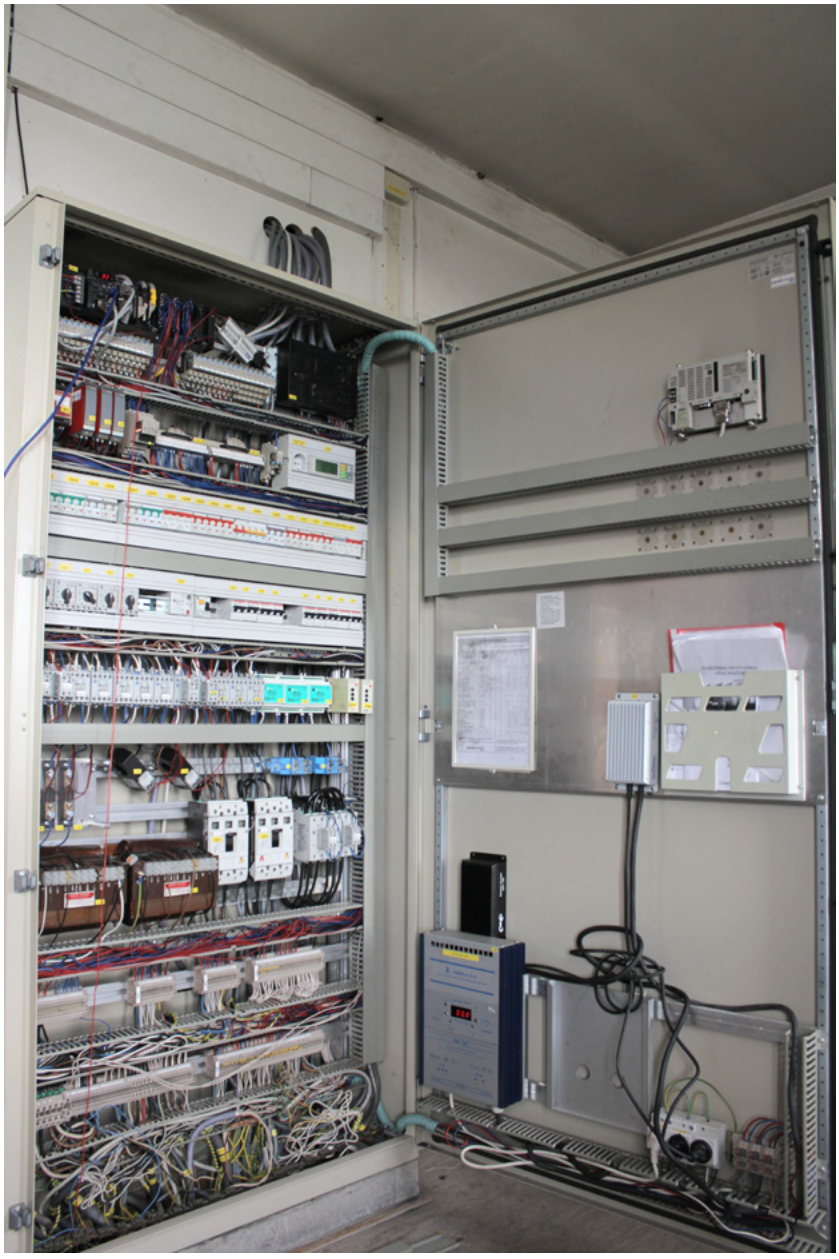
> Like it or not, I was born kin to Pu239[100] and to transgenic, trans-specific and transported creatures of all kinds; that is the family for which and to whom my people are accountable. (ibid.: 62)

Some of these 'creatures' that Haraway mentions are offspring of humans, as genetically modified OncoMouse (Haraway, 1997) and the first cloned sheep Dolly. Importantly, it is not only transgenic mice are 'cyborgs'; humans themselves are bio-techno hybrids too (1991)[101]. Nonhumans are not only 'among us', or we among them, but these 'other' bodies are a constitutive part of humanity, e.g. bacteria in the digestive tract. Human bodies are made through "collaborations of a post-humanist kind" (Neimanis, 2012: 216).

Bruno Latour develops what he calls the 'sociology of associations' to trace how the two blurry realms of natures and cultures hybridise (1999, 2005a). Nobody is a member of a society by species lineage, the question is who/what participates in 'assembling the social' (Latour, 2005). The links are continuously made between nonhumans—microbes, machines, all sorts of things, living and non-living—and humans. The social is *how* these 'associations' take place, how

100 Plutonium-239 is an isotope of plutonium, primary ingredient of nuclear bombs and one of the isotopes used in nuclear reactors.

101 Due to its technological genealogy, Haraway's 'cyborg' is often read only to signify techno-bodies, but it stands for immanent hybridity and multiple identity. Compared to somewhat tamer notion of 'companion species', cyborg seems a more provocative and unfamiliar proposition, that incited some very exciting re-readings (Cuomo, 1998; Braidotti, 2002).



1.88. Skomvær lighthouse. Skomvær, Røst archipelago, Norway.

humans and nonhumans "exchange properties" and 'compose' a 'collective':

> Instead of a science of objects and a politics of subjects, … a political ecology of collectives consisting of humans and nonhumans. (Latour, 2004: 61)

In Latour's sociology, an actor is "*any thing* that does modify a state of affairs by making a difference" (Latour, 2005a: 71). From this minimal definition of social agency, Latour imagines a 'parliament of things', which enacts complex procedures of "progressive composition of a common world" (2004: 61). Few authors have gone this far in 'socialising' nonhumans, however precisely 'socialisation' might be a problem in Latour's project[102]. Without following Latour's conclusions, it is to be said that, by way of Haraway and Latour, and the efforts of a multiplicity of their colleagues and followers, nonhumans are (discursively) liberated from much of the stigma that was attached to them throughout modernity.

On the material side of things, we cannot ignore the fact that animals are as exploited today as ever, and billions of them remain humanity's "zoo proletariat" (Braidotti, 2011: 111). 'Carnophallogocentrism' is terrifyingly alive and well (Derrida, 2006), animal bodies are the most deprivileged participants in the biopolitical regime of capitalist exploitation of life (Braidotti, 2011; Haraway, 2008). The horrific exploitation patterns of animals are part of the 'web of oppression' spun by the 'logic of colonisation' (Plumwood, 1992). (Eco)feminist theory has worked intensely on thinking and practising a transversal alliance between animal liberation and women's rights (see, Adams

102 In Latour's 'parliament of things', it is nonhumans that need to 'knock' on the door of the Republic in order to be integrated or not. The Republic is divided in two houses: "[t]he first house brings together the totality of speaking humans . . . The second house is constituted exclusively of real objects . . ." (2004: 14). In between, a "group of handpicked experts" possesses the ability "to make the mute world speak" (ibid.). The entities outside of the collective 'appeal' to be included, upon which the collective proceeds through the procedures of 'perplexity', 'consultation', 'hierarchy' and 'institution' to determine whether they 'can live together' or whether they will be 'externalised'. The most problematic aspect of Latour's proposal is that it presupposes an insider 'we' (who is we?), as well as a progressive, that is, a modern narrative of progress. These problems stem from the fact that Latour's Republic is based on *representational* politics, which I believe is extremely problematic in the naturalcultural context. (see 2.1.3.)

1.89. Östergårdsgrufvan. Kemiönsaari, Finland.

& Donovan, 1995; Donovan & Adams, 2007). Mainstream animal ethics has proposed giving 'rights' to animals in order to 'liberate' them. Standing in solidarity with animal rights movement, there is also another, perhaps more radical way.

Deleuze and Guattari invite humans to leave behind fantasies of supremacy and to *become-animal*. Darwin and Freud may have dipped the human into a collective nonconscious memory that links us immanently to the prehuman, but these considerations have clearly not been realised on the level of social practices. For DG, animal is a trajectory out of the identity of the Oedipal subject. Modern subject should thus aim for "a pack, a band, a population, a peopling", becoming a multiplicity. Becoming-animal is not about "imitating" a dog, but transforming what a body can do to enter into "the domain of symbioses that bring into play beings of totally different scales and kingdoms, with no possible filiation" (DG, 1987: 238). Life is an immanent force that rushes forth across species, categories, filiation lines. It is a radically open space of transcorporeal kinship. Following DG, Braidotti postulates a 'bioegalitarianism', described as "a vital connection based on sharing this territory or environment in terms that are no longer hierarchical or self-evident" (2011: 110). Becoming in this open space embraces a variety of inhuman trajectories. DG and Braidotti, for example, further suggest becoming a plant, a mineral, molecular, earth and so on. This practice of 'becoming-minoritarian' is an invitation I will try to pursue in my project.

1.6.2. When other-than-humans meet

It is by no means sufficient to animate objects or usher the liveliness of matter without re-inventing, re-imaging and remaking the ways by which we encounter these different, and now hopefully more significant, other others (or othernesses from what was thought to be 'other'). Arts of encounter between humans and other-than-humans is a domain in which posthuman eco-aesthetics moves. Art

1.90. Hyvinkää municipality, Finland.

facing or addressing the nonhuman is a vibrant and varied field. The works discussed here therefore only represent a cross-section of practices that have an *ethos* in tune with my research.

Before mentioning recent practices, I have to refer back to Joseph Beuys, who was one of the first to co-perform with animals[103]. Many artists have followed suit. Marcus Coates's performances are consistent attempts at learning what it is like to be an animal. In *Stoat* (1999) Coates attempts to walk on bespoke high wooden platforms aiming to reproduce the animal's gait. In *Goshawk* (1999) he ties himself high on the trunk of a Scots pine in order to mimic the standing point of this bird. In *Indigenous British Mammals* (2000), lying buried below a piece of turf in moorland, Coates emulated wild animal calls of the region. In more recent works Coates situates performances in areas subject to urban regeneration projects, where, dressed as a shaman, he tries to get in touch with animal spirits and seek advice about the developments, thus linking animal with socio-political and economic worlds (*Journey to the Lower World,* 2003; *Vision Quest – A Ritual for Elephant and Castle*, 2012). Coates's performances may look naïve and ludicrous, a sort of lay 'new age' shamanism, but who says that animals do not have a sense of humour? Practising extended cohabitation, in *Falling Asleep with a Pig* (2009), Kira O'Reilly shares a house, like a barn, with a pig for 36 and 72 hours. In his work *A holiday from being human (GoatMan)* (2016), Thomas Thwaites lived on a goat farm for a week in the guise of a prosthetic sheep, with legs and an add-on stomach that allowed him to simulate 'eating' grass. Learning to meet plant is an ongoing engagement in the performative practice of Essi Kausalainen. Through careful work on listening

103In *I Like America and America Likes Me* (1974), Joseph Beuys, in his classic shamanic role, spent three days, six hours each, in a cage with a coyote, the symbol of American wilderness. Among other interesting paraphernalia, each day fifty copies of Wall Street Journal were brought into space, which coyote ripped into pieces or urinated upon. At first aggressive, as the time advanced, coyote eventually seemed to have created some form of a cohabitation with the artist. It can be commented in length on the density of symbols and metaphors, and possibly even anthropocentricism of the piece. Whatever may be the case, I find this performance a forerunner to posthuman naturalcultural art, not so much for its breaching cultural space by the animal (something other performances of the period already did), but for its intersectional quality of bringing together human and animal within a differentially shared geopolitical and biopolitical context. In the prelude to the performance, Beuys, in line with his acknowledged anti-Americanism, was transported from the plane to the gallery and back, wrapped in felt, supposedly never touching the ground of the country.

1.91. Skansen open-air museum. Stockholm, Sweden.

and responding, Kausalainen creates plants—humans co-performances, choreographies in which mutual boundaries are tested. Mari Keski-Korsu in *Alpaca Miracle* (2014/2015) "looks at the possibility of expanding human understanding on the present state and future prospects of life on Earth by practising the skills of inter-species communication" (Keski-Korsu, 2015). In this work, humans, with the help of an animal communicator, are introduced to a herd of alpacas in search of advice. In Rita Vitkauskaite, Karl Heinz Jeron & Bartaku's *Aronia M. Overture* (2014), human singers are invited to "assist the Aronia Melanocarpa (chokeberry) to express its essence" by putting aronia concentrate on tongue, letting it deploy its taste and astringent properties.

Multispecies Salon was a series of events and panels organised in 2006, 2008, and 2010 by the American Anthropological Association, bringing together ethnographers, biologists, and artists working in the emerging field of 'multispecies etnography'[104]. Multispecies Salon created a space of experimentation for arts and sciences. Among other practices in the show, Caitlin Berrigan invited visitors to feed dandelion plants with blood, receiving in return the plant's root tea and sprouts, thus creating an inter-species 'blood bond' or gift economy. And Miriam Simun disturbed familiar structures of dairy farming by proposing 'human cheese'.

Elizabeth Stevens and Annie Sprinkle founded a new field of Sexecology with their Ecosex Manifesto (2011: 7). Practising what they preach, the artists engage in 'pollen-amorous' affairs with nonhumans that are sometimes formalised in Ecosex weddings. At the point of writing, Stevens and Sprinkle have married the Sea, the Earth, the Appalachian Mountains, the Moon, the Snow, the Rocks, the Coal, Lake Kallavesi and the Dirt. These performative acts bring together an

104 In the catalogue of the show, multispecies ethnography is described in these terms:

> Ethnographers are now exploring how 'the human' has been formed and transformed amid encounters with multiple species of plants, animals, fungi, and microbes. Rather than simply celebrate multispecies mingling, ethnographers have begun to explore a central question: Who benefits, cui bono, when species meet? (Kirksey, Schuetze, & Heimreich, 2014:1-2)

Multispecies ethnography is one of the many emerging field that can be said to participate in the larger 'nonhuman turn'.

1.92. Klovakärrsgruvan. Kemiönsaari, Finland.

aesthetics of queer festivity with issues of activism. The Appalachian Mountain wedding took place in solidarity with the struggle against mountain top removal for coal extraction. Recently, the duo participated with the 'EcoSex contingent' in San Francisco and Santa Cruz Gay Prides, a gesture of radically affirmative "GLBTQIE (E for ecosexual)" (Stevens & Sprinkle, 2015) art and politics.

In her early works, Terike Haapoja staged meetings between humans and plants through interactive works using digital sensors[105]. More recently, through trans-disciplinary long-term projects, Haapoja developed a so to say multispecies institutional critique, aimed at deconstructing the histories and presents of the inferiorisation of nonhumans. *The Party of Others* (2011 -) started as a series of interviews with environmentalist, animal rights, political and art thinkers, in order to crystallise into a political party in Finland. The Party of Others represents those that do not possess a (human) voice of their own. *History of Others* (2012-) is an ongoing rhizomatic project, in collaboration with researcher Laura Gustafsson, that "seeks to open paths for more inclusive notions of society" through performances, exhibitions, discussions[106]. Haapoja's work is both a critical-historical and a creative intervention into the (cultural) protocols of production of nonhumanity.

Matthew Fuller (2009) coined the concept of 'art for animals' referring to artists who create human—animal interactions, mostly through digital media (Natalie Jeremijenko), or who encourage novel animal—animal relations (e.g., Louis Bec). Fuller draws on DG's radically expanded understanding of art, not as a fully human mode of expression, but as belonging to the cosmos. "Perhaps art begins with the animal, at least with the animal that carves out a territory and constructs a house…" (DG, 1994: 183) In the writings of Charles Darwin, art, especially music, is central in the explanation of sexual selection (Grosz, 2008).

105 In Haapoja's *Dialogue* (2008), a gallery space was populated by a number of trees the visitors were invited to breathe or whistle into a CO2 sensor. Sensors on the trees measured the decrease of CO2 as it was absorbed by the leaves and whistled back to the visitor.

106 Haapoja's and Gustafsson's project had different manifestations, *The Museum of the History of Cattle* (with the publication *History According to Cattle*) (2013), *The Trial* (2014), a performance that staged a juridical proceeding about legal personhood of nonhumans, and the exhibition *The Museum of Nonhumanity* (2016), that will be followed by the publication *The Encyclopedia of Nonhumanity* (2017).

1.93. Zlot cave. Serbia.

Art and music go beyond the pragmatics of survival, they are an "opening up of life to taste, to sexuality, to erotic appeal, to excessiveness" (ibid.: 39). Thus, 'art for animals' does not indicate that it is art that enlightens animals with 'our' gift. Something else is at stake here. 'Art for animals', and art for plants, for earth, is a question of participating in the wider artistry of the cosmos.

The key element of interspecies art is the creation of a shared territory where a meeting, or mingling, can take place. Site-specificity here means species- or entity-specificity, a transcorporeal mode of address of radical alterity. This is why multispecies arts are inextricably linked with ethics and politics. In this they tread ground familiar to natural sciences, with a distinction that artists do not seek objective knowledge; inter-species artists experiment with hybrid, trans and queer modes of affective intensity. This is the affective and ethico-political ethos of my research. Transpersonal is the political body in a posthuman ecology. Sensibility and attentiveness to singular differences, observed in the above practices, leads to the key feature of alter-anthropocen(tr)ic art and philosophy.

1.94. Mäntsälä municipality, Finland.

1.7. Ecology of difference

Difference is the 'hidden abode of production' of modern subjectivity based on othering, the dynamics underlying all the dualisms of modernity:

> In the European history of philosophy, 'difference' is a central concept insofar as Western thought has always functioned through dualistic opposition that create subcategories of otherness or 'difference-from'. Because, in this history, difference has been predicated on relation of domination and exclusion, to be different-from came to mean to be 'less than', to be worth less than. Difference has been colonised by power relations that reduce it to inferiority, as Simone de Beauvoir pertinently put it in *The Second Sex*. Difference consequently acquired essentialist and lethal connotations; it made entire categories of beings disposable, that is to say, just as human, but slightly more mortal. (Braidotti, 2011: 138)

Difference in the modern settlement is ultimately the distinction between the Self and the Other, perhaps the horizon of modern thought, as seen in ethics of Emmanuel Levinas who recognised that Other is "transcendent, irreducibly different, 'forever unknowable'" (in Murphy, 2006). This recognition of boundedness of the modern epistemology is an opening for the philosophy of difference. Post-structuralists laboured to reset difference from negativity into the creative force of being, 'differenciation' in Deleuze, and 'différance' in Derrida. From this standpoint, difference is the dynamics that the logic of dualism recognises but tries to capture in its binaries. In poststructuralism, difference is not produced by the dualism, it is an ontological property of the world.

Extending this tradition, Braidotti's philosophy/politics of difference is an attempt to "overthrow the pejorative, oppressive connotations that are built not only into the notion of difference, but also into the dialectics of Self and Other" (2011: 11). This is a very different project from difference instrumentalised by capitalism as diversity, authenticity and personality. Difference is in capitalism geared at the production of (homogeneous) value: "Differential capitalism

1.95. Utö, Finland.

striates the differences, hierarchises and valorises them" (Raunig, 2013). Franco 'Bifo' Berardi describes capitalist operativity as based on "the functional interoperability of organisms previously reduced to compatible linguistic units" (2012: 123). An ecology of difference, is instead about conjunctions between bodies: "becoming-other, living, and the unpredictable concatenation of bodies" (2012: 123). Difference is closely related to another liminal concept: life. Life and non-life are very different notions in a dualist modern ontology and in an ecology of difference.

Ecology of difference is about conjunctions beyond compatibility, a freedom of possibilities of life in a posthumanist "continuum of indistinction" between bodies (Philippopoulos-Mihalopoulos, 2015). Indistinction means being outside the grids that sort bodies according to species, genera, sex, race, class, and other enclosures. Only in a continuum of indistinction can "each singularity live out its own strangeness to the extent of its possibilities" (Raunig, 2013). For Braidotti, feminist philosophy of difference, "[w]hat is at stake is the definition of woman as other than a nonman" (Braidotti, 2011: 154), i.e. positing the 'other' beyond a 'difference-from' (a standard). Learning from this statement, I think that the task is similar for a posthuman ecology of difference. *What is at stake is the definition of earth others as other than nonhuman*.

The ontology of the present, as outlined in this chapter, is an analytical exercise of localising the intersections of oppression, modes in which subjects, natures, objects, and other 'others', are materially and discursively bounded and materially dominated. This ontology starts from the body, itself constituted and crossed by a number of modern protocols. Modern protocols permeate a majority of the social field but they never fully capture it. Representation does not match the world one-to-one. The boundary areas of dualisms are 'leaky', they absorb only what they can 'see', a fraction of the indeterminate buzz of difference. Difference is always present but it is often appropriated or backgrounded. How to sense difference, address it, make oneself responsible to it, is a process of becoming-other than what one is. In the boundary areas where

1.96. Klovakärrsgruvan. Kemiönsaari, Finland.

differences are apportioned, it is not an exit the eco-practitioner is looking for. The question is how to leave the enclosures staked and controlled by the modern 'logic of dualism'. Leaving the territory does not amount to crossing a boundary from one domain to another (human →nonhuman), or inverting the boundary (nature →culture). It is about diverting or suspending the logic of the boundary mechanism.

How to perform a situated affirmation of difference in the context of modern protocols is what I will try to outline and enact in Parts II and III.

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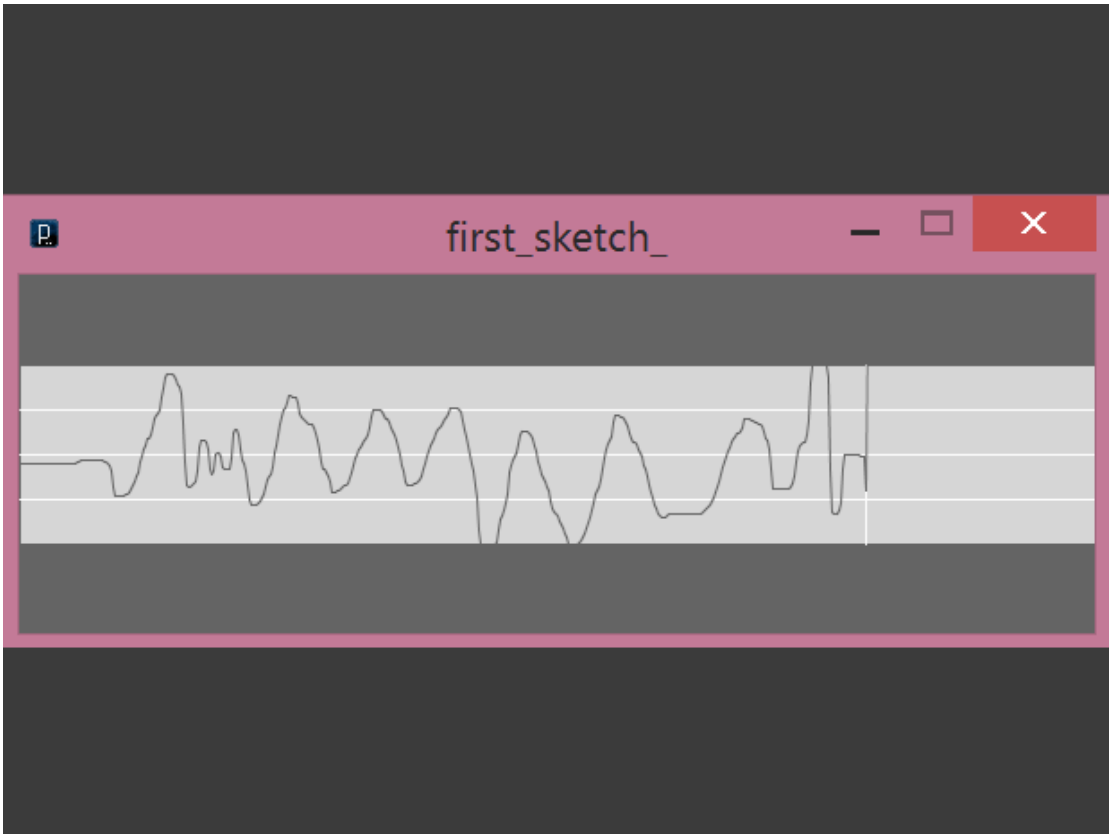
Part II:

Flat ecology:
an analytics of the possible



2.01. Heartbeat tracking app. *confluence*.

2.0. Introduction

The scope of this chapter is to build on the critical ontology of the present towards a practice that could perform a posthuman eco-aesthetics of intra-action. Following Rosi Braidotti's approach, if the previous chapter was primarily critical, this one is primarily creative. The two modes merge into what I call the *analytics of the possible*. This mode of research is entangled with performative practice, which I call *infraphysics of becoming* (see Part III).

In Part I, I outlined a number of modern protocols of dualisation of the world, interfaces that materially and discursively construct subject positions based on othering. Through this exposition, however, a number of alternative or emergent lines have been singled out. This chapter will proceed in assembling these conceptual tendencies into an assemblage that would in turn move through the friction space of modernity, with a desire to reorient it otherwise. This chapter will performatively trace a shift from 'I' to 'i' of the practising subject, immersed in a posthuman ecology. To prefigure this minoritisation from this point of the thesis I will become a minor 'i'.

This chapter engages in a 'shared conversation' (Haraway, 1991) with and through philosophy. In a posthumanist flat ontology, matter and discourse are part of an onto-epistemic "continuum of indistinction" (Philippopoulos-Mihalopoulos, 2015). Gilles Deleuze and Michel Foucault began the work of deconstructing the modern binaries between theory and practice, work furthered by recent posthumanist and neomaterialist feminists. The distinction has by now been sufficiently troubled to be able to imagine and practice a continuum. How could one even hope at destabilising the dualisms of the late modernity without hybridising what was considered theory and practice into a material-discursive praxis? I will show how this hybridisation and entanglement is a constitutive part of an eco-aesthetics oriented towards posthuman ecology of difference.

2.02. Plant and photo-sensitive paper. *confluence 0.2*.

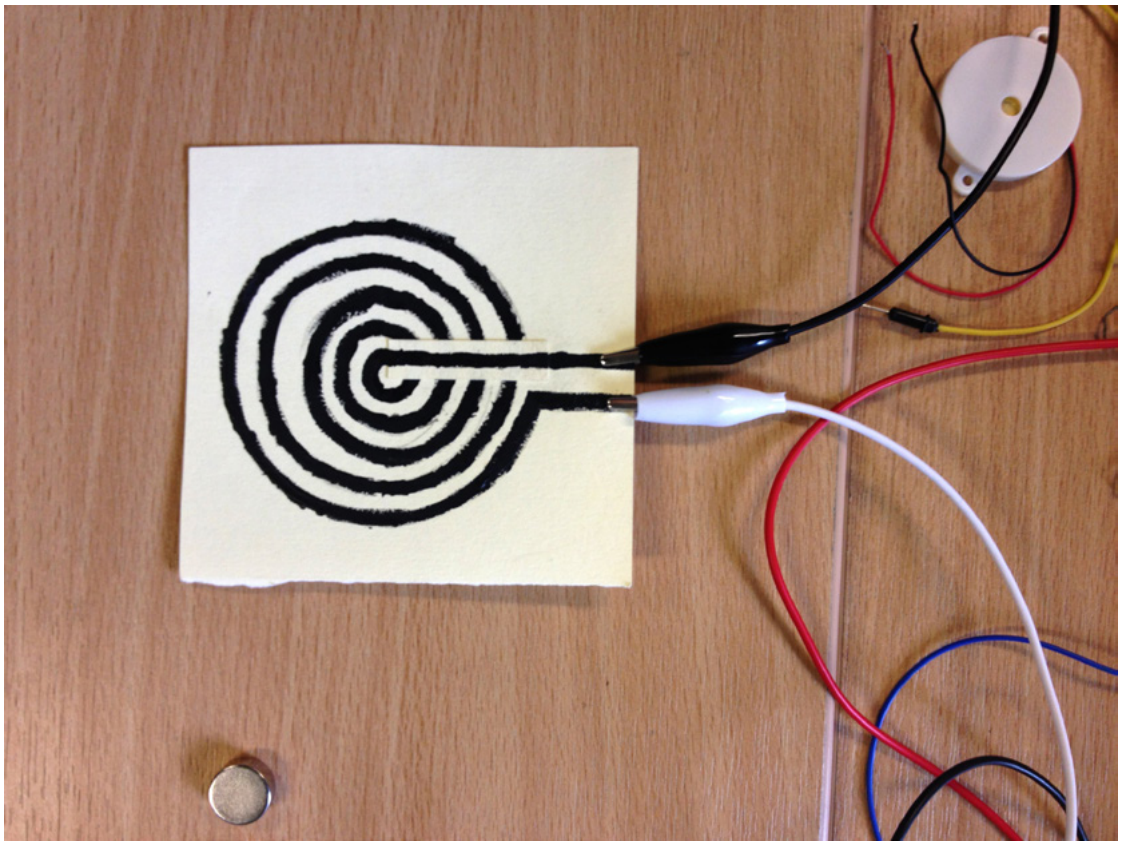
2.1. Flat ecology

2.1.1. Plane-ing immanence

Flat ecology is one mode in the praxis of an eco-aesthetics of intra-action, whose goal is creating performances in which agencies and heterogeneous bodies, both nonhuman and human, are free to experiment with mod(e)ifying and being modified by one another. In the context of posthuman eco-aesthetics, flat ecology is a setting up of the analytical conditions necessary for these bodily intra-actions to happen.

The main theme of this chapter is to outline what kind of group dynamics exist in a posthuman world (relational ontology), how to learn to engage with these groupings (epistemology), and how to support their formation and maintenance (ethico-politics). This Part in particular is concerned with locating the possibilities that lie in-between the boundary-making projects mapped in Part I. As such, analytics of the possible can be best imagined as a *performance of positioning amongst the apparatuses*. This positioning implies an experimentation along the edges of possibilities of the apparatuses, where possible meets the virtual (excluded possibilities), and where other possibilities may come to be. Analytics as positioning/situating relates to and stems from feminist politics of location and feminist critical epistemologies. Situatedness is a primary condition for an eco-oriented performance, since it needs to respond and account for local effects on the bodies.

Analytics of the possible contains components of ontology and epistemology, as well as of political philosophy. However, its primary dimension is 'ethico-political' and 'ethico-aesthetic' (Guattari, 1995), it is a general *ethos* of a 'world*ing* project' (Haraway, 2008). Ecologies are not already there, *ecologies must be performed*. Flat ecology is thus about a positioning within a power field, diagramming and scoring possibilities that can be enacted, having in mind posthuman justice, which is at odds with modern, capitalist, colonialist, and imperialist world-making projects that perpetuate domination of life.



2.03. Speaker made from conductive paint. In collaboration with Emilie Giles. *assembling ecologies*.

An ‘ecosophy’, or ecological pragmatics, has to envisage a possibility of living together with others, with special place given to earth others. However, any ecosophy must be aware that it is only one of a multiplicity of ontologies, or worldings at work in this world, forged and practised from various social and extra-social positions. Ecological praxis, of which analysis is one mode, therefore does not aim for objectivity, rationality, or truth, but for a meeting among multiple heterogeneous worldings. Flat ecology is thus not a system of inter-connected concepts that shapes a coherent theory or methodology, but a “machinic assemblage of desire” (DG, 1987: 22) that moves through and against the gridded presents shaped by social forms of domination. What this machinery desires is a re-settlement of forces especially along the dramatic culture—nature rifts that presently map the social field and its surroundings.

Flat ecology is therefore not ‘out there’, it is a performative laying out of a plane of possibilities for the emergence of posthuman worldings in common. Following Guattari and Deleuze, i take the view that this operation of thought implies a radical immanence to earth, a mode of art and philosophy which re-asserts a belonging to milieu. DG say that to do philosophy or art is to “set out” a plane of immanence, that is “populated” by concepts, percepts and affects[1]. A plane of immanence is “an unlimited One-All, an ‘Omnitudo’ that includes all the concepts on one and the same plane” (DG, 1994: 35). Thinking is a double movement of “the creation of concepts and the laying out of a plane” (ibid.: 36). The plane of immanence is “the horizon of events” (ibid.: 38), whereas concept is “the contour, the configuration, the constellation of an event to come” (ibid.: 32). The nexus between the plane and the concepts is the subject, the “conceptual persona” who produces concepts. The creation of concepts, the movement of the plane, and the persona form an “infinite movement”, in which “thinking and being are one and the same” (ibid.: 38). It is not a question of correspondence or reflexivity between a subject and an object, as a plane of

1 DG distinguish between plane of consistency and concept-creation as tasks of philosophy, and plane of composition and thinking through affects and percepts as the domain of art (ibid.: 65-6). This distinction is a difference of degree, indeed they can “slip into each other” (DG, 1994: 66), thus i will merge two modalities of setting the plane.

2.04. Prototyping a conductive circuit. In collaboration with Emilie Giles. *assembling ecologies.*

immanence is immanent only to itself (its 'territory'), yet it is affected by "the not-external outside and the not-internal inside", 'the earth' (ibid.: 60). "[T]hinking is a relationship between territory and the earth" (ibid.: 85). Deleuze and Guattari thus pose a task of their 'geophilosophy', which i see as consonant to eco-oriented artistic practice.

On the one side, thought/being can be folded upon themselves, surveying their territory and establishing a sovereign control upon it, thus moving from earth to territory ('reterritorialisation') (ibid.: 86). However, thought/being can also be oriented toward nonthought/nonbeing, writing or doing 'for' of 'before' the earth (ibid.: 109). This is the orientation of a posthuman ecology, from territory to the earth, what DG call a movement of 'deterritorialisation' (ibid.: 86), meeting the 'not-external' and 'not-internal' difference.

In radical immanence, there "is no such thing as either man or nature now, only a process that produces the one within the other and couples the machines together" (DG, 1983: 2). Radical immanence is not a web of life in which things hang together in balance, instead it is an asymmetrical process of enfolding between the earth and the planes of immanence that populate it. Flat ontology as a plane of immanence can be described in these terms:

> flat ontology argues that all entities are on equal ontological footing and that no entity, whether artificial or natural, symbolic or physical, possesses greater ontological dignity than other objects. While indeed some objects might influence the collectives to which they belong to a greater extent than others, it doesn't follow from this that these objects are more real than others. (Bryant, 2011: 246)

In a flat ontology, there are no categories, such as species or genera, rather what we have are "unique, singular individuals, differing in spatiotemporal scale but not in ontological status" (DeLanda, 2002:46). This does not mean that a flat ontology is a sea of continuous calm or that everything matters equally. Far from a flow of one-same, immanent or flat ontology is an ontology of generative difference. For Deleuze:

2.05. Light sensor on a new guinea. In collaboration with Emilie Giles. *dancing ecologies*.

> the essential in univocity is not that Being is said in a single and same sense, but that it is said, in a single and same sense, of all its individuating differences or intrinsic modalities. … It is 'equal' for all, but they themselves are not themselves equal. (Deleuze, in Bryant, 2011: 269)

World as a flat ontology is a univocality of differentiations that produce discontinuities between territories[2]. Following Levi Bryant's 'ontic principle', "'to be' is to make or produce difference" (Bryant, 2011: 263). This is the ontological component of an ecology, whereas an ecological praxis is the problem of rendering justice to the immanence of differentiation.

Flat ecology is thus a mode of performativity that begins naturalcultural assemblages of difference. It is important to set out a relation between radical immanence and a critique of the logic of dualism. Setting out a plane of radical immanence is not a matter of moving from 'here' to 'there'. Ecological praxis is a matter of a multitude of molecular shifts or quantum leaps[3]. These movements from 'this' to 'there' are, in the quantum spirit of electrons, dis/continuous leaps between the humanist present and more-than-human ecologies. Acts of posthuman eco-aesthetics are thus "strangely stationary, in place" (DG, 1983: 131). Posthuman ecology works outside the modern narratives of progress, overcoming. This is because 'we' are already 'there', in a posthuman continuum, ontologically speaking. However, the dynamics of radical immanence is currently subjugated by other practices. A posthuman continuum of differentiation needs to be (re)affirmed through mental, social and nonhuman

2 This understanding is different from universalist claims that *begin* from the premise that universe is one unified entity and that 'everything is interconnected' (e.g., in deep or spiritual ecology).

3 This physical phenomenon has in popular culture come to signify a massive jump or change. From the point of view of physics, this vision is entirely wrong, since quantum leap is effectively the tiniest of jumps. However, there is a certain truth in this over-dramatisation of quantum leap. Through these minuscule performative acts electrons enact a universe that is radically diverse from the modern mechanistic physics. Quantum leap happens when an electron jumps from one to another energetic level in an atom. Crucially, the leap happens in a 'discontinuous' fashion, "not from here-now to there-then" as in a smooth Newtonian universe. Instead, "the electron is initially at one energy level and then it is at another *without having been anywhere in between! A quantum leap is a discontinuous movement."* [original emphasis] (Barad, 2012b: 39). Thus, quantum leap is a molecular move that changes so to say everything, the very fabric of modernity. To make quantum leaps on molar level, i.e. in everyday life on the scale of human bodies, is the agential plane of posthuman eco-aesthetics of becoming, as i will expand further.

2.06. *intra-dance with trees, dunes and sea*, workshop at Inter-format Symposium on Flux of Sand and Aquatic Ecosystems. Nida Art Colony, Nida, Lithuania.

ecologies.

Rick Dolphijn, following Deleuze, envisages art as an "affirmative and creative act" of "occupation" (2015: 194). This gesture is not about "occupying 'something' (an outside object)" but affording "'to be occupied with something' (the *revelation* of a world)" (Dolphijn, 2015: 194). Eco-aesthetics of intra-action is not about producing a world, but "dismantling" what constrains us to be occupied with "'anotherness' which was always already there" (2015: 196). This is an immanent occupation that amounts to a decolonisation of the domination of the same, in favour of affirmation of "absolute and ultimate Difference" (Deleuze, in Dolphijn, 2015: 191). This work consists in deterritorialising the constituted planes of modernity, and creating the conditions to occupy "nature by heart, by will and by chance" (Dolphijn, 2015: 197). Becoming occupied by difference is "an intense love" (ibid.: 191), that for Spinoza from whom Dolphin draws upon, is the highest degree of knowledge and spiritual life. To 'learn to love' difference begins with a "summoning" (DG, 1994: 181) of anotherness. How to enact or be enacted by these summonings is the key problem of the posthuman eco-aesthetics of intra-action.

Posthuman art consists in actions of radical imagination that are rooted in the here-now, in the present everydayness, but that defamiliarise the conditions of labour, love and play through performative quantum ruptures. It is a transversal practice between the actual, the possible and the constituent outside of social apparatuses of production: the inhuman. This practice thus requires a certain parlance in the language of the apparatus that violently occupy us (ontology of the present), but at the same time, and entangled with this mode, it demands a posthumanist imagination. Posthuman eco-aesthetics needs to see and speak (at least) double. Here i learn from the concept of 'double vision' as developed in the work of Black feminist author, Patricia Hill Collins. According to Collins, black women who work as servants in white households have the position of both 'insider' and 'outsider', they are "outsiders within", which gives them a "special standpoint" or epistemic position (Collins, 1986). I wish to render homage to this crucial insight, and to transpose it in a posthumanist practice, to

2.07. White gerber. *confluence 0.1* 9 April 2013, London.

indicate a seeing that is minoritarian in the sense of seeing the inside of social apparatuses and at the same time sensing and accounting for what they exclude and suppress. This double vision is a transversal vision that speaks through the possible, but is oriented towards the suppressed, unspeakable external-inside and internal-outside. It learns this ethos from the politics of possibility (Gibson-Graham, 2006), but is a politics of im/possibility. In posthuman terms, it is a situatedness along the 'teetering' edges "on the cusp of stability and instability, of possibility and impossibility" (Barad, 2012b: 40). These areas of im/possibility are frontiers where the biopolitical appropriation of life operates, and also where impossibility exists. Im/possibility here should be understood as the creative freedom of life, exuberant difference before and beyond possibilities of the here-now.

2.1.2. Material-discursive entanglement

Posthuman eco-aesthetics can begin to be imagined through Karen Barad's agential realism (2003, 2007). Agential realism is an ethical ontological epistemology ('ethico-onto-epistemology') that depicts the dynamics of being and knowing through a radical re-conceptualisation of agency and its interactivity. This section will focus on the immediate implications of agential realism for the plane of immanence of eco-aesthetic praxis.

Barad proposes a flat ontology (although she doesn't use this term) that reworks the relationships between thought and matter, and discourse and materiality, into 'intra-active' dynamics of 'entanglement' of mattering and meaning. "Matter and meaning are not separate elements. … Mattering is simultaneously a matter of substance and significance." (Barad, 2007: 3). Through this horizontal ontology, Barad sets up a plane of 'posthumanist performativity' (ibid.: 136-7). In a posthuman dynamics of mattering–meaning, "knowing, thinking, measuring, theorising, and observing are material practices of intra-acting within and as part of the world" (ibid.: 90). The major consequence of

2.08. Diagram for *dancing ecologies*.

posthumanist performativity is that "there is no unambiguous way to differentiate between the 'object' and 'agencies of observation'. No inherent/Cartesian subject–object distinction exists" (ibid.: 114). Distinctions are not inherent because agential realism does not recognise the separatedness of things. Differences are being continuously performed by matter in its 'intra-active dynamics'. Art or philosophy therefore participate in this differential mattering, but they are not anymore simply cultural or discursive, they are 'material-discursive entanglements'. In a posthumanist continuum, "concepts are specific material arrangements" (ibid.: 196) that make difference in the mattering of the earth.

Posthumanist performativity is radically different from representationalist epistemologies, grounded in a territorial distinction between language and matter, "representationalism is the belief in the ontological distinctions between representations and that which they purport to represent" (Barad, 2007: 46)[4]. In a performative posthumanist ontology, there is no ontological rift between sign and body. Science studies scholar Andrew Pickering calls this posthumanist performance "the mangle of practice", which he describes as a 'dance of agency' between humans and matter. "[T]he contours of material and social agency are mangled in practice" (Pickering, 1995: 23). Causality and signification are profoundly entangled and co-constitutive of each other. This continuum of indistinction between ontology and epistemology is what Barad calls 'onto-epistemology'. Practices of being and meaning-making cannot be separated from each other.

Barad's performative onto-epistemology holds important potential for traversing the modern quandary of representation in environmental thought, politics, and eco-aesthetics. It provides a different perspective on one of the unsolvable problems of green politics and eco-art, that of the representation of nature. In the modern world-view, it is assumed that natural-others lie outside language, and that the only means of interacting with these others is through

4 Representationalism is also a theory in cognitive science, by which mental representations are the only means of knowledge about the world. Here i am opposing representation as eqauted to linguistic constructionism in the humanities.

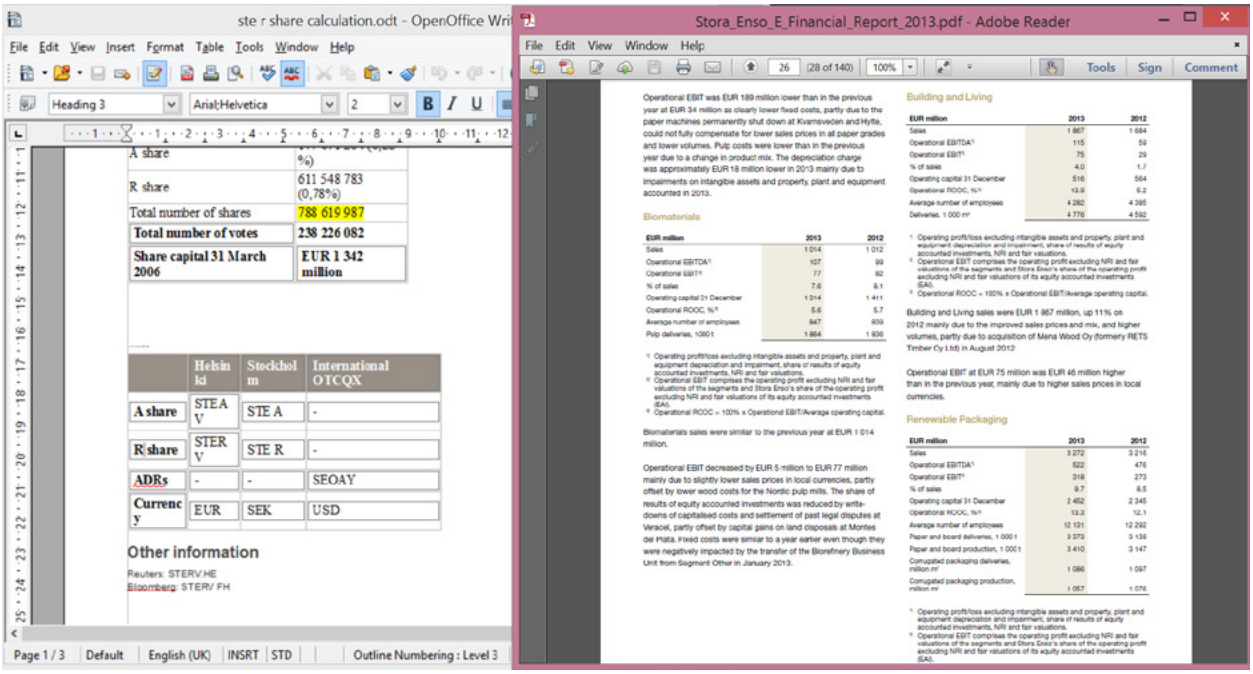
2.09. Paper share convoy. *black box paper walk* test run. February 2014, Stockholm.

representation. I will take environmental law as an example, since it is one of social practices explicitly concerned with bridging the gap. Lawyer Christopher Stone in his landmark article "Should Trees Have Legal Standing?" (1972) speculated on how earth others could become part of the human legal system. Stone acknowledges that, amongst the numerous problems, the crucial one lies in the difficulty of knowing what a forest 'needs' or 'wants'. Even if "natural objects *can* communicate their wants (needs) to us, and in ways that are not terribly ambiguous" (1972: 471), Stone maintains that it is 'we' that ultimately need to represent nature's interests in the court of law. With this gesture, Stone opened a crack in the sovereign plane of humanity, yet the process of imagining how nature can occupy law, or art, is still very much open.

Ecofeminism provides another insight. In ecofeminist analysis, natural others are understood as subjugated, oppressed, or subaltern, and therefore *do not have the right to speak*. Critical and radical thinkers have variously attempted to bring the viewpoints of the marginalised to the fore. Deleuze, who was himself thinking through this problem, claimed in a conversation with Michel Foucault that:

> those who act and struggle are no longer represented [by the intellectuals or unions] … there is no more representation; there's only action – theoretical action and practical action which serve as relays and form networks. (1977b: 206-7)

In this statement, Deleuze seems to be vocalising a performative ontology resonant with Barad's agential realism. However, feminist and postcolonial scholar Gayatri Spivak provides an important counterpoint. Gayatri Spivak criticises Deleuze's point and asserts that "the subaltern cannot speak" for herself. Spivak did not mean that subaltern does not have a voice, but that it cannot speak within the discourse set up by the dominant Subject. Spivak concludes that "representation has not withered away" (ibid.: 308), and asks for another "image of thought" (ibid.). Spivak follows Derrida to imagine a thought based on 'appealing to' or 'calling' the 'quite-other' (ibid.: 294). Spivak's



2.10. Critical-creative accounting. *black box white paper*.

argument is important for understanding the relationship between postulating a performative ontology and an ethico-political practice in the context of capitalist and colonial representation. Representation is strongly correlated with modern logic of dualism and taking someone else's voice is one of the first gestures of appropriation. Quite different from this is creating contexts where another can choose to respond or remain silent.

Risks of representation turning into domination are high, but silence is even more untenable. In a naturalcultural context, Astrida Neimanis sees this as a "can't but must" imperative. Neimanis proposes fostering "representation without representationalism", "[t]he kind of representation … concerned with the urgent need to advocate for the interests of others (non-humans, in this case), but also with the risk of capture and appropriation" (2015). Neimanis concludes that we "must represent in the name of these [natural] 'citizens,' even as we also commodify and misrepresent them" (2015). The point is therefore not to refute representation altogether, but to release the subaltern from the grip of representationalism. Catriona Sandilands suggests that nature should be recognised as intrinsically 'unrepresentable' and 'unknowable', but another necessary task is to "[bring] nature into democratic discourse in a way that opens up the possibility of our remembering our lack" (Sandilands, 1999: 193). While recognising this discursive 'lack', the "failure of representation" could affirmatively lead into "the development of an ethical relation to the Otherness of the Other, to nature, to the Real" (Sandilands, 1999: 181). Catriona Sandilands and Astrida Neimanis situate what could be viewed as a posthumanist proposal in relation to the established territories of power. It is crucial to refuse representationalism as a mode of appropriation of the Other, but creating naturalcultural entanglements may imply resorting to methods of representation, which imply risks of re-appropriation.

Posthuman eco-aesthetics thus faces a twofold task: to perform critique of representational apparatuses that produce rifts between words and things, and to affirm practices of immanent material-discursive performativity. It may be correct to assert ontologically that life proceeds through immanence, that words

2.11.‘Paper share’ transportation. *black box white paper*. February 2014, Stockholm.

are not separate from things, but it is also necessary to recognise that many mangles of matter and meaning operate *as if* discourse were separate from bodies. This is the logic of despotic axiomatics which abstracts the co-constitution of matter and meaning into a grid of generalised equivalence. Posthuman practices thus necessarily proceed through frictions and barriers of representationalist apparatuses. However through the lens of flat ontology, these aesthetic practices can see the co-constitutive dynamics of discursive practices and the earth.

Posthuman eco-aesthetics thus desires to participate in what Vicki Kirby has called the 'literacy' of Nature (2011). Kirby reworks Derrida's theorem that there is "no outside of text", usually taken as a claim towards radical linguisticism and anti-naturalism, into a posthumanist claim that there is "no outside to Nature" (2011: x). Nature "reads and writes itself" (ibid.:xi), and human agency or "originary humanicity" is part of this natural literacy or expressivity. This literacy runs through our genes, as well as through earth's geological strata. Humans are but nature's marks, and they scribble upon nature as well. Kirby's 'consubstantiality' of thought and matter, human agency and materiality, is thus a transversal setting up of a plane of a common literacy in which humans can engage in 'natural convers(at)ions' (ibid.). This is a corresponding claim to DG's understanding of art as a general cosmic inscription, which humans take part in (Grosz, 2009). How to learn this wider literacy and expressivity and how to join these 'natural convers(at)ions' is a desire of posthuman eco-aesthetics of intra-action.

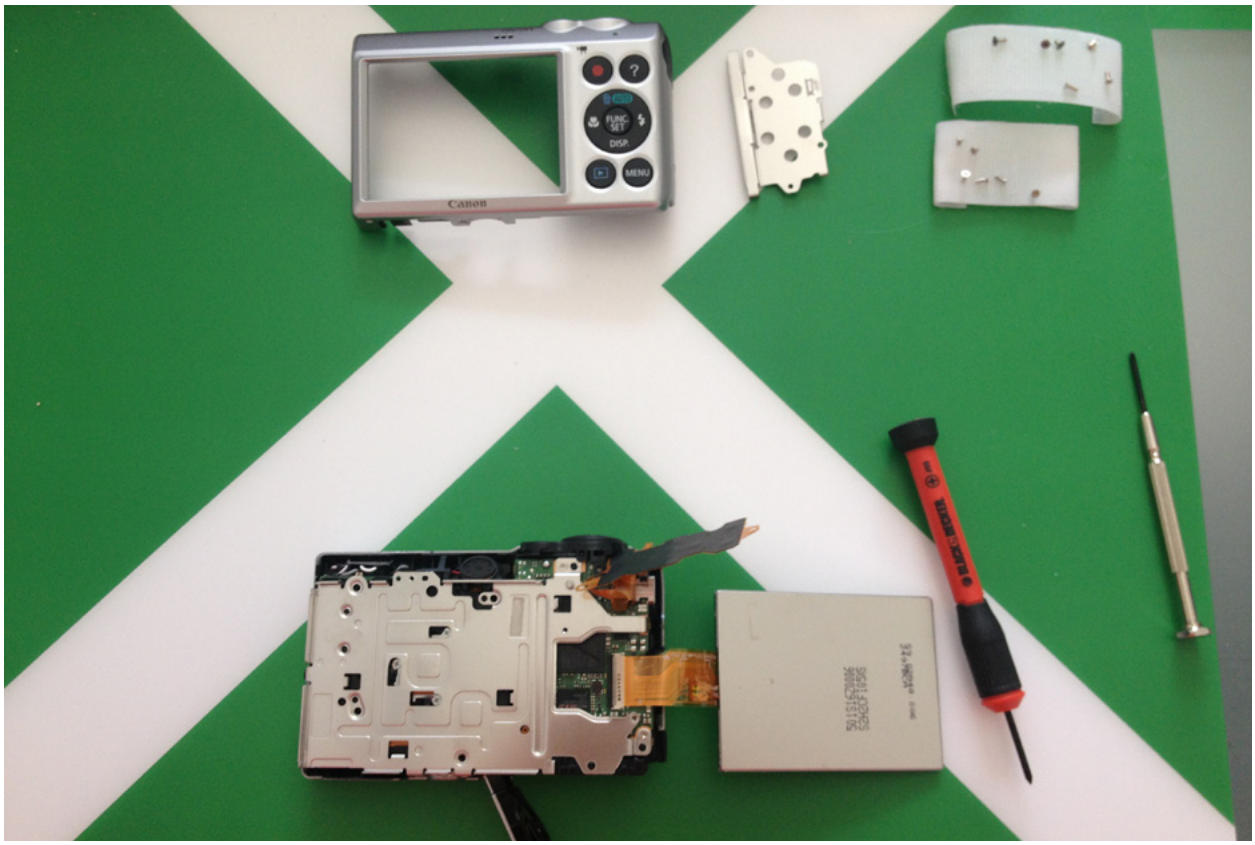
2.12. Score diagramming. Development of *all that is air melts into city*.

2.2. Agency

The question of agency is crucial for a practice of posthuman cohabitation. Who/what is in act? Who/what is (en)abled to act? Posthumanist re-elaboration of agency represents a decisive move away from humanist and liberal theories of social agency. In liberal ontologies, agency is understood as the capacity of an "I" to think and intervene in "it", an external reality. In posthumanist and neomaterialist philosophies, agency is not correlated with a (human) subject, instead it is a property of matter, or, in the work of Barad, of materialisation. In posthumanism, agency is not 'owned', it is "differentially distributed" among myriads of entities, biotic and abiotic, animal, vegetal, inorganic (Bennett, 2011: 37-8). I will read this distribution of liveliness through Karen Barad's posthumanist elaboration of agency as 'intra-action'. In the second part of the section, i will see how agency has been critically conceptualised in the work of Michel Foucault. From this transversal reading will emerge a tension between modern and posthumanist ontologies.

In Barad's agential realism,"'things' don't pre-exist; they are agentially enacted and become determinately bounded and propertied within phenomena" (2007: 150). Boundaries are not determined in advance, "relata do not preexist relations; relata-within-phenomena emerge through specific intra-actions" (ibid.: 140). The notion of 'intra-action' counters the usual 'interaction' that implies first, bodies, and then, the relations between them. Instead it is through "intra-activity in its differential mattering" (ibid.: 140) that bodies assert their differences. In Barad's radically relational ontology, mattering proceeds only through meeting. Through intra-action "matter comes to matter" (Barad, 2003), bodies are articulated through entangled practices of being and meaning.

Instead of objects or subjects, in Barad's agential realism, the primary ontological units are phenomena: "the ontological inseparability/entanglement of intra-acting 'agencies'" (2007: 139). These entanglements are enacted through 'agential cuts', which locally determine subjects and objects. Intra-



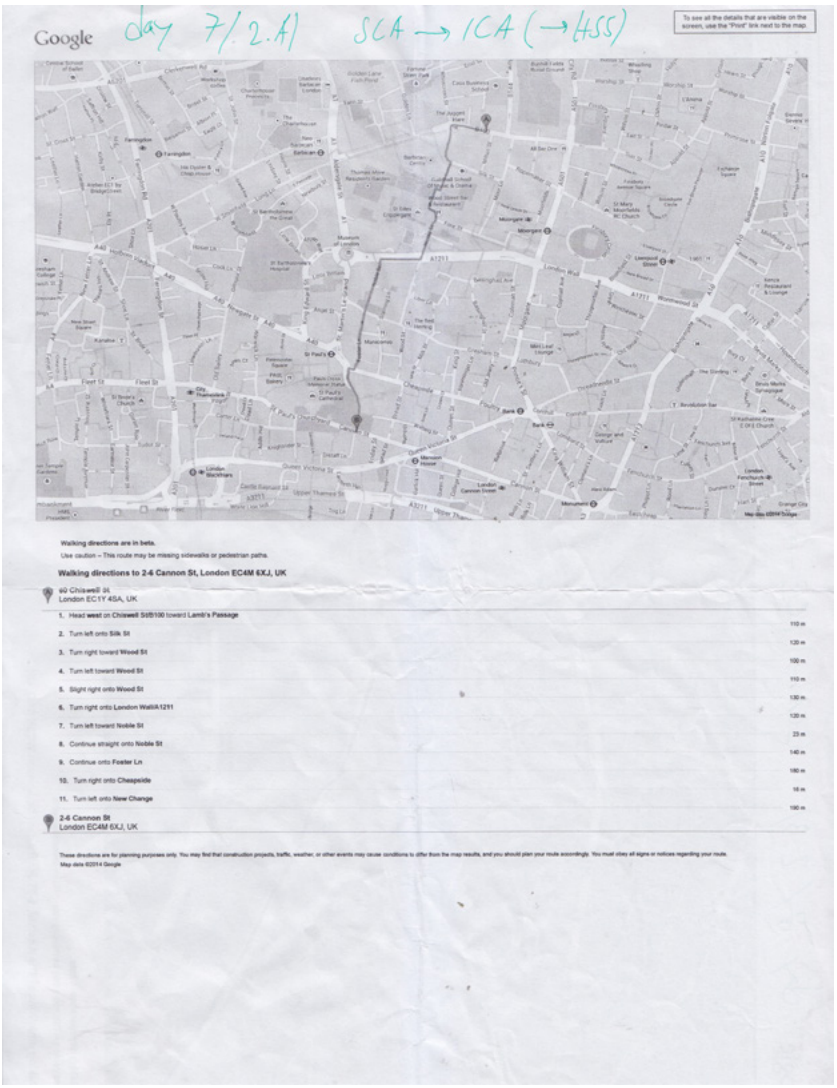
2.13. Rehabilitating a digital camera to ‘see’ the near-infrared spectrum. Development of *all that is air melts into city*.

actions play out "agential separability – the condition of *exteriority-within-phenomena*" [original emphasis] (2007: 140)[5]. Ontologically, agencies are entangled, but through agential intra-action of meaning-making (agential cuts), agencies become separable from each other. This is Barad's onto-epistemic entanglement in which practices of meaning emerge through practices of being. Importantly, following quantum physics, space and time are implicated and re-constituted through these material performances. "Space, time, and matter are mutually constituted through the dynamics of iterative intra-activity" (ibid.: 181). 'Spacetimemattering' (ibid.) is thus an iterative performativity of matter*ing,* meaning, spatialisation and temporalisation.

Agential cuts caused in intra-action "cut 'things' together and apart" (ibid.: 179). "Intra-actions always entail particular exclusions" (ibid.: 177), parts of phenomena are therefore locally 'exterior'. This 'excluded' side of mattering is what constitutes "an open space of agency" (ibid.:179) and is the part of the phenomena that provides "the conditions of an open future" (ibid.:177), what might come to matter in future iterative intra-activity. As some things 'come to matter', others are excluded from mattering. This onto-epistemic process of inclusion/exclusion is crucial for posthumanist ethico-politics. How cuts are enacted is a question of ethics, as not all cuts produce the same consequences on bodies. Meaning is ontologically produced through agential cuts, but as i will try to demonstrate, this property of mattering can be co-opted within certain types of apparatus to empower some agencies at expense of others.

I will now extend Barad's reading by focusing on the 'excluded' side of the cut, which i will interpret through notions of 'withdrawal' and 'virtual'. In this, i will follow a recent re-reading of Martin Heidegger's concept of withdrawal in the Object-Oriented Ontology of Graham Harman. For Heidegger, humans perceive reality in terms of "equipment", "essentially something 'in-order-to'" (Heidegger, in Harman, 2011: 38). Every object is a 'reference' or 'assignment' that allows us to do something. However at the same time, Heidegger asserted

5 Agential cut is performed by "the larger material arrangement" (ibid.;140), or 'apparatus', the concept which Karen Barad elaborates by diffracting Niels Bohr's philosophy-physics and Michel Foucault's notion of *dispositif*.

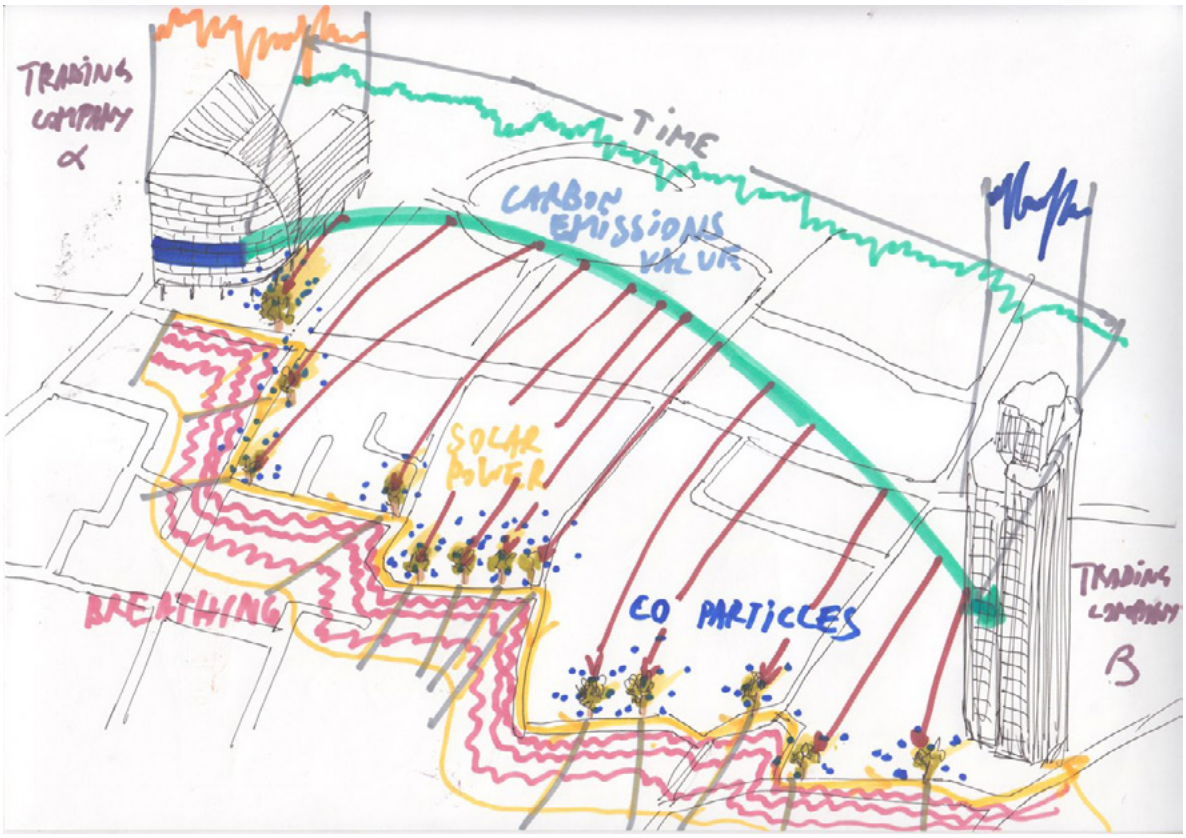


2.14. Walking itinerary for day seven. Performing *all that is air melts into city*. 1 - 18 May 2014, London.

that no use or introspection can definitively exhaust the being of a tool or object. This sliding away of objects from phenomenal grasp is what Heidegger called 'withdrawal'. Graham Harman, in the framework of his Object-Oriented Ontology, expands withdrawal into a posthumanist space by asserting that "[e]quipment is global; beings are tool-beings" (Harman, 2002: 36). This does not mean that all beings are instrument as 'reference' for humans, but that *objects resist full access or 'use' by any object*. "The sum total of events does not exhaust the reality of objects" (Harman, 2005: 79). Bodies are more than the sum of their relations, they *cannot be reduced to their intra-actions*. In other words, there are always more possibilities within a given body that are ever realised.

Withdrawal gains depth through Deleuze's notion of the virtual. The consonance between two concepts is charted by Levi Bryant, who interprets Harman's withdrawal in terms of 'virtual proper being' (2011). I see virtual differently from Bryant, but he paved the way for this conceptual intra-action. For Deleuze, virtual is the structuring of "singularities (unactualised tendencies) and what he calls affects (unactualised capacities to affect and be affected" (De Landa, 2002: 63). Importantly, in Deleuze, virtual is a real dimension of the body, "the virtual must be defined as strictly a part of the real object" (Deleuze, in Bryant, 2011: 96). Virtual is the potential for action, a structuring of agentic capacities that can be realised in encounter with other bodies. Virtuality can thus be envisaged as a "space of possibilities" (De Landa, 2006: 29), a field of virtual trajectories that a body can potentially actualise or perform. Departing from Deleuze, i will take virtual not to be a property of the individual, but of the phenomenon, a performance of intra-active dynamics. In the context of agential intra-action, virtual is an intra-bodily possibility space that remains excluded in the agential cut. Here i will be even more specific. Possible is not the same as virtual. Possible refers to the capacities of the phenomenon that are *known*, whereas virtual is that which is *unknown* but real. This distinction is important in the context of apparatus-assemblage dynamics (see 2.3.).

The notion of withdrawal/virtualisation is in line with Barad's reading that



2.15. Performance diagram. *all that is air melts into city*.

exclusions performed by agential cuts hold 'conditions of an open future'. What i wish to add, with Deleuze and Harman, is that withdrawal/virtualisation is an agential performance of matter, as much as mattering. Virtual is not merely a passive side of phenomenon that is "excluded from mattering". Dynamics of intra-action brings matter to matter *and* matter withdraws from mattering, it virtualises. The autonomy of bodies is also connected to withdrawal, to what remains outside of the scope of mattering. A flat ontology should not forget the excluded side of the cut, because, in some contexts, this may amount to forgetting the minorities secluded by agential cuts. Therefore, a posthumanist elaboration of agency stands for intra-action through which matter ('congealing of agency'), meaning, and withdrawal are asserted.

At this point i will try to situate this posthumanist understanding of agency within the social context of modernity. To do so, i will read how agency relates to the notion of 'power' in the work of Michel Foucault. In this i am following the example of Rosi Braidotti, who engages with Foucault's bio-power in her critical posthumanist project[6]. Foucault's understanding of power is rich and complex, but i am taking its first systematic exposition in the *History of Sexuality Vol. 1: Will to Knowledge* (1978). In the section of the book titled 'Method', Foucault outlines a number of 'propositions' on power. First, power "is not something that is acquired, seized, or shared, something that one holds on to or allows to slip away: power is exercised from innumerable points, in the interplay of nonegalitarian and mobile relations" (ibid.: 77). Power is 'impersonal' or 'subjectless', power relations are "both intentional and nonsubjective" (ibid. :78). There might be "strategies" or "calculations" that some bodies may perform but ultimately power is never the "choice or decision of an individual subject" (ibid.). In other words, power is always a *relation* by which some bodies act upon others, but it implies that the bodies acted upon are able to be affected[7]:

6 In *Order of Things* (1970), in his critique of humanism, Foucault prefigures the 'death of Man'. Braidotti claims that this marks an important step towards critical posthumanism (2013: 23), explicitly deeming Foucault to be a "neo-materialist" (in Dolphijn & van der Tuin, 2012: 20).

7 Power relation in Foucault could be read through the notion of affect, which, in DG's re-reading of Spinoza, stands for "capacities to affect and be affected" of individual bodies (1987: 261).

2.16. Assembly of dracaena marginatas. Logistics of *all that is air melts into city*.

> Where there is power, there is resistance, and yet, or rather consequently, this resistance is never in a position of exteriority in relation to power. .... But this does not mean that they are only a reaction or rebound, forming with respect to the basic domination an underside that is in the end always passive, doomed to perpetual defeat. (Foucault, 1978: 78-79)

Power cannot unilaterally capture a body's agency, power is in a double articulation with resistance. Were power to fully take over a body and annihilate resistance, there would be no relation whatsoever. What is crucial here is that resistance is not a 'consequence', answer or 'reaction' to power. "Power comes from below" (ibid.: 68), or, in Deleuze's commentary on Foucault, "*resistance comes first*" [original emphasis] (Deleuze, 1988: 89). I believe this resistance can be related to withdrawal, the virtual side of each phenomenon, the unactualised surplus that has not and cannot be absorbed by power. The virtual is the internal-exterior to what the power 'sees'.

The analytics of power emerges in Foucault's investigation of the disciplinary regimes in modern Europe, especially in the context of how sexuality has been controlled. Although this may seem like a humanist topic, what is at stake in this analysis has consequences for extra-human bodies. Modern disciplinary operations of power mark a new regime, that of biopolitics, power over life: "the ancient right to *take* life or *let* live was replaced by a power to *foster* life or *disallow* it to the point of death" [original emphasis] (Foucault, 1978: 111). Biopolitics are techniques of 'administration' of life through procedures that aim to "qualify, measure, appraise, and hierarchise" (ibid.: 116) the bodies. Foucault in his writings is concerned with how biopolitics inscribes human bodies. Following an ecofeminist analysis, regimes of power over life extend to extra-human bodies. In an important sense, historically, regimes of bio-power begin by taking power over animal and vegetal bodies, an argument that has been made by Giorgio Agamben (1998). As bio-power targets life itself, the objective of resistance becomes "the 'right' to life" (Foucault, 1978: 116-7). "Life becomes resistance to power" (Deleuze, 1988: 92). Foucault's analysis of the rise of bio-

2.17. Floor mapping. Installing the ‘office’ of *all that is air melts into city*. April 2014, arebyte gallery, London.

politics provides an insight that *biopolitics is only possible because life is already power, a capacity to resist and persevere*. By capturing portions of life into relations of power, biopolitics harnesses the immanent agency of life and streamlines it for instrumental purposes. However, power relations are fundamentally apparatus intra-actions, power regimes are able to capture only the actual and the possible, whilst withdrawn parts of the phenomenon harbour other futures. This brings us to another of Foucault's points. Power relations exist only where there is a degree of freedom. "Power is exercised only over free subjects, and only insofar as they are free", otherwise "power would be equivalent to a physical determination" (Foucault, 1982: 221). This indicates the edge of bio-power and the beginning of what we can call bio-control. If we assume that power is a relation between subjects, then it is clear that the power relations of humans with animals and other non-human bodies are always *relations of domination*. Or at least that is what they intend to be.

In a later formulation, Foucault speaks about power as "action upon action of others" (1982: 791). This can be read as a body being constrained to do something it otherwise *would* not, a doing-against. 'Action upon action' can also be understood as an expression of a generative 'action with action', bodies doing things they otherwise *could* not, a doing-with. Power also has a productive aspect of empowerment. These are the two dimensions of power: "Power is negative (*potestas*) in that it prohibits and constrains. It is also positive (*potentia*) in that it empowers and enables" (Braidotti, 2002: 21). Analytically, these two different notions of power refer to two different modes of intra-action. In one, subjects capture agency and channel it into domination. The other one refers to intra-actions in which possibilities of bodies are increased. These two modes of power are modes of intra-actions that are constitutive of a number of social practices. Power relations do not confute the logic of intra-action, they just formalise it into repetitive patterns that produce determinate consequences.

Returning to biopolitics—power over life—a posthumanist ontology may provide a transversal reading that may allow for creative intra-actions. If we follow the posthumanist explanation of agency, we will see that life is not the same as

2.18. Carbon convoy assembling. *all that is air melts into city*.

power. Life is, according to Agamben, first and foremost a philosophical term that in Aristotle becomes the foundation of politics (2015: 195-6). Ancient Greeks had two words for life, as *bios* or *zoè*.

> *zoè,* which expressed the simple fact of living common to all living beings (animals, men, or gods), and *bios*, which indicated the form or way of living proper to an individual or a group. (Agamben, 1998: 1)

Specifically, *bios* is the life of a 'political animal'*,* of the citizen. *Zoè* is "bare life", excluded from polis *and* captured by sovereign power (ibid.: 9). The distinction between the two is operated by Aristotle by separating 'vegetative life' or 'nutritive soul' from the capacity of 'reason', the latter being available only to the 'political animal', the citizen (Agamben, 2015: 201-2). At the same time, nutritive life is recognised as the 'foundation' and 'motor' of biopolitics, because there would be no life without nutrition and reproduction. But this 'simple life' is separate from reason, and therefore excluded from the city and from the human (ibid.: 205). Life as *zoè* can thus be dominated, but not negotiated politically, which pertains only to *bios*. This dualist ontology at the heart of biopolitics is still present in current political and economic practices, but it must be overcome for a more-than-human justice to be asserted. Agamben works towards this with the notion of 'form-of-life', where its form cannot be separated from 'bare life', but he stays in the realm of the human. Posthumanism operates in a continuum of a broader solidarity, and life itself is re-examined even beyond vegetative life.

It must be insisted that 'life' in a biopolitical regime does not comprehend the full capacities of material agentiality. Life is an arbitrary marker that biopolitical regimes institute as their zone of operation, but the capacity of matter to 'come to matter' is an infinitely broader realm:

> Birth and death are not the sole prerogative of the animate world. "Inanimate" beings also have finite lives. "Particles can be born and particles can die", explains one physicist. (Barad, 2012b: 9)

Here goes one of the deepest boundary-making projects of modernity, the

2.19. Performance score. *counting live stock(s)*.

distinction between life and non-life. Capacities of matter occupy both *zoè* and *bios*, and traverse across *non-bios/non-zoè,* materiality of life is the agential potential of the world to keep spacetimemattering.

Posthumanist notion of agency thus only partially corresponds to what biopolitical regimes of power capture. However, a critical posthumanism must recognise that vast portions of agentiality of matter are being appropriated by these very regimes. Ontologically speaking, Barad is right to say that agency "never ends. It can never 'run out'" (2007: 177). However, i think that this is different from stating that "possibilities aren't narrowed in their realization" (ibid.). When the second assertion is contextualised in specific power apparatuses, we can see that the possibilities of specific agencies can be narrowed. Distributions of power are entangled with the ways that intra-actions determine im/possibilities. How the conditions of possibilities of mattering are enacted is what i will try to explicate with two modes of material-discursive performative dynamics: apparatus and assemblage.

2.20. Making balls of yarn. *counting live stock(s)*.

2.3. Apparatus ⇔ assemblage

From the question of 'who is in act?', which turned into 'how is it that agency emerges?', the question must now be reformulated into 'how is agency distributed'? If no thing acts alone, how do some possibilities of mattering and withdrawal prevail over others? I will explore these questions through two concepts: assemblage and apparatus. In this section i will entangle Deleuze and Guattari's description of assemblage with Karen Barad's elaboration of apparatus. Apparatus and assemblage are usually understood as referring to material arrangements, but i take them as specific *material-discursive dynamics*. They are different modalities of groupings of agencies, of composition of power, and they generate different histories, present and, possibilities for the future. Real formations of power mostly exhibit both dynamics. These two concepts are *analytical frameworks* for understanding *how* given agential phenomena do what they do, and they are also *creative tools* for intra-acting with these phenomena, and producing alternative ones.

2.3.1. Apparatus/*dispositif*

Foucault uses the word d*ispositif* to indicate processual and physical nature of organisation of power. In French, the word means disposition both as a specific arrangement of elements, but also an inclination, tendency, propensity. A mechanism can thus be seen as a product, a material coagulation of an apparatus dynamics. To further this processual nature of apparatus, i will follow and rework Karen Barad's performative conception of *apparatus as practice*.

I will begin with Foucault's description of apparatus:

> a thoroughly heterogeneous ensemble consisting of discourses, institutions, architectural forms, regulatory decisions, laws, administrative measures, scientific statements, philosophical, moral and philanthropic propositions—in

2.21. Setting up counting office in field. *counting live stock(s)*. October 2014, Zlatibor, Serbia.

> short, the said as much as the unsaid. Such are the elements of the apparatus. The apparatus itself is the [network][8] of relations that can be established between these elements. (Foucault, 1980: 194)

On the one hand there is a heterogeneity of discursive and material elements/forms, but this is not what makes the apparatus. It is the network that connects and disconnects these elements, and determines the distribution of power and knowledge. Deleuze re-reads apparatuses as "multilinear ensembles" (1991: 159). With this networked dynamics in mind, i move now to consider apparatus in the posthumanist continuum.

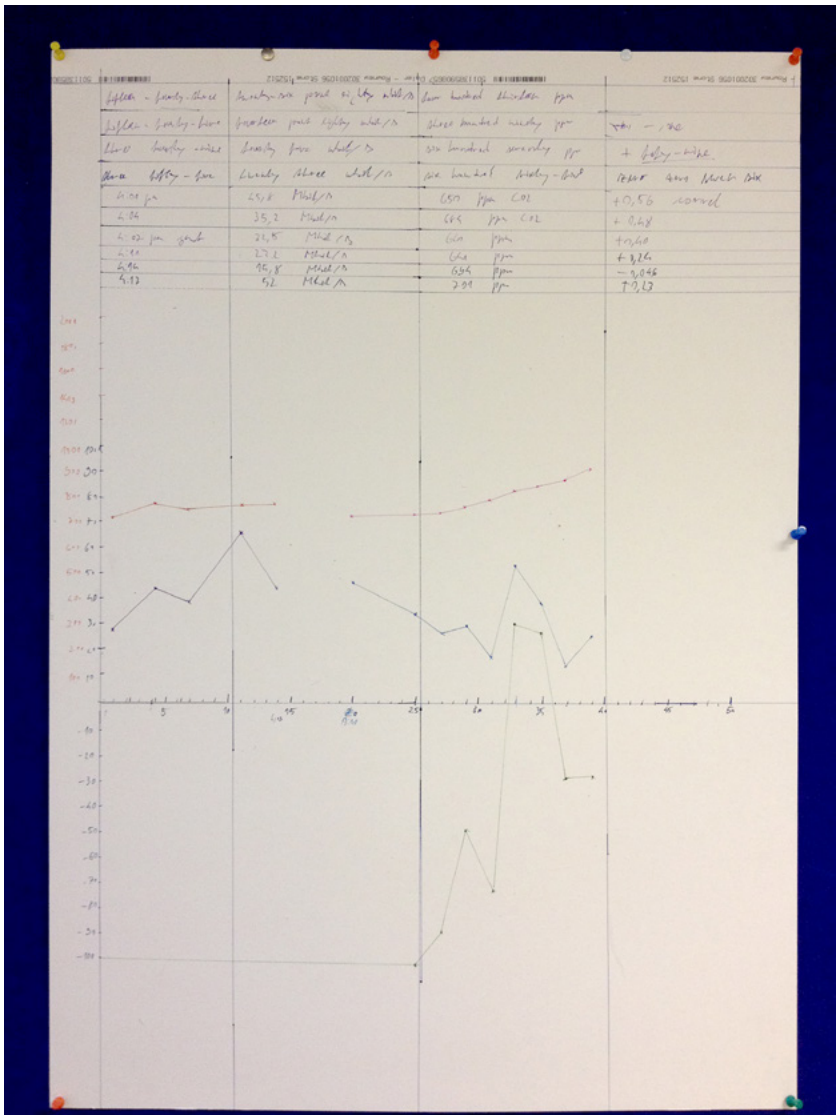
In Barad's agential realism, apparatuses are fundamentally the dynamics of meaning, but which is entangled with mattering. "[A]pparatuses are the material conditions of possibility and impossibility of mattering; they enact what matters and what is excluded from mattering." (Barad, 2007: 148) Apparatus performs inclusions and exclusions:

> Intra-actions include the larger material arrangement (i.e., set of material practices) that effects an agential cut between 'subject' and 'object' … (Barad, 2007: 139-140)

Apparatus is thus a specific mode of intra-action, a 'set of material practices', whose principal output are subjects and objects. Furthermore, it determines the im/possibilities of matter to come to matter. By intra-acting Barad's reading with Foucault's (and Deleuze's), i will outline four material practices of apparatus: boundary-drawing, diagramming, territory and disposition.

In Barad, "apparatuses are not mere observing instruments but *boundary-drawing practices*—specific material (re)configurings of the world—which come to matter" [original emphasis] (ibid.: 140). Boundary-drawing is a performance of determination of what matters and what gets excluded from mattering. Key outputs of this performance are subject and object, intra-actively enacted, exterior to each other but interior to the phenomenon of intra-action. It is not

8 In Rabinow's collection in which this interview first appeared the word used was "system". Agamben's text brought to my attention that the word in case is "network [*le réseau*]" (2009: 7).



2.22. Manual correlation plotting. Research for *office of ecological labour*.

subject that makes object, they are entangled with the other, asserted through agential cuts that "cut 'things' together and apart" (Barad, 2007: 179).

The dynamics of together/apart is where onto-epistemology gets entangled with ethico-politics. Agential cuts perform exclusions from mattering, which are 'co-constituted and entangled' with inclusions. However i wish to stress that apparatus, through these operations, creates relations of power. Cuts are performed in one way or the another, but this hinges on the relations that exist between included and excluded agencies. Barad asserts that "possibilities aren't narrowed in their realisation; new possibilities open up as others are now excluded: possibilities are reconfigured and reconfiguring" (2007: 177). As i pointed out above, if we are to avoid determinism, which Barad also refutes, some possibilities 'reconfigure' more than others and they may indeed 'narrow' other possibilities. In the latter case, for some agencies, cuts may be made "once and for all" (2007: 179), precluding them in a determinate manner from coming to matter within a given phenomenon. Apparatus can make cuts that support virtualisation, unrealised possibilities, or, on the contrary, it can make cuts that silence, background, or hyperseparate agencies (Plumwood, 1993).

How boundary-making is enacted is determined by the power–knowledge circuitry of the apparatus. To depict this, i will claim that apparatuses possess their possibility spacetime, a power diagram of possibilities of various implicated elements. A power diagram is the map of pathways through the possibilities of an apparatus: "a cartography that is coextensive with the whole social field" (Deleuze, 1988: 34), a performing map, a sort of algorithm, "a non-unifying immanent cause" (ibid.: 37) that determines the performativity of the apparatus. Deleuze calls the diagram an 'abstract machine' that is "like the cause" of the concrete machine (ibid.). Diagram is an intertwinement of two dimensions: power and knowledge. "Between power and knowledge there is a difference in nature or a heterogeneity; but there is also mutual presupposition and capture" (ibid.:73). Deleuze describes the knowledge function of apparatus as 'archive' or 'stratum' (ibid.: 120), whilst power functions according to the 'diagram' (ibid.: 73). Apparatus is an immanent inter-play between "techniques

2.23. Tracking exercise. *office of ecological labour*.

of knowledge [archive] and strategies of power [diagram]" (Foucault, in ibid.: 75). Knowledge is, for Deleuze, the 'stratification' of agential cuts and possibilities, "'sedimentary beds' … made from things and words, from seeing and speaking, from the visible and the sayable, from the bands of visibility and fields of readability, from contents and expressions" (Deleuze, 1988: 47). Following Barad's reading of the co-constitution of being and meaning, i will add that power relations of the apparatus participate in stratification. Knowledge operates between the possible and the virtual (the outside of the apparatus), whilst power operates between the possible and the actual. Thus power and knowledge meet and co-determine the interior and also how apparatus negotiates its exterior. An entanglement of diagram and archive is the *power-knowledge diagram*, or the possibility timespace of apparatus, which determines what in the last instance *can* be 'seen' *and* what is 'articulable' (discourse) in a given apparatus (Deleuze, 1988). Cutting through the power-knowledge diagram, agential cuts enact 'enunciations' or 'statements', determining what matters (the actuality of the apparatus) and, at the same time, reworking the power-knowledge diagram. Agential cuts are enactments of possibilities and further possibilitisations.

Disposition is the topography produced by power-knowledge techniques and translation mechanisms, *the organisation of the apparatus,* a territoriality that determines the conditions of (re)production of power-knowledge and vice versa. Disposition refers to the dynamics between the possible of the apparatus and its actual effects, and in this sense it can be said to be at least partially the visible part of the apparatus dynamics, its infrastructural spacetime (Easterling, 2014). Therefore, disposition is the territory of the apparatus, a dynamic form that in itself participates in the performativity of agential cuts.

Disposition proceeds through techniques of 'translation', a notion i borrow from Bruno Latour's sociology of associations (1988). In Latour, ontological units are called 'agents' or 'actors' and they are characterised by the 'principle of irreducibility' (1988: 158). However, this principle of irreducibility is compounded with the 'principle of relativity': "[n]othing is, by itself, the same as

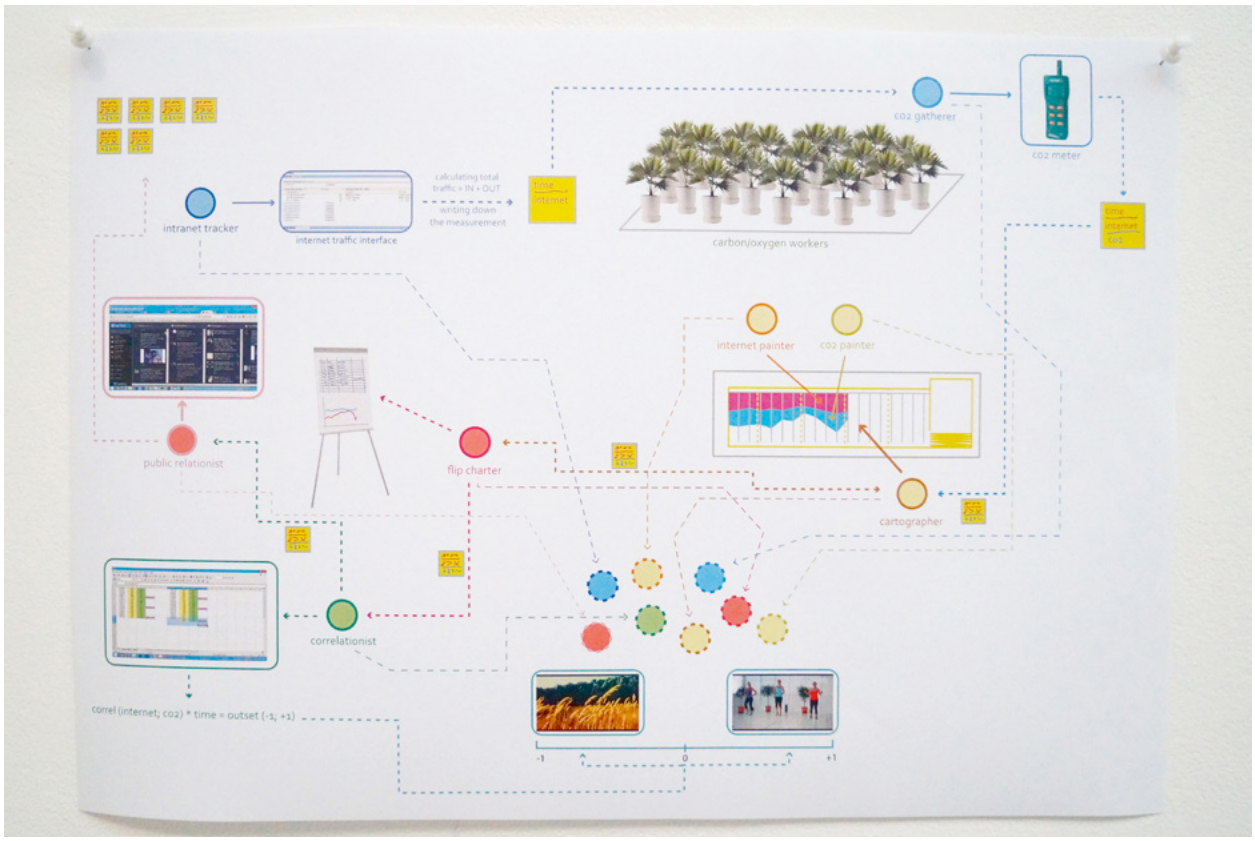
2.24. On-site monitoring. Preparations for *office of ecological labour*. Herbert Read Gallery, UCA Canterbury.

or different from anything else. That is, there are no equivalents, only translations." (Latour, 1988:162). The concept of translation should be understood outside of its purely linguistic meaning, it is a reduction of difference in order to create power relations. Through translation, 'weaknesses' become 'potencies' and bodies "gain strength" (ibid.:160). Translation is an arithmetic of power:

> [when] one actant manages to persuade others to fall into line, it thereby increases its strength and becomes stronger than those it aligned and convinced …. It can be said that A is *connected* to others. […] A can also be said to *command* others. A can also be said to *translate* the wishes of others. (ibid.: 172)

Through translation, power is transferred or relayed between bodies, some bodies are made to do things *for others* ("action upon action" for Foucault). It is a way of creating chains of action or diagrams of an apparatus. Translation is the mechanism of representation that apparatuses develop and through this mode of aligning, they ossify their power-knowledge diagrams to become mechanisms of control. Disposition is the congealing of the agential cuts, their formalisation and normalisation, a history that impacts but does not fully determine the future.

I will distinguish two critical dispositions of apparatuses: majoritarian and minoritarian. Dispositions can thus also be imagined as ethico-political expressions of an apparatus. Majoritarian apparatuses tend to concentrate power in determinate areas of the diagram, they re-iterate cuts in a similar fashion, creating lineages (lines of discent), eventually narrowing the band of possibilities of some of their members. In extreme cases, majoritarian apparatuses may become hierarchical or sovereign 'apparatuses of capture' (Chap. 13, in DG, 1987). Apparatuses of capture are biopolitical machines. Some examples might be the State, prison or certain urban organisations (e.g., gated communities). Minoritarian apparatuses are different inasmuch as they have more dispersed power-knowledge diagrams, their agential cuts are more



2.25. Performance score. *office of ecological labour*.

flexible, more indeterminate. It can be said that majoritarian apparatuses privilege inner consistency or stability, while minoritarian ones favour openness. The difference between the two can be explained in terms of the relations of accountability and responsibility they generate and perpetuate.

Returning to agential cuts (boundary-making), i will focus on another aspect of it: *territorialisation*. Agential cuts simultaneously determine what DG call 'content and expression' (reterritorialisation) and(re)work the constitutive outside of the apparatus. This other side of the agential cut "is constituted by lines of deterritorialization that cut across it and carry it away" (DG, 1987: 504). These other lines are basically other agential cuts that slice through the apparatus: "some open the territorial assemblage onto other assemblages" (ibid.). Apparatuses are never alone, others press upon them and intervene in their agential cuts. Also, bearing in mind the dynamics of mattering—withdrawal, there is always more to agencies within the range of an agential cut than those captured within its territory. The non-correspondence between the territory and matter (or life) is 'a crack', "a gap or disjunction" (Deleuze, 1988: 38). The crack is the inter-territory of friction between power and resistance that creates "two different directions that are necessarily divergent and irreducible" (ibid.). Territorialising function "either stabilise[s] the identity of an [apparatus], by increasing its degree of internal homogeneity or the degree of sharpness of its boundaries, or destabilise it" (De Landa, 2006: 12). (Here i substitute 'assemblage' for 'apparatus'.) Through the cracks, some possibilities tend to run 'away' from the capture of the apparatus, these are deteritorrialising/destabilising tendencies. However, at the same time, the cracks also indicate the permeability of the apparatus, deteritorrialising vectors that come from the 'outside'. In light of the above, it can be said that majoritarian apparatuses prefer reterritorialisation, whilst minoritarian tend towards deterritorialisation. Both tendencies are, however, compresent in any apparatus and each has cracks within.

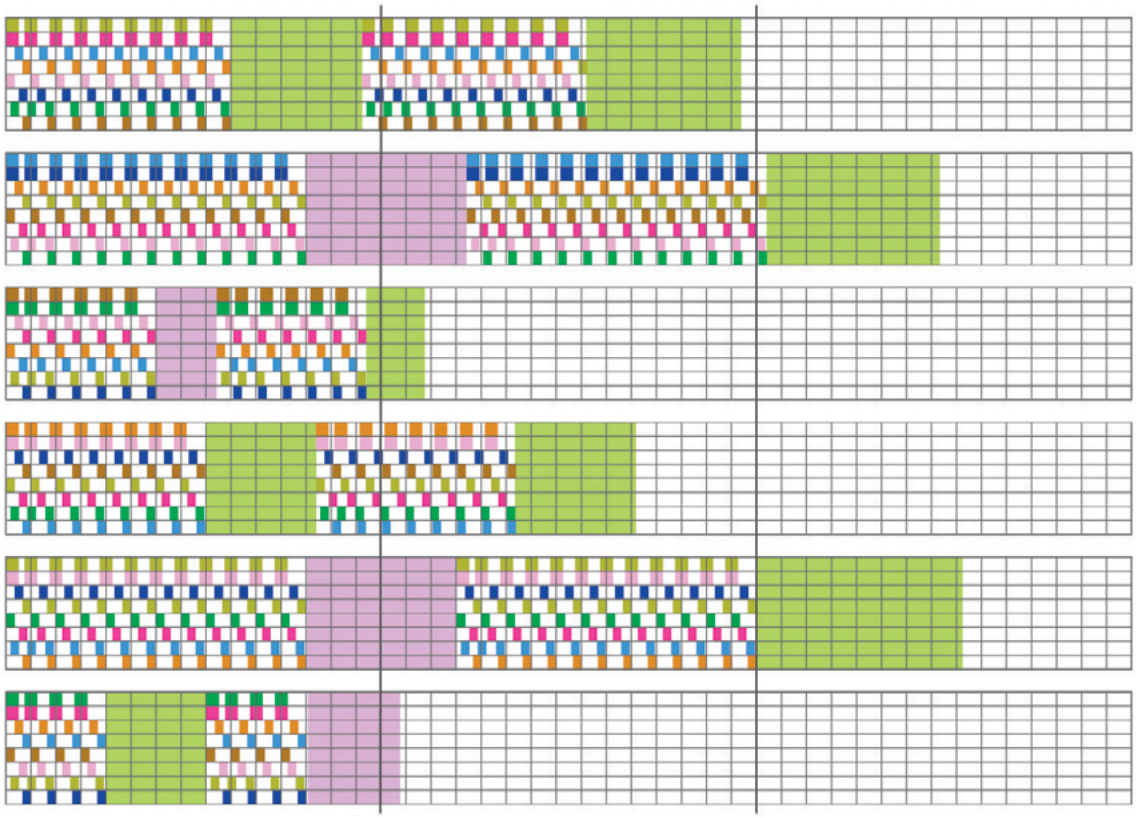
2.26. Co-performers. *office of ecological labour*.

The above described performances of apparatus are analytical tools for localising the operations of apparatuses. By studying their power-knowledges, translations, boundary-making procedures, and dispositions, it is possible to grasp what they bring to matter, what they 'say' or 'express', but also to understand what they invisibilise, background, capture or dominate. Inherently, apparatuses are lieus where relations of power are determined, producing material effects upon bodies. Posthuman eco-aesthetics has to find ways to account for apparatus dynamics, because these are nodes where im/possibilities of life are strongly impacted. Even human bodies are finely tuned apparatuses that produce territories, inclusions and exclusions. In the social field, we are participants in what Donna Haraway calls 'apparatuses of bodily production' (1991: 200), co-constituted in intra-active dynamics with numerous technological, economic, scientific apparatuses. From a modern human standpoint, i believe one always begins from the apparatus dynamics.

2.3.2. Assemblage / *agencement*

In this section, i advance an understanding of assemblage as a generative dynamics through which bodies learn to do things together, developing common capacities to affect and be affected. Assemblage in my reading is a material-affective dynamics in which bodies become other to themselves. I will highlight the politico-epistemic dimensions of assemblage, but the concept has been read and applied in fields such as ecology, political economy, sociology and art history[9]. My reading stems from DG's notion of assemblage in *A Thousand Plateaus*, but moves in the direction of posthumanist feminist epistemology and

9 In ecology, assemblage is a concept very close to community. Anna Tsing works with the concept of assemblage to analyse matsutake mushroom supply chains. "Assemblages drag political economy inside them, and not just for humans." (Tsing, 2015: 23) Further, following Manuel De Landa's groundbreaking 'neo-assemblage theory' of society (2006), assemblage has become a critical term in a number of fields in social theory. Furthermore, the concept has gained hold in international relations studies (Michele & Curtis, 2013), and geography (e.g., Anderson & McFarlane, 2011). Last but not least, assemblage has a distinguished history in the visual arts, where it was introduced by Jean Dubuffet in the 1950's. It is a successor and close kin to collage, often referring to three-dimensional compositions. What is of interest to me, however, is a posthumanist re-definition of assemblage, direction in which especially De Landa and Tsing point.



2.27. Timeline score. *office of ecological labour*.

quantum physics, as outlined in the works of Donna Haraway and Karen Barad.

Assemblage as a shared heterogeneity is encapsulated in DG's original formulation of the term, which in French is *agencement*[10]. John Phillips clarifies that *agencement* means 'arrangement', 'fitting' or 'fixing' in both active and substantive mode: "one might use the term for both the act of fixing and the arrangement itself" (2006: 108). Assemblage is an act of fitting, a material performance of composing agencies together. Similarly to apparatus, i insist on assemblage as a performative dynamic, not an arrangement. Anna Tsing provides a performative understanding of assemblage as an inter-species gathering that creates novel lifeways:

> Assemblages are *open-ended gatherings*. They allow us to ask about *communal effects* without assuming them. They show us potential histories in the making. [my emphasis] (Tsing, 2015: 22)

Assemblages are 'open-ended gatherings' that shape "ways of being" (ibid.). The key point is not the topographical relation of bodies in spacetime ('grouping'), but what they can do together. Contrary to apparatus, assemblages are 'open-ended'. Open-ended here stands for the malleability of assemblage boundaries, but also their multiple orientation. Assemblages do not have a common expression, they are 'polyphonic' (ibid.:23) and enact multiple possibilities at once. Assemblage is thus a machine for the "meshing of differences", which "endow[s] the process with capacity for divergent evolution, that is, the capacity to further *differentiate differences*" (De Landa, 2002: 64). DG's example of 'horse-stirrup-man' is not to be viewed as simply three bodies stacked on top of each other. What could make them an assemblage are the differences they are able to generate, the body movements they can enact that were previously impossible for them individually. In this sense, assemblages can be understood as 'events', or 'happenings' (Tsing, 2015:23). The polyvocal quality of assemblage is conveyed well in Hardt and Negri's reworking of Spinoza's

10 Assemblage as translation of *agencement* has gained foot in English since the first translation of *Rhizome* in 1981, and was formalised by Brian Massumi's translation of *A Thousand Plateaus* (Phillips, 2006: 108).

2.28. Monitoring internet volume. Preparations for *office of ecological labour*. Herbert Read Gallery, UCA Canterbury.

multitudo:

> The multitude is a multiplicity, a plane of singularities, an open set of relations, which is not homogeneous or identical with itself and bears an indistinct, inclusive relation to those outside of it. (2000: 103)

Multitude in Hardt and Negri's political ontology embodies the constituent political subject. It can be said that assemblage is a process of constituting multitude.

Assemblage dynamics are not about fusing elements into full alignment, creating a diagram. In assemblage, each element "maintains an energetic pulse slightly 'off' from that of the assemblage" (Bennett, 2010: 24). De Landa explains that assemblage should be analysed in terms of 'external relations', different from 'internal relations' as in an organism paradigm (De Landa, 2006: 11). On the one hand, this implies that "the properties of a whole cannot be reduced to those of its parts" (ibid.). Assemblage is a "non-totalizable sum" (Hayden, in Bennett, 2010: 24). On the other hand, but of equal importance, it demonstrates that "parts are always greater than the whole" (Bryant, 2011: 272). *Assemblage elements generate something 'other' than themselves, and each element is also something 'other' from the assemblage*. Contrary to apparatus, which displays a tendency towards capture, functional alignment and formalised disposition, agencies in assemblage are in continuous experimentation. Assembling agencies 'tether' between the singularisation and collectivisation of autonomy, thus developing "patterns of unintentional coordination" (Tsing, 2015: 23). We can never fully know what an assemblage or a multiplicity can do. The constituent parts of assemblage do not know either. Assemblages are intra-actions of a multiplicity that moves without an end, their possibilities are open-ended.

Material practices of assemblage include: field, possibility cloud, quantisation/desire, becoming, situated-dispersal. To evoke the difference in consistency between apparatus and assemblage relationality, departing from DG

2.29. Composing #copper #love #machine. *we ♥ copper & copper ♥ us vol. 1.*

terminology, i call the territory of assemblage a *field,* after the quantum field. A simple definition of quantum field is that it "is a [many-body] system with an infinite number of degrees of freedom, which may be restrained by some field equations ['renormalisations']" (Kuhlmann, 2015). A quantum field is obtained by 'quantising' the particle field of quantum mechanics (ibid.). Quantisation implies a transformation in the understanding of the particle and the field (its territory). Quantum theory has been described as "the land of anonymity" (Dalla Chiara & Tonaldo, in French, 2015), in which the principle of identity wavers or 'non-individuality' becomes a possibility (ibid.)[11]. Quantisation implies a leap in the dynamics of an entity, which is now a particle—field entanglement. Barad invites us to imagine the quantum field as an 'infinite drumhead' (2010: 10) without the drummer. It has its own intense 'fluctuations' filled by 'virtual particles', "ghostly non/existences that teeter on the edge of the infinitely thin blade between being and nonbeing. They speak of indeterminacy." (Barad, 2012b: 12) Barad describes quantum field as "a lively tension, a desiring orientation toward being/becoming" (ibid.: 13). This teetering or fluctuation is what i will call 'possibility cloud', a quantised version of the power-knowledge diagram with the difference that it is "flush with yearning" (ibid.), animated by intensities of desire.

Assemblages emerge through intra-active iterative dynamics, but their expressions are not subjects and objects, as in apparatuses. Assemblage touches and is touched by the virtual and desires difference – to become. Becoming is a condensation that connects the possibility cloud with the field, a difference that self-differs/self-others. In the language of Deleuze and Guattari, this is becoming. In their example of wasp-orchid assemblage there is "a becoming-wasp of the orchid and a becoming-orchid of the wasp" (DG, 1987: 10). Assemblage that becomes extracts a portion of the virtual, it quantises it, translates it into discrete parts of the possibility cloud. A new possibility is born, joining various agencies in a shared yet differential cause. Through becoming, wasp and orchid become entangled in the possibility cloud, always in tension that can land on each other. The becoming-wasp of the orchid and the

11 There is a variety of interpretations of the problem of individuality in quantum theory.

2.30. Retracing exploration data of Geological Survey of Finland. Fieldwork of *we ♥ copper & copper ♥ us vol. 1.*

becoming-orchid of the wasp are not individual events, they are a wasp-orchid as a 'polyvocal' 'happening'.

Assemblages have their own discourses, but they are different from those of apparatuses which consist of a plane of what is sayable and articulable. Assemblage is a process of learning among heterogeneous entities that Gregory Bateson calls "an evolution of fitting together" (1979: 152). In Deleuze's words, assemblage is "a symbiosis, a 'sympathy'" (in De Landa, 2006: 121). It is primarily a dispersion of agencies, *agentements*, a transformation of the virtual into the possible. Becoming breaks away from power as "action upon action" and turns it into "action with action", an empowering agentialisation. Assemblage intra-actions can be called *infra-action*, which operates beneath the "grid of intelligibility" (Drefyus & Rabinow, 1983: 121)[12]. It is an unintelligible 'natural convers(at)ion' with the earth, the virtual exteriority-within.

The concept of assemblage has affinity with *assembly*, meeting, gathering of affects and bodies. Assemblies, in their Germanic tradition, were called 'ding' (thing), and often it was indeed a thing, e.g. a mound or another geographical formation, at or around which free-speaking men gathered. However, the 'thing' in question was a 'matter of concern' (Latour, 2004), an issue to be collectively discussed and hopefully resolved. Following Tsing, assemblages are not gathered around a pre-determined matter in mind. The attractors of assembly are not things, but immanent processes of desire for anotherness.

In Spinoza, "desire is each man's nature or essence", it is the *expression* of *conatus*, "the endeavour to persist in its being" (in Negri, 2012: 85). Desire is different in nature from one essence to another, including animals, and i would add, other earth others (ibid.: 86). "There is only desire and the social, and nothing else" (DG, 1983: 29). Assemblages are social expressions of *the desiring of matter, mattering as desiring*. Joyful meetings among bodies form what Spinoza called 'common notions':

12 "Grid of intelligibility" is Dreyfus and Rabinow's alternative to the more standard translation of Foucault's *dispositif* as 'apparatus' (1983: 121).

2.31. Phone dissasembly. Fairphone workshop at Open Source Circular Economy Days. 13 June 2015, Helsinki.

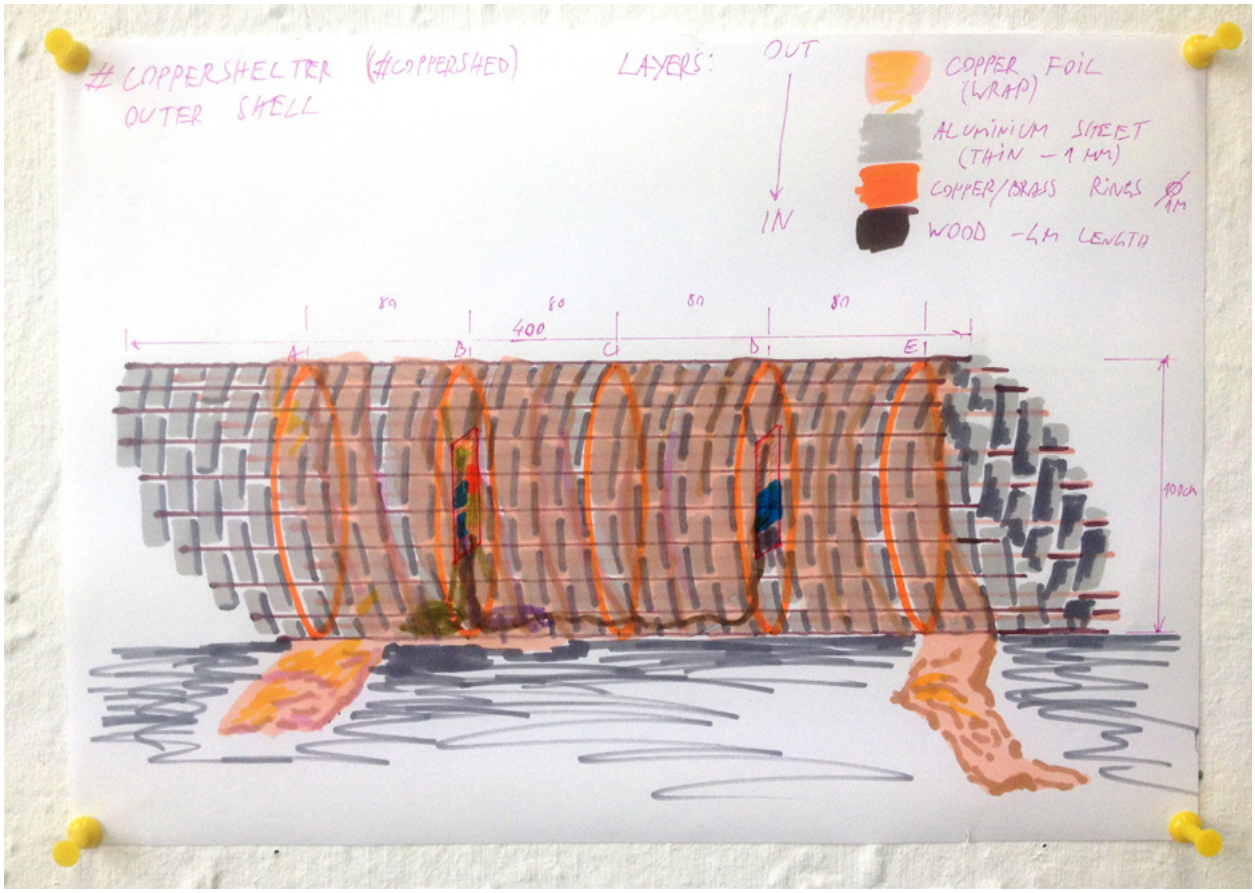
> ...common notion is *the representation* of a composition betwen two or more bodies, and *a unity of this composition*. ....it expresses the relations of agreement and composition between existing bodies. [my emphasis] (1988: 54)

Representation and materiality (unity) are joined in "something common" (Deleuze, 1990: 280). In Spinoza's monism, the mind is the idea of the body and the body is the idea of the mind (Dolphijn & Tuin, 2012: 96), therefore 'forming common notions' is the moment of unity of matter and meaning, of forming a "relations of agreement". Common notions move the body from passive into active modes through 'joy-passions'. "There is a whole learning process involved in common notions, in our becoming active" (Deleuze, 1990: 288). Commoning with other bodies is thus a "learning process". Assembling the social is an intra-active dynamics of learning and composing. Assemblage as *agencement*, agentialisation, are intra-actions of 'forming common notions' with other agencies through which new shared possibilities come into being. Thus, assemblage has an intimate relation to knowing, it is a relation of knowing (see 2.4).

2.3.3. Spacetimematterings of apparatus/assemblage

In this section, i detail what kind of space and time (territory or field) are created through the dynamics of apparatus and assemblage. Apparatuses and assemblages are not bodies hanging in space and time, they are different modes of intra-action of matter entangled with space and time. "Space, time, and matter are mutually constituted through the dynamics of iterative intra-activity" (Barad, 2007: 181).

In Newtonian mechanics, bodies are inside a topographical metric space and time. In agential realism, matter is *of* space and time. Contrary to topographical space that separates bodies on a map, topologies are of a connective nature, and dis/continuity is part of them (e.g., quantum leap). The "topological manifold of



2.32. Developing *#copper #love #machine. we ♥ copper & copper ♥ us vol. 1.*

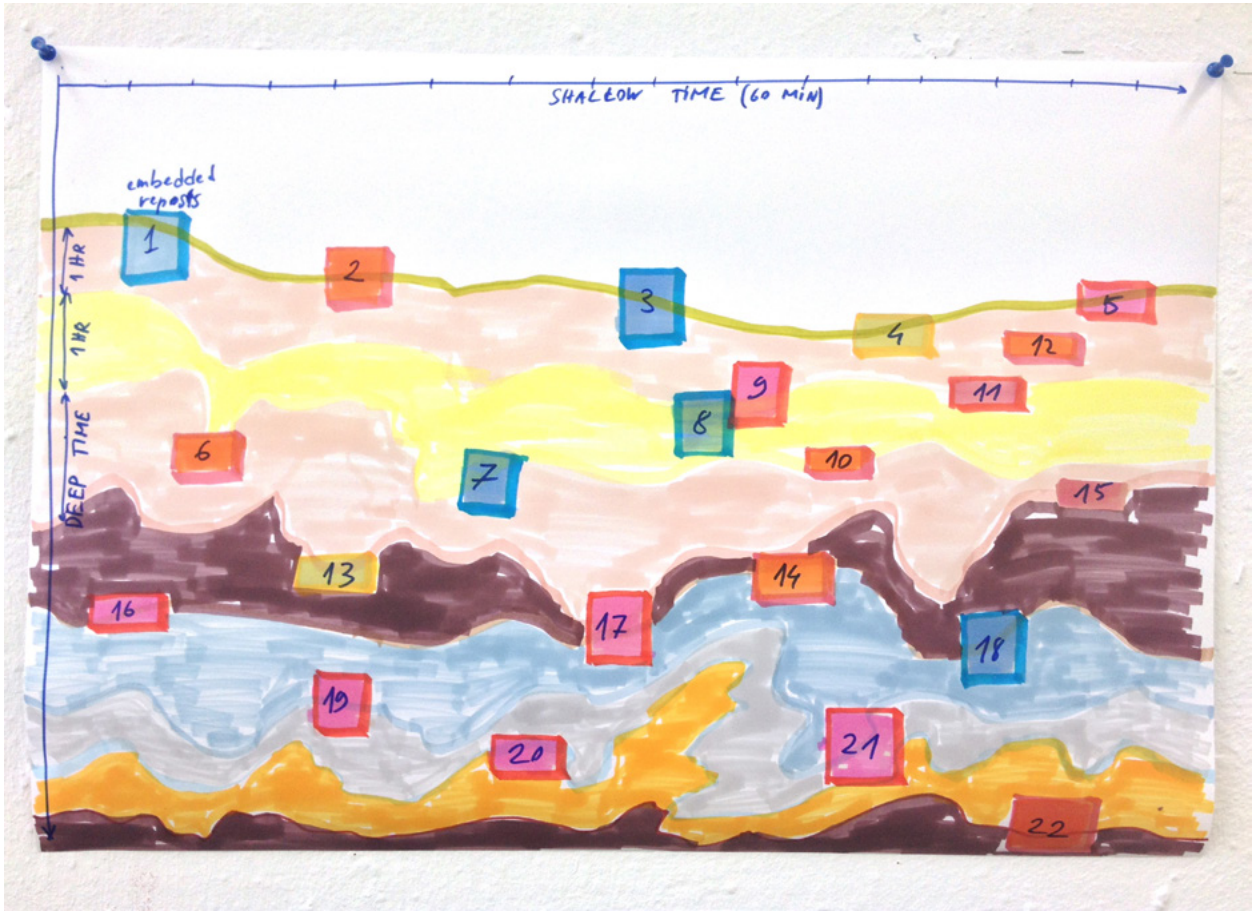
spacetimematter relations" is iteratively reconfigured through intra-active entanglements. Bodies do not 'touch' in space and time, they are *of* the space and time of connective intra-activity. "All real living is meeting. And each meeting matters." (Barad, 2007: 353) Intra-action does not begin when the bodies are close in a pre-existing space and time, but closeness is the intra-action of the spacetimematter manifold. Correspondingly, time is not a container either, but a connective folding of pasts and presents[13]:

> As a result of the iterative nature of intra-active practices that constitute phenomena, the 'past' and the 'future' are iteratively reconfigured and enfolded through one another: phenomena cannot be located in space and time, phenomena are material entanglements that 'extend' across different spaces and times. (ibid.: 383)

Apparatuses produce differential times that partake in wider spacetimematter manifolds involving other apparatuses. Spacetime is entangled with how matter meets, folds and sediments.

Apparatuses and assemblages enact different spacetimematterings or territorialisations, affording different types of meetings to happen. Apparatus privilege a topographical territorialisation, a formation of a disposition that can be cut through techniques and strategies. Assemblages intensify the topological inter-connectivity of spacetimemattering through their formation of fields of desire. It can thus be said that apparatuses 'arrange' meetings among friends by stabilising a territory, whereas assemblages are more like 'blind dates' in which connectivity is always reconfigured. Apparatuses have a tendency towards locality, compared to assemblages that are more oriented towards trans-locality. Horse and omnibus are a localised and interlocked apparatus performing a certain operation. Bumblebee and orchid are a tenuous assemblage that rarely comes to meet. Apparatuses are more nests, while assemblages are more

13 This is one of the key findings and ontological revolutions of quantum physics, that past can be 'changed'. Karen Barad re-interprets the result of a double-slit diffraction experiment to support her claims (2007: 247-352). Beyond scientific significance of Barad's explanation of the experiment, it supplies powerful conceptual tools for an analytical-critical engagement with a humanist reality that produced the idea of the linear time.

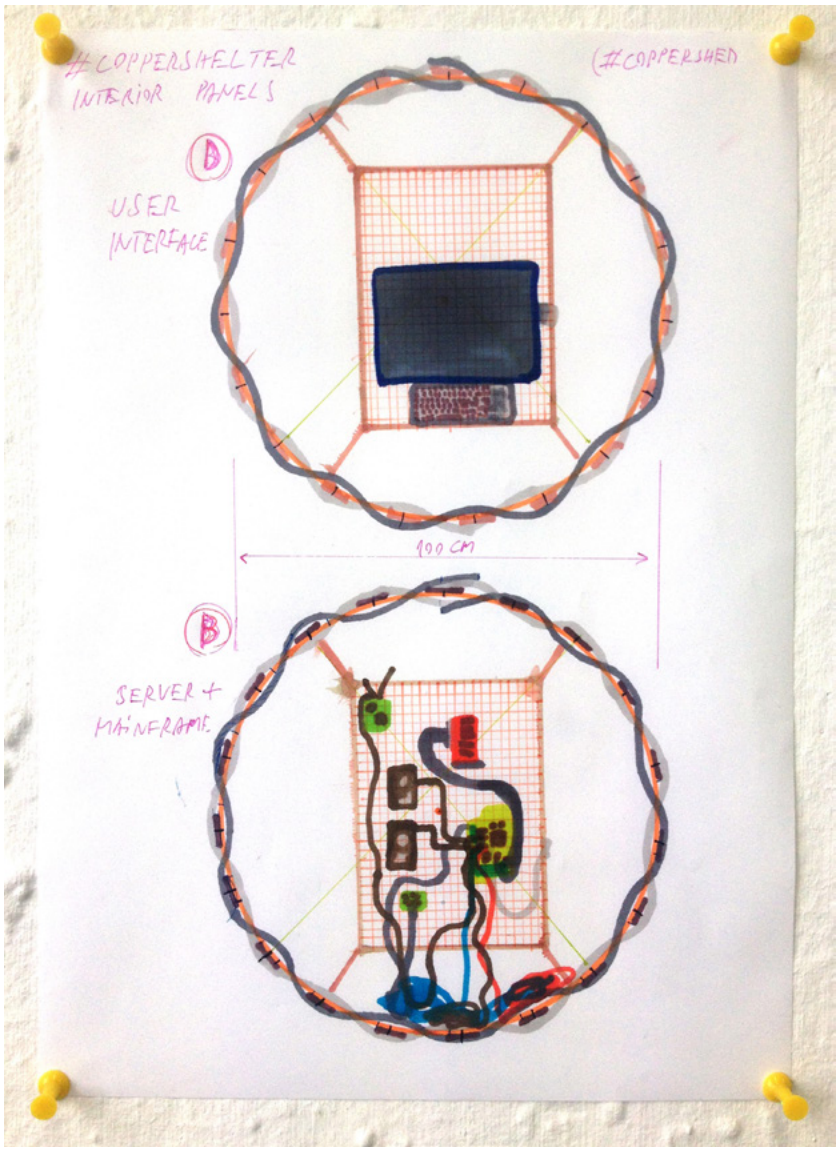


2.33. Sketches for #weheartcopper web deposit. In collaboration with Romulus Studio. *we ♥ copper & copper ♥ us vol. 1.*

springboards. Assemblages and apparatuses are coagulations of agencies that produce different patterns of spacetimemattering.

In apparatus dynamics, territory is stabilised and pathways are relatively (never fully) pre-determined. “Let’s meet at eight o’clock at Louvre”, is a relatively stable thing to say within a certain apparatus. There are a number of apparatuses that have organised and disposed spacetime *as if* there was a grid of pathways, and a linear time. It does not take much to see that even inside this type of apparatus, thanks to other topologies (e.g., mental ecologies), it might not be as straightforward to arrange crossings of agencies. Even topographical space, understood as a linear, homogeneous, contiguous space of modernity is a topological spacetimematter, only its possibilities have been significantly narrowed down through techniques of power-knowledge and strategies of power. Yet, even inside this spacetimematter manifold, unexpected meetings may happen.

Assemblages are fields that are brimming with fluctuating intensities, with very fuzzy borders, just like clouds. Inconsistency and in/determinacy are being experimented with through freedom, but since they are so open it is quite hard to notice them, and to maintain them without turning them into something else. How to meet and intra-act in assemblage mode is what Spinoza depicts in his idea of forming common notions. Therefore, to engage with other bodies in freedom is to assemble. In posthuman ecology, the question is how to assemble with earth others, to create possibilities of co-constitutive in/determinacy, in which becomings or symbioses may happen. Spinoza opens up a trajectory that needs to be moved beyond human freedom and sociality. By envisaging assemblage as a field of posthuman freedom, i will try to analyse what kind of knowings and politics they demand. This will be a step towards understanding how they could be composed through eco-aesthetic or other practices in which humans participate.



2.34. Sketch for *#copper #love #machine. we ♥ copper & copper ♥ us vol. 1.*

2.4. 'Situated-dispersal' of assemblage

In this section i move from a critical to a creative mode. I will now try to see what material-discursive performances could lead to the emergence of posthuman assemblages. This analysis is informed by two related fields: critical feminist epistemologies of standpoint theory and Haraway's 'situated knowledge', and Barad's posthumanist understanding of knowing practices. I also discuss these epistemics in relation to the feminist politics of location. I believe that these approaches have rich insights to offer to a posthuman eco-aesthetics due to their emergence as critical responses to modern epistemologies, and their inseparability with political struggles for social justice and emancipation[14]. Furthermore, the feminist epistemological and political tradition underpins and in many respects founds neomaterialisms and environmental humanities, so there is a clear genealogy in which i am situating this thinking.

Modern science embodies Galileo'e early exclamation: "anyone can see through my telescope" (Harding, 1993: 51). From this viewpoint, modern epistemology is based on the assertion that there is one 'objective' and 'value-free' knowing location (the seer). Donna Haraway has criticised this epistemology as performing a transcendental "god-trick", resulting in "the view from nowhere, from above, from simplicity" (Haraway, 1991: 195). Nancy Hartsock further equated this position with that of 'abstract masculinity' (1983), an epistemology embedded in dualisms (gender, first of all) and tied to the sexual division of labour. In this politico-epistemic settlement, women are relegated to the domain of reproduction and material support for the masculine exercise of thinking (ibid.). Feminist standpoint epistemology reformulated both the status of the knower and the definition of knowledge-making projects.

14 Feminist epistemologies seek to decentre the Enlightenment knowing subject, and as such they join intentions with post-colonial, antiracist, minoritarian, and other critical-political projects that try to displace the white, male, and patriarchal projects of domination. In this, critical feminist epistemologies share *ethos* with ecofeminist critiques of domination, which is the conceptual-political ground of this work.

2.35. Undiscovered copper deposit. *we ♥ copper & copper ♥ us vol. 1.*

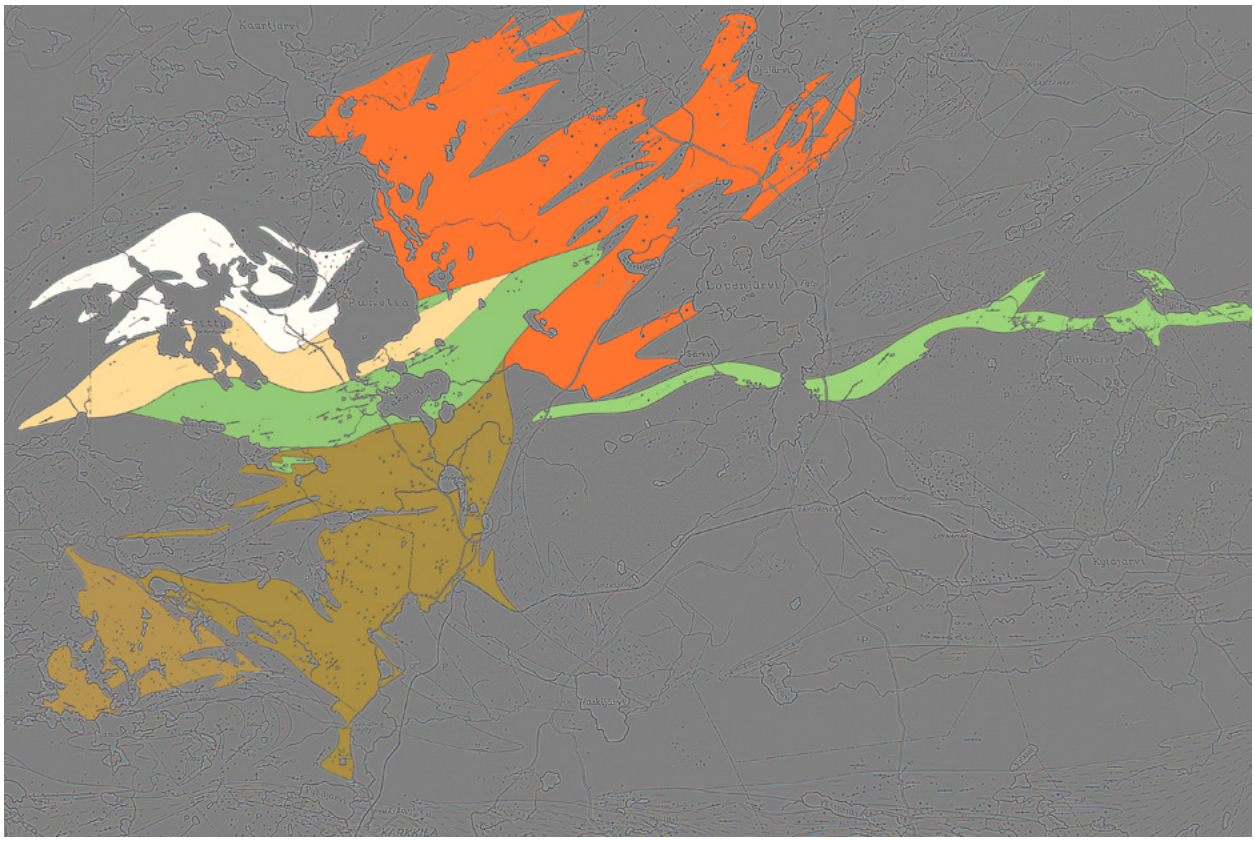
The centrality of social location, its embeddedness in the relations of gender, class, race, ethnicity, has been the principal contention of feminist standpoint theory (Collins, 1991; Harding, 1986; 1991, 2004; Hartsock, 1983). Standpoint theory claims that some social positions—those pertaining to women, marginalised and minoritised—are repressed and that knowledge projects starting from these positions make for better accounts of the world and could serve as means of achieving social justice. Standpoint theory proposes that knowledge is "grounded in particular, historical social situations" (Harding, 1993: 59). Standpoint theories thus propose embodied and embedded knowledge projects that account for the everyday lives of the marginalised, an "epistemology of 'everyday life'" (Code, 1993: 16).

The question of standpoint epistemology is how to gain 'access' to a standpoint, how to "start thought from women's lives" (Harding, 1993: 56). This represents an important innovation for the Marxist claim that the proletariat had a special insight into their oppressed status inside capitalism. The task for a feminist epistemology is then not to know the 'other' (as object of knowledge), but to reclaim the marginalised as knowing subjects and to know with them. Standpoint theory has been criticised for this idea of 'epistemic privilege'[15]. Without expressing judgment on this complex debate, i believe that these critiques could be transformed if we see the standpoint as challenging the topographical understanding of social location (fixed identity)[16]. The standpoint is a process of relational, thus topological, positioning:

> a standpoint cannot be thought of as an ascribed position. … Rather, a standpoint is an achievement, something for which oppressed groups must struggle, something that requires both science and politics … (Harding, 2002: 8)

15 A claim that women's lives afford an epistemic privilege has been criticised as essentialising from the point of view of postmodern feminism (e.g. Hekman, 1996). As a result, standpoint theories have moved from claiming women's social location towards a pluralisation of positions. However, this attentiveness towards plural positionings has been present even in early formulations of the standpoint, as Sandra Harding reasserted that feminisms are historically embedded and thus that there are many positions from which to start thought off (1993: 60). There is no final word on this, and it is not my task to resolve this important dispute.

16 Insight for this comes from Karen Barad's critique moved against how feminist social theory uses spatial metaphors which are primarily of modern nature, i.e. 'space as container' (2007: 223-6).



2.36. Pattern design for *#copper #love #machine. we ♥ copper & copper ♥ us vol. 1.*

Knowledge-making is a relational project that can be aligned with a topological understanding of social location. The key points i wish to highlight in standpoint theory are proposals that: knowledge is topological (or positioning), and that knowing is a collective endeavour. I will transpose some of these claims into the posthumanist continuum to understand the dynamics of assemblage.

There are important resonances with questions of environmental justice in these claims. In ecofeminist analyses, a number of world-making projects are captured by the logic of domination. If ecofeminism is situated into a posthumanist continuum, a large variety of knowings can be considered suppressed. Some of these knowings do not involve humans. Other-than-humans engage in their unique, singular onto-epistemic entanglements, "practices of knowing in being" (Barad, 2007: 185)[17].

The key passage from standpoint theory to a posthumanist epistemology can be made through Donna Haraway's formulation of 'situated knowledge' in 1988. In dialogue with standpoint theories and ecofeminism, Haraway makes the case for feminist objectivity that "is about limited location and situated knowledge, not about transcendence and splitting of subject and object" (ibid.: 190). The very nature of situatedness in Haraway opens towards a topological epistemic dynamics: "partial, locatable, critical knowledges sustaining the possibility of webs of connections called *solidarity* in politics and *shared conversations* in epistemology" [my emphasis] (ibid.: 191). Situated knowledges emerge communally and through territories of power relations: "knowledge:community::knowledge:power" (ibid.: 196). *Because* the "knowing self is partial in all its guises, never finished, whole … it is able to join with another, to see together without claiming to be another" (Haraway, 1991: 193). To be partial is not a limitation as in modern epistemology, it is the very condition that enables engagement with the world's iterative intra-activity. Partiality opens towards an expanse of possibilities for semiotic-material intra-

17 For example, Karen Barad extensively describes the onto-epistemology of a brittlestar (2007: 371-383). Importantly, Barad does not claim that other-than-humans 'have' their epistemologies, but that humans should practice 'onto-epistem-ology' to better "come to terms with how specific intra-actions matter" (2007: 185).

2.37. Sewing *#copper #love #machine*. In collaboration with Siru Juntunen. *we ♥ copper & copper ♥ us vol. 1*. May–June 2015, Helsinki International Artist Programme.

connectivity that lead to generating a 'larger vision' (ibid.: 191). This vision is however only possible from "somewhere in particular" (ibid.: 196), bodies and fields. This situated-webbed knowing location i believe strongly resonates with the dynamics of assemblage.

Partiality (composition), conversation, 'webbed accounts' (polyvocality), community/solidarity (affect); i think these can be imagined as traits of assemblage knowing. For Haraway, knowing is an intra-action of subjects and the world, "a power-charged social relation of 'conversation'" (ibid.: 198). The humanist concept of 'conversation' here traverses natures and cultures, because the world is understood as a 'witty agent', an agential 'coyote' or a livel 'trickster'. Because of this worldly unruliness, knowing is a 'messy' practice of care and cross-breeding, of "making kins", becoming-by-knowing-with-other[18]. Shared conversations can be had only between partners. Following Vicki Kirby's concept of 'natural convers(at)ions', the question for posthuman situated knowledge is how to *join and participate* in this wider field of lively talking.

In intra-active dynamism, knowing is entangled with iterative agential cuts, enacted through subject—object determinations. Knowing is a meeting, it implies material causality. Niels Bohr, in describing particle physics experiments, says that "permanent marks .... [are] left on bodies" (in Barad, 2007: 119). The object side of an agential cut experiences power. Each knowledge 'leaves' consequences. Situated knowledges are thus immediately ethico-political:

> knowing requires differential accountability to what matters and to what is excluded from mattering. That is, what is required is differential responsiveness that is accountable to marks on bodies as part of a topologically dynamic complex of performances. (Barad, 2007: 380)

Accountability and responsibility/responsiveness are different from knowledge oriented towards objectivity as critical distance from object. Together with the

18 In fact, Haraway shares conversations with primates, cyborgs, dogs, laboratory mice, and many other others (1989, 1991, 1997, 2003, 2008).

2.38. *#copper #love #machine* material gymnastics. *we ♥ copper & copper ♥ us vol. 1.* Helsinki International Artist Programme.

'cutting apart' of subject and object in onto-epistemic dynamics, there needs to be a 'cutting together', an intensification of relations of accountability and responsibility, especially towards what gets "excluded from mattering". Knowing is always a question of 'ethico-onto-epistem-ology' (ibid.: 185).

(In a critical/analytical mode, it must be noted that most of the apparatuses in the present do not cultivate situated epistemology. In capitalist, imperialist, modernist apparatuses, it is merely optional if subjects will treat a guinea pig as a person. When agential cuts are made in non-responsive fashion, some agencies are turned into objects-as-things, 'others,' fetishes, black boxes, commodities, collateral damage, or a means to an end. When a subject properties objects in this way, it installs a 'blind spot' of transcendence over the rest of apparatus, avoiding relations of accountability.)

The question remains, if relationships to marks made can be more responsive, can marks be empowering for the marked objects (as much as the subjects)? Can there be a knowing that undoes the dynamics of agential cut, or that does otherwise? Can there be other types of knowing/sensing, ones that do not involve a constitution of a subject?

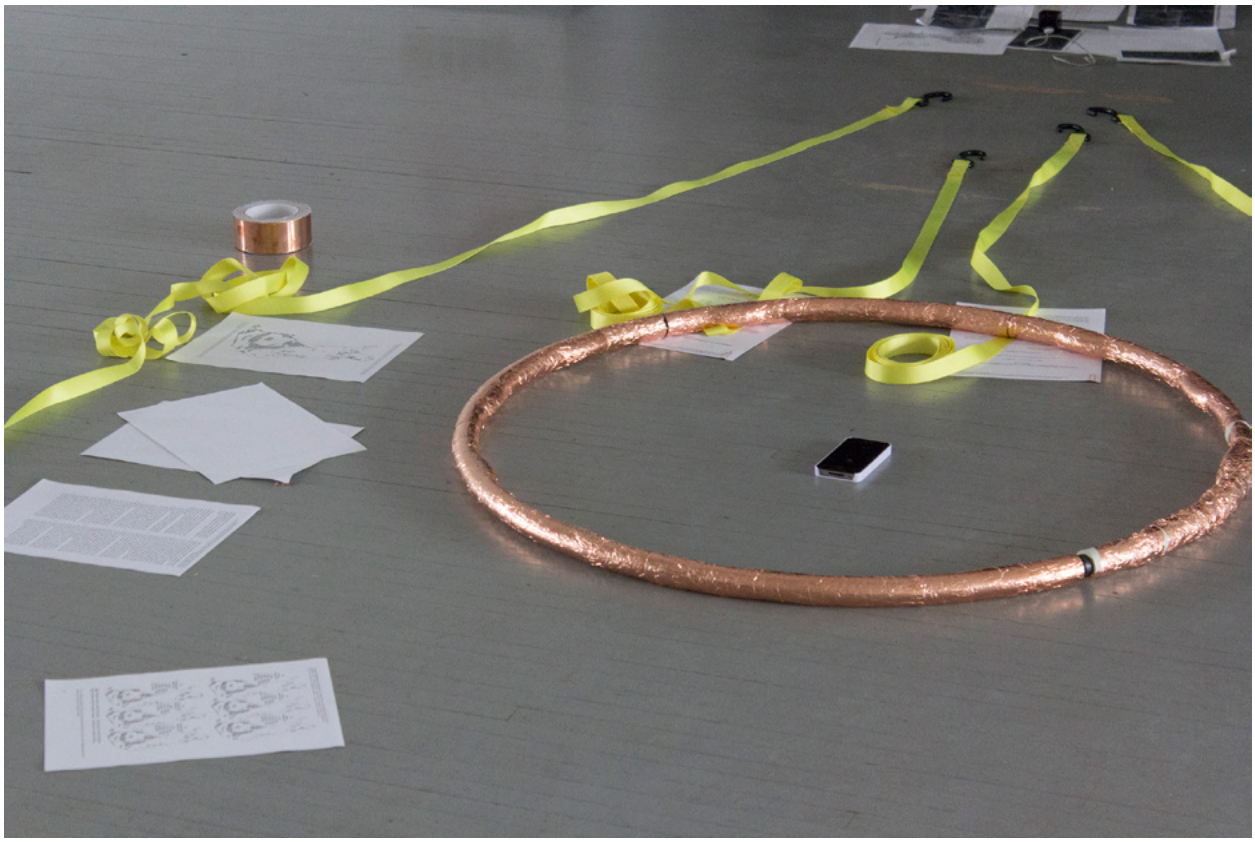
In her recent writings, Barad makes steps in this direction through an ethico-onto-epistemics of quantum 'touching' (2012a, 2012b, 2015). Barad invites us to learn from electrons. The dynamics of mattering in quantum field theory (QTF) opens for a radical re-imagining of being—knowing and aesthetics. The details are technical, but the dynamics is fundamentally poetic. In Barad's reading of the quantum field of vacuum, electrons are not separate from the void, instead they collectively engage in tireless experimentation with infinities of possible becomings. The vacuum itself is brimming with "quantum fluctations" performed by "virtual particles" (Barad, 2015: 396). The void is "an endless exploration of all possible couplings of virtual particles, a 'scene of wild activities'" (ibid.:). Electrons not only "traffic" in virtual particles with the void, but also *with themselves* (emitting and re-absorbing photons). "Matter is an enfolding, an involution, it cannot help touching itself, and in this self-touching

2.39. *#copper #love #maintenance. we ♥ copper & copper ♥ us vol. 1.* 17 June 2015 Galleri Augusta, Helsinki International Artist Programme.

it comes in contact with the infinite alterity that it is" (ibid.: 399).The so-called point particles, and the vacuum itself, are an incessant (self-)experimentation. In the end (that is, in the middle), what comes to matter are "condensations of responses, of response-ability" (ibid.: 401). Becoming as (self-)touching displaces the paradigms of visuality in both epistemology and aesthetics. Most importantly, "the self is dispersed/diffracted through time and being" (ibid.: 400). 'The self' participates in the in/determinacy of non/being, dispersing and absorbing others' dispersions, 'self-touching' and 'self-touching the other'. We should not be led to think that this 'polymorphous perversity' belongs only to electrons (ibid.: 399).

In a consonant fashion, Vicki Kirby interprets the touching of earth and cloud in flash lightning. It is not that lightning 'strikes' somewhere, a lightning is an upwards and downwards conversation between the currents of the thunderstorm and earth. The electric charges start 'travelling' from the cloud in a zig-zag pattern, until about "ten or a hundred metres" *before* the ground, and then *the earth responds* by discharging "a travelling spark" from the point where the strike *will* occur (Kirby, 2011: 11). In Barad's analysis of Kirby, lightning is "an energising response to a highly charged field" (Barad, 2015: 397). The field between earth and cloud comes into being *as* the electric charges experiment their way (ibid.: 397). There is an advance, the cloud "flirts" with the earth, until electrons from the ground respond (ibid.: 398). This is a becoming, a double deterritorialisation, and it almost uncannily embodies DG's concept of "line of flight", which draws two agencies into a joint path. However, what should be pointed out is that the 'line of flight' is only the dramatic expression of a broader field of self-touching. Knowing consists in assembling of an intense field of possibilities, through which a becoming, a new possibility, may draw its agential path to touch itself. From this depiction, to 'touch' or to 'know' a 'thunderstrike' is an entanglement of self-touching (being affected) and self-touching the other (affecting). In intra-action of becoming, subject and object are situated and dispersed.

Lightning is a materialisation of assemblage. Both the cloud and the earth need



2.40. *#copper #love #maintenance. we ♥ copper & copper ♥ us vol. 1.* 17 June 2015, Galleri Augusta, Helsinki International Artist Programme.

to align to different degrees. There are two key elements of assembly: the 'flash' or becoming, and the field. The flash is the 'location' of becoming, becoming-earth of the cloud and becoming-cloud of the earth. It can be correlated to the achievement of a collective standpoint; a figure, a tree, standing in the field in relation of response-ability with the cloud. However, it is only an expression of a much broader field of collective intra-activity, numerous zig-zag patterns of experimentation that slowly made their way across the initial gap. In this 'murmuring' (Barad, 2012a: 216) of the virtual touches, assemblage is already-not-yet-there, it is in the virtual, but it is real. Becoming 'response-able' to the *yearning of matter* is to begin to know-as-assemblage (hooks, 1990)[19]. Matter is made up of "condensations of responses, of response-ability" (Barad, 2015: 401), and to participate in mattering is to be response-able *before* the flashes of matter.

Following up on situated knowledge, i believe that assemblage can be considered through Magdalena Górska's concept of 'situated-dispersal' (2016: 67-9)[20]. Posthuman knowing implies situated work within power and knowledge apparatuses and a dispersal of force and desire. This dispersal may invoke the field into a 'shared conversation'. Situating and response-ability are entwined performances of knowing/meeting the inhuman. From the viewpoint of human(ist) apparatuses, initiating an assemblage dynamics implies "sensing the abyss, the edges of the limits of 'inclusion' and 'exclusion" (Barad, 2012a: 216)—*facing "the inhuman"*—embodying that "each of 'us' is constituted as responsible for the other, as the other" [my emphasis] (ibid.:215). *Responsibility comes before a response, it is becoming-other* before *the other*.

19 'Yearning' is affect-feeling with which bell hooks condenses her vision of liberatory Black feminist consciousness, "desire for radical social change [that] is intimately linked with the desire to experience pleasure, erotic fulfillment, and a host of other passions" (1990). I am encouraged to use desire and yearning in posthumanist register by Karen Barad (2012b). Significantly, Barad emphasises that yearning is indeed a material force. "Don't for a minute think that there are no material effects of yearning and imagining" (ibid.: 13). I use yearning in conjunction with DG's notion of 'desire' as a driving force of the social. "There is only desire and the social [the field], and nothing else" (DG, 1983: 29).

20 Magdalena Górska formulates 'situated-dispersal' by diffracting "situated knowledges" with inter-textuality to describe the movement of signifiers (and matter) among heterogeneous planes. Situated-dispersal also relates to her subject of inquiry, to the process of breathing: situating and dispersing particles and affects. I find this figuration highly evocative for imagining posthuman assemblies in which it is not only humans that sense and know.

2.41. Meeting lithic bodies in Skomvær. In collaboration with Marika Troili. Røst Artist in Residency, Skomvær.

‘Before’ stands for the spatial and temporal orientation of yearning. Because the world is response-able and brimming with irreducible will to self-touch anotherness, a field of assembly may come into being.

From this we can see how apparatus and assemblages are two entangled modes of mattering—meaning. Apparatuses know by way of cutting together/apart of subjects and objects, with different degrees of accountability and responsibility. Assemblages are touches in fields of shared experimentation. It should be clear that both assemblage and apparatus participate in the same dynamics of worldly spacetimemattering. I am drawing an analytical distinction in orientation between the two modes. Apparatuses are performances of ‘cutting together/apart’ whilst assemblages are performances of touching of aparts-together, (self-)touchings with other (self-)touchings.

Matter ‘comes to matter’ through apparatuses and assemblies, but no other entities’ apparatuses are as violent in cutting apart as humans’ are currently. Human apparatuses cut much more than they touch, and in this they profit from the immanent surplus of life. From the position of life in biocapitalist apparatuses of capture, *the virtual or the inhuman is the excluded-within*. This is Agamben’s ‘state of exception’ (1995), the fundamental formulation of biopolitics. Appropriation by exception is possible only because apparatuses imply making cuts. In this context, it is imperative to insist on other modes of knowing, on assemblages that are “a symbiosis, a ‘sympathy’” (Deleuze, in De Landa, 2006: 121). To know/touch the *in*human implies a re-orientation of “practices of knowing in being” (Barad, 2007: 185). In this light, i see eco-aesthetics as fundamentally a mode of ethico-onto-epistemic performativity. The main question for art is how to meet other bodies in response-ability, how to learn to touch others without domination. Eco-aesthetics can thus be one of what Foucault called ‘techniques’ or ‘practices of the self’ (1997: 225). However, in view of the ontico-epistemic entanglement, the ‘self’ has become radically other. I therefore believe that more than ethics, we are speaking about a practice of posthuman polytics.

2.42. Trans-species gatherings. In collaboration with Marika Troili. Røst Artist in Residency, Skomvær.

2.5. Posthuman polytics of becoming

Adrienne Rich in her landmark speech on June 1, 1984 provides the formulation of a feminist 'politics of location':

> Begin ... not with a continent or a country or a house, but with the geography closest in – the body. ... to begin with the female body ... as locating the grounds from which to speak with authority *as* women. Not to transcend this body, but to reclaim it. ... Begin, as we said, with the material, with matter, mama, madre, mutter, moeder, modder, etc. etc. ... let us go back to earth - not as paradigm for 'women', but as place of location. (2007: 369-71)

I want to turn attention to the refrain—"begin...begin...", this is a performative summoning of a shared field, of a field that cannot be enclosed:

> *The difficulty of saying I*—a phrase from East German novelist Christa Wolf. But once having said it, as we realise the necessity to go further, isn't there a difficulty of saying "we"? (ibid.: 378)

'I' is always already emplaced *with*in 'we'. This situated/entangled body asks: 'Who is *we*? Who am *I*?' It is to be written without pause: who-is-we-who-am-i[21]. Learning from the history of feminism as a social movement, 'we' is a continuously changing field of differences, a re-iteration of both the 'we' and the 'not-yet-we'. How these differences are sensed, and how they deterritorialise the previously constituted 'we' is a question of politics of location. Adrienne Rich concluded her speech with: "*Once again*: who is we?" [my emphasis] (Rich, 1988: 41). *Once again* responds to the iterative dynamics of worlding in its continuous reworking of boundaries. Reiterating this question is to remake a cut, to un/do the boundary: "*how can we* become *together*?" This question is always an invitation, *a dispersal of 'me-us'*.

21 The credit here goes to the Swedish band iamamiwhoami. It is also inspired by DG's formulation of unique, singular individuals as haecceities: "This should be read without a pause: the animal-stalks-at-five-o'clock." (1987: 263)

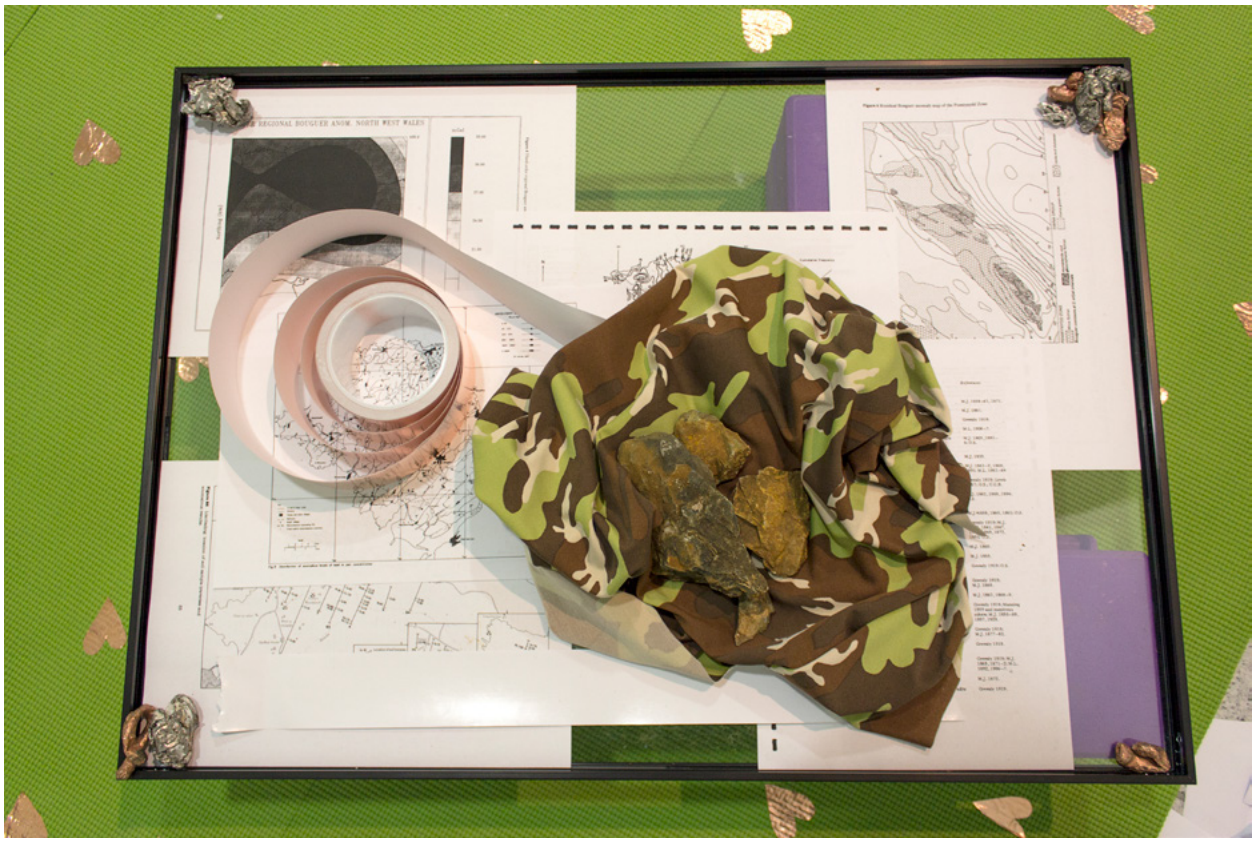
2.43. Pre-enactment of *or tilva roš, mynydd parys, buenavista del cobre, and other red mountains*. *In Process*, December 2015 – January 2016, Project Space, University of Westminster.

In a posthuman naturalcultural continuum, 'i-we' questioning is entangled with the embodied and embedded recognition that "we are in *this* together" (Braidotti, 2011: 144). The dis/continuity of the 'i' and 'we' is entangled with the co-constitutive in/determinacy of 'we' and 'this', they are heterogeneous and *co*-constitutive ecologies of the mental, social, and others (Guattari, 2000). To rework and re-orient these cracks is to refuse to see 'i' as a 'foundational fantasy' of independence (Brennan, 2000) or negation from the other, but as intra-active dynamics of differentiation with 'we' and 'this'. Iterative re-affirmation of 'this-we-i' is a practice of the polytics of belonging/becoming.

2.5.1. Minoritarian ecologies

In this section i analyse eco-aesthetic praxis from the perspective of a practice of posthuman polytics. I claim that eco-aesthetic praxis is situated amongst the apparatuses of capitalist production, but that it aims for posthuman 'happenings' (Tsing, 2015: 23). The case in question are specifically the apparatuses of the capture of life, biopolitical machines. I will analyse them here as technologies of production of majorities and minorities. The majority—minority relation, as described by Deleuze and Guattari, provides a clinical perspective on the ecofeminist problem of the logic of dualism, opening creative venues for its potential undoing.

First, a look at two important techniques of modern apparatuses: discipline and control. Disciplining is a combination of *strategies of power* that have as their goal the "normalisation" of subjectivities, one of the principal aims of biopolitics (Foucault, 1977: 184). Normalisation is organised from the perspective of "departure from the norm, the anomaly" (ibid.: 255). Thus, norm(al) is constituted as a negative identification *grounded in the anomalous*. In this sense, discipline participates fully in the logic of dualism, with one important specification. Contrary to science, disciplinary logic does not aim to assimilate, its goal is "to set up and preserve an increasingly different set of anomalies,



2.44. Pre-enactment of *or tilva roš, mynydd parys, buenavista del cobre, and other red mountains.*

which is the very way it extends its knowledge and power into wider and wider domains" (Dreyfus & Rabinow, 1983: 198)[22]. Its extension to 'wider and wider domains' goes deep beyond culture to a generalised biopolitical *normalisation and abnormalisation* of life, both human and extra-human[23]. These are the generalised tactics of the 'state of exception', which, according to Agamben, characterises modern biopolitics:

> The particular "force" of law consists in this capacity of law to maintain itself in relation to an exteriority. We shall give the name *relation of exception* to the extreme form of relation by which something is included solely through its exclusion. (1995: 19)

Agamben, following Carl Schmitt, explains that exception is 'a taking of the outside' (Schmitt, in ibid.: 20). Transposing this onto the logic of dualism, it becomes clear that nature is appropriated by making it an exception to culture, discursively and materially, as Plumwood (1993) pointed out.

At the beginning of the 1990s, Deleuze claimed that disciplinary societies have transformed into 'societies of control', characterised by the logic of 'modulation' of power (1992). It is not that discipline disappears, it overflows from the spatially delimited disciplinary apparatuses to permeate subjective, social and environmental ecologies at large, marking a new phase in biopolitics. Whereas disciplinary apparatuses worked through the logic of sovereign exception, "the society of control marks a step toward the plane of immanence", bringing capital and the management of life closer to biopower itself (Hardt & Negri, 2000: 329). Control is based on the logic of 'protocol', a moulding of distributed yet standardised networks that plug into life and capture it into the "informatics of domination" (Haraway, 1991: 161). Control is closer to life than discipline and is

22 Dreyfus and Rabinow point out "a striking similarity between Kuhn's account of normal science and Foucault's account of normalizing society" (1983: 197). This is in line with the overall ecofeminist argumentation that the key dynamism of modernity is the logic of dualism. Here Drefyus and Rainbow distinguish normalisation as a disciplinary technology from normal science which ultimately aims to show that anomalies are "compatible with the theory" (1980:197).

23 As an example of normalisation of extra-human life, a recent article revealed that possibly half of all food produce in US is thrown away because of a "cult of perfection", immense amounts of produce are left to rot or abandoned in the fields because of "minor blemishes" or "scars" (Goldenberg, 2016).

2.45. Pre-enactment of *or tilva roš, mynydd parys, buenavista del cobre, and other red mountains*.

a ‘coding’ operated through the “capitalist axiomatic” (DG, 1983). Axiomatics of control work “through the brutal limitations of abstract logic (if/then, true or false)” (Galloway & Thacker, 2007: 81). Norms and codes have not vanished but proliferated exponentially, and thresholds of exception are more supple in order to capture more flows. This can be observed in the way in which capitalist axiomatics recognise the generative dynamics of difference, and try to use it as a motor for production of (normalised) value (e.g, authentic food, world music, labour-power skills) (Hardt & Negri, 2000: 339). Difference in capitalist axiomatics is not difference-in-itself but “difference in degree”, a discrete translation of differences into codes and protocols[24].

Guattari and Deleuze read this axiomatics of exception or (ab)normalisation of difference as producing ‘minority’ and ‘majority’. Majority—minority is not a question of quantity, it is the question of “the constant or standard” in the protocol of a given apparatus. They use the following example:

> Let us suppose that the constant or standard is the average adult-white-heterosexual-European-male-speaking a standard language (Joyce's or Ezra Pound's Ulysses). It is obvious that ‘man’ holds the majority, even if he is less numerous than mosquitoes, children, women, blacks, peasants, homosexuals, etc. (Deleuze & Guattari, 1987: 105)

Here DG show how “women, children, but also animals, plants, and molecules, are minoritarian” (ibid.: 291). “Majority implies a state of domination, not the reverse” (ibid.). This argument is very much in line with the ecofeminist analysis of the logic of dualism. In the plane of capitalist axiomatics, it may look like that capital and state are fully immanent, i.e. that there is no majority in the continuum of valuation. However, Jason Moore recently claimed that the chief axiom of capitalism is the *production of “abstract natures”*, or “Cheap Natures” as external “zones of appropriation” (2015: 85). These zones of appropriation are thresholds through which the earth itself is “minoritised” (Connolly, 2013:

24 Anna Tsing (2015) meticulously traces how translations of matsutake mushroom are performed from its biological existence in the forest all the way to the uptown markets of Tokyo. “Capitalism is a translation machine for producing capital from all kinds of livelihoods, human and not human” (Tsing, 2015:133).

2.46. Analytics of extraction industry chain. Score for *we ♥ copper & copper ♥ us vol. 3: mineralizacija*.

48). *Capitalist value-making minoritises life and self-organising processes, it minoritises possibilities of becoming*. By coding (decoding and recoding) flows of life, capitalist axiomatics establish majorities and minorities. These axiomatics are very successful because of the constant 'modulation' of coding, so the process of modulation is presented as neutral, guided by the 'invisible hand' of the market or innovation. Beyond this ideological screen, it is visible that the great minorities are more or less the same as those listed by DG almost 40 years ago. In many respects, they were minoritised even further.

Together with this critical analysis, DG make a creative proposal how to undo the logic of majority—minority. 'Becoming' is a key onto-political concept in DG's schizoanalytic project and it stands for an *intensive transformation*, as i have described above. Now situated in a biopolitical context as part of a broader posthumanist continuum, becoming is a performance of quantum leap away from the logic of domination. Becomings

> imply two simultaneous movements, one by which a *term (the subject) is withdrawn from the majority,* and another by which a *term (a medium or agent) rises up from the minority*. [my emphasis] (ibid.:291)

A becoming occurs through a "block of becoming, a block of alliance" (ibid.: 292), an intra-active dynamics which is primarily "the process of desire" (ibid.: 274). Becoming emerges from the dynamics of the apparatus (subject/object), and distributions of power (majority/minority), but it is of a different logic. Becoming is the undoing or *withdrawal from the apparatus dynamics* because it enacts a difference that apparatus has been excluding. For this reason, *there is no becoming-majority* or becoming-man, "all becoming is a becoming-minoritarian" (DG, 1987: 291). Becoming is a withdrawal from the majority through a block of desire the minority.

To illustrate this idea, DG sketch out a "kind of order or apparent progression for the segments of becoming in which we find ourselves: becoming-woman, becoming-child; becoming-animal, -vegetable, or -mineral; becomings-

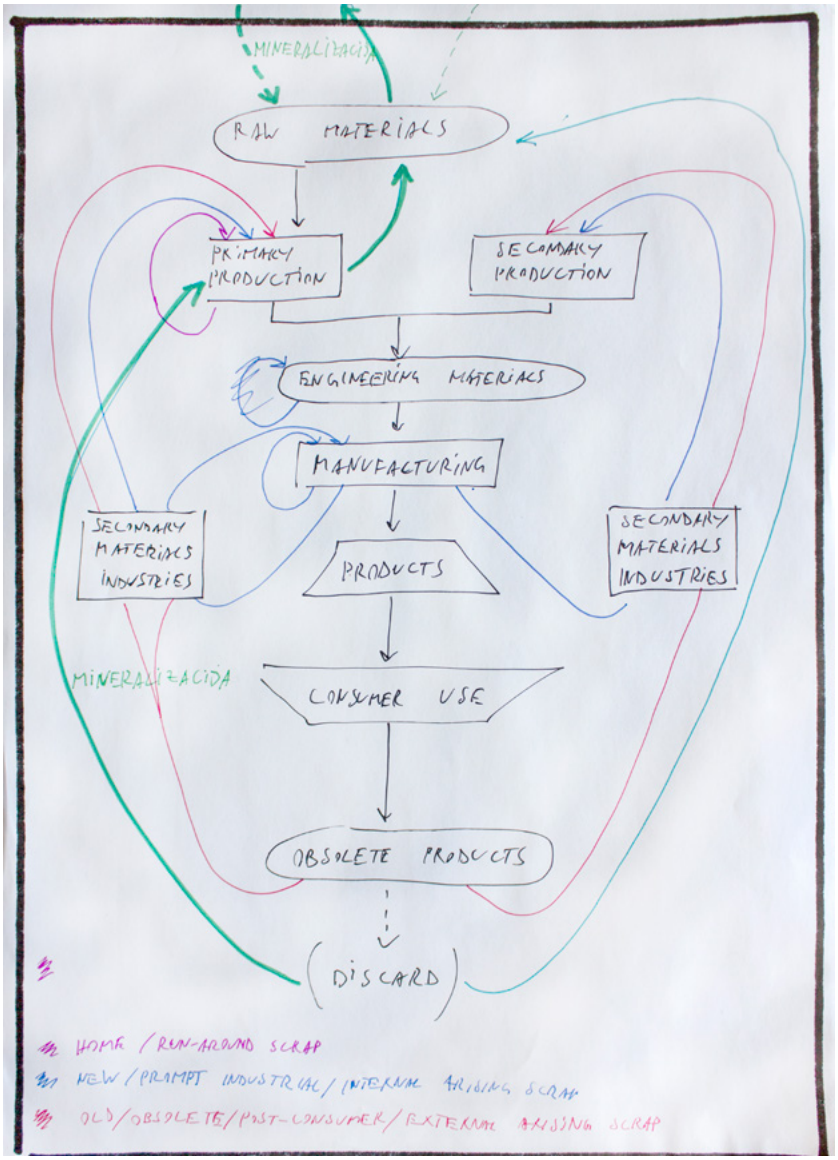
2.47. Copper comes home. Fieldwork for *we ♥ copper & copper ♥ us vol. 3: mineralizacija*. Bor, Serbia.

molecular of all kinds, becomings-particles." (DG, 1987: 274). From where they "find themselves", all becomings "pass through a becoming-woman" (ibid.: 291). This point has attracted fervent criticism, which is in many ways justified because DG proposed a radical departure from identity-based politics, however without sufficiently attending to the specificity of their actual social locations. Rosi Braidotti has performed extensive refinement of DG's still rather metaphysical proposal to outline a situated politics of posthuman becoming:

> I think consequently that the process of becoming-nomad (-minority, -woman) is *internally differentiated* and depends largely on where one starts off from. The politics of location is crucial. (2002: 84)

Location, or cartography for Foucault and Braidotti, within the disposition of a given apparatus determines the possibilities of a body. DG claim that becoming proceeds with the 'principle of proximity or approximation', which is to establish relations or a 'zone of proximity' "*closest* to what one is becoming, and through which one is becoming" (DG, 1987: 273). In the translator's note on the 'zone of proximity', Brian Massumi explains that DG use *voisinage*, a term from the set theory, which in English is 'neighbourhood' (ibid.: 542). Therefore, becoming is a local, embodied and situated topological movement that begins from where one is, and tries to come close to what is excluded, the secluded minority, 'always already there' (Dolphijn, 2015).

For a 'block of alliance' to become, a minority needs to enter into assemblage intra-action with a majority. DG insist that becoming is 'asymmetrical' (1987: 278) because it proceeds by 'advance' or 'flirtation' (Barad, 2015). A lichen cannot become-rock of its own. If and when lichen and rock constitute a zone of in/determinacy, "a proximity, an indiscernibility" (DG, 1987: 279), a possibility of lichen-rock assemblage can actualise. But it is not a lichen that is becoming-rock, or the other way around. At that point of intra-action, we cannot talk about lichen and rock anymore. *All becoming is becoming-multitude, all assembling agencies become-other*. (In fact, there are only multiplicities/assemblages to 'begin' with. Rock is never only a 'rock' but



2.48. Performance score. *we ♥ copper & copper ♥ us vol. 3: mineralizacija.*

partakes in a number of assemblages, and is embedded within a multitude of real possibilities to become-other.)[25]

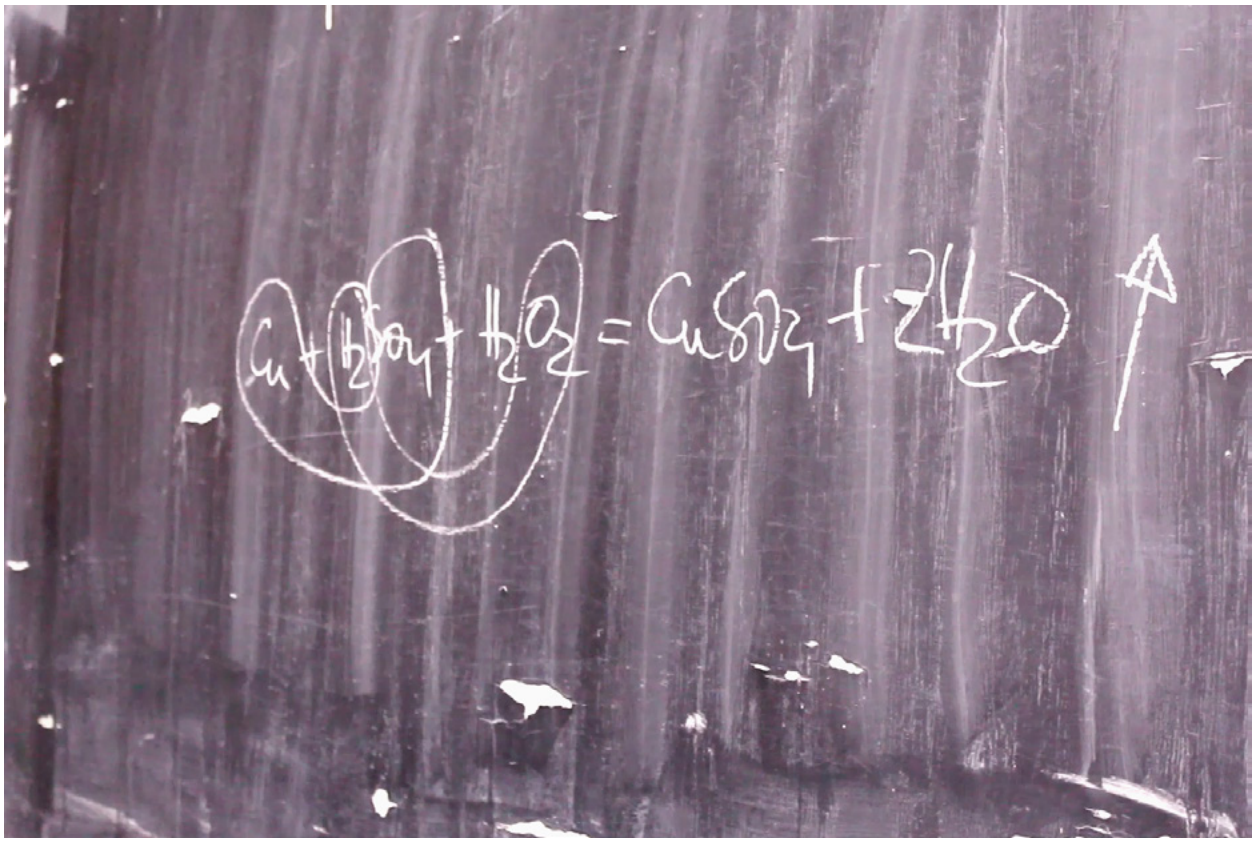
Because of the conversational or polyvocal quality of becoming, a praxis of becoming is different from ethics, which is grounded in subjectivity. Becoming is a plural ethico-polytics of response-ability between differences. The meaning of assemblage is a 'simultaneous movement' of a multitude in a 'shared conversation'. Shared conversation, however, is not made of answers and responses. Assemblages are 'dispersed' 'summonings' *and* situated response-abilities (Górska, 2016; Dolphijn, 2015). *In the zones of situated approximation, a becoming, a symbiosis can happen*. Ecology is not the dominion over a household, it is a polymorphous conversation in an expansive topological neighbourhood across species, families, kingdoms.

Becoming-minor is an enactment of a collective leaving (deterritorialisation) of power positions previously held in an apparatus of capture. Becoming-minor from the perspective of a modern apparatus can thus be understood as a (quantum) leap from identity to multitude, "a diffraction/dispersion of identity"

25 DG explain this by saying that all becoming is 'molecular' (1987: 275). In their terminology, 'molar' essentially stands for identity, individual, formed entity; whereas 'molecular' is the unconscious, suborganic, affective, multiplicity. (In many ways, molar maps into majority, whereas molecular refers to minority.) What i think DG wish to express by the claim that all becoming is molecular is that the mattering of the world is fundamentally molecular (quantum). However, social apparatuses operate in molar terms. DG are aware of this tension as they say:

> It is, of course, indispensable for women to conduct a molar politics, with a view of winning back their own organism, their own history, their own subjectivity: … But it is dangerous to confine oneself to such a subject, which does function without drying up a spring or stopping a flow. … It is as deplorable to miniaturize, internalize the binary machine as it is to exacerbate it; it does not extricate us from it. It is thus necessary to conceive of a molecular women's politics that slips into molar confrontations, and passes under or through them. (DG, 1987: 276)

If i were to use these two DG terms, i would say that posthuman politics and aesthetics would be about (re-)asserting/slipping *the molecularity (multiplicity) in the domain of (molar) social practices*. However, as the above passage, and numerous others in *A Thousand Plateaus* show, i think it is extremely complicated to maintain this distinction without slippages. The key problem, in my view, is that DG use essentially 'molar' terms, such as 'child' or 'woman', to describe the dynamics of becoming, which is essentially 'molecular'. Another issue is their preference of using the word 'particles' to describe the 'molecularity, but molecular particles could well be molar (individuals). Following Barad's performative ontology, i take that bodies are determined through iterative intra-action, therefore i prefer to use apparatus and assemblage as *dynamics* of mattering. Exploring further resonances and dissonances between DG's micropolitics and Karen Barad's quantum-inspired agential realism is a collective endeavour (e.g., Thiele, 2016).

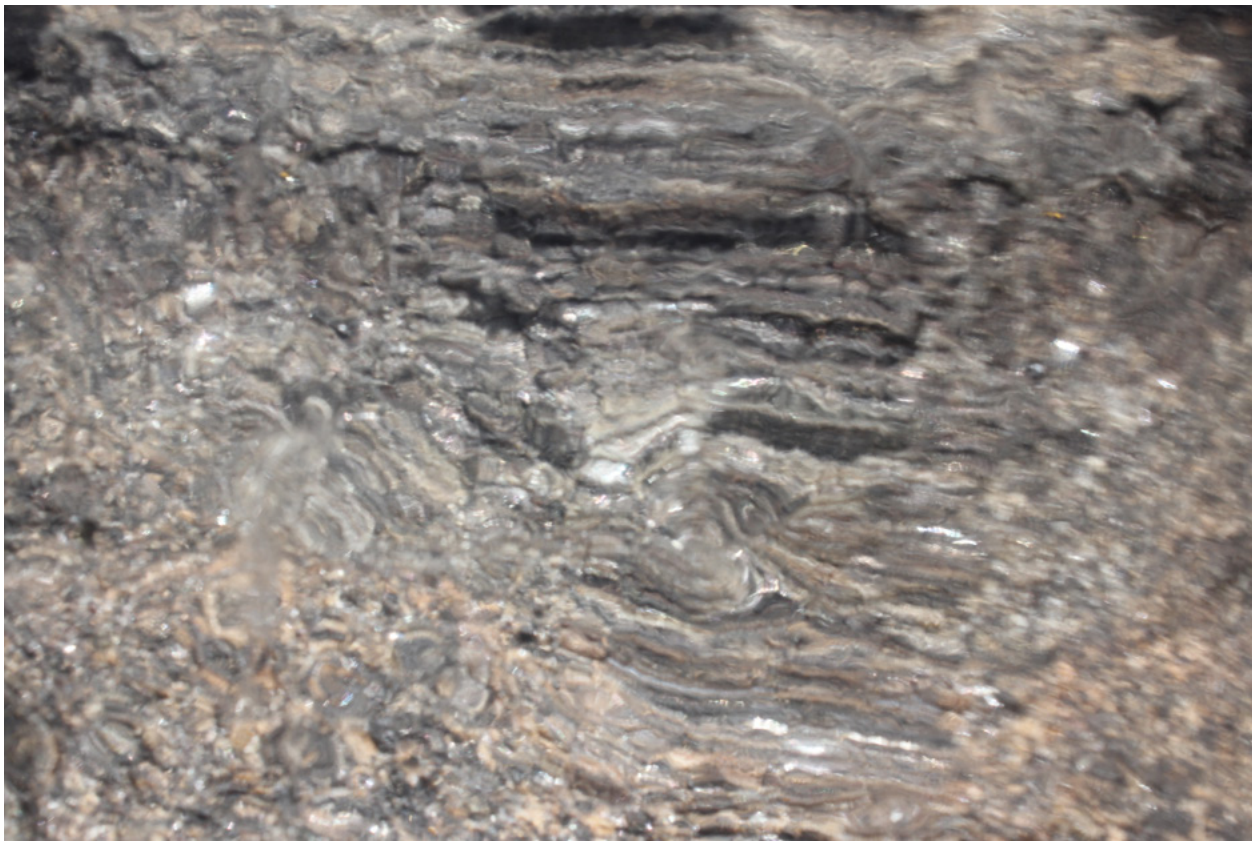


2.49. Material-discursive scoring of laboratory experiments, by Dr Aleksandra Mitovski. *we ♥ copper & copper ♥ us vol. 3: mineralizacija*. Technical Faculty in Bor, Serbia.

(Barad, 2012b: 47), or a 'situated-dispersal' of power-knowledge (Górska, 2016). From quantum physics emerges that when an electron leaps from a higher to a lower energetic level in an atom (when it becomes-minor), it fires a photon, it disperses a tiny lightning bolt (Barad, 2012c: 40). A quantum leap is a dis/continuous jump—it cannot be determined when the photon is fired, before, after or during the jump—there is no 'here-now' and 'then-there' (. The particle and the zone of proximity (fields) come together in the in/determinate performance of the leap (ibid.). A quantum leap is a rupture in the determinacy of the atomic apparatus, but it is a suture that enacts another continuity, that of possibilities, of a world that is becoming. Quantum field theory reveals the polity of the matter, a "political physics" (Kirby, 2011), because it shows that justice is always already engrained in the dynamics of spacetimemmatering.

Human bodies are certainly not quanta as they are constituted in modern apparatuses of bodily production, hence the question for an eco-aesthetic practice is how to enact becomings-minor (from) within these apparatuses. With Barad we can see a posthuman "justice-to-come", a queer ecology that exists on molecular levels, but how can it be transposed onto scales of human intra-action? How to (ab)normalise the apparatuses of capture to a quantum jump into other regions of possibility? This is a task for a posthuman polytics of becoming. In the context of eco-aesthetics, i will call this mode of performativity an *infraphysics of becoming*, opening apparatuses towards assemblies-to-(be)come.

Apparatuses of capture can be unravelled by various modalities of intra-action, and i believe this can be attempted through artistic praxis as well. The next Part will venture into some apparatuses of capture, and try to seek their minoritarian 're(con)figurations' (Barad, 2007). Exposition in this Part II was essentially a set of analytical tools through which to approach and position eco-aesthetic performative practice with regards to majoritarian apparatuses. Agency, apparatus and assemblage are clinical-diagnostic tools for 'seeking the secluded' (Lyotard, 1989: 101-2) in material-discursive entanglement with the



2.50. Matter-real entanglements. In collaboration with Marika Troili. Røst Artist in Residency, Skomvær.

performance of the polytics of becoming. This performativity is local and in the possibility spacetime, but yearns for what is impossibilised, the subjugated areas of an apparatus.

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Part III:

Minoritarian performance:
infraphysics of becoming

3.01. *confluence 0.1*. Plant-human tracking (detail). 9 April 2013, London.

3.0. Introduction

In this Part, the narrative will follow the coming into being of artistic projects properly speaking. As claimed previously, ontology of the present and analytics of the possible are two modes of praxis, which are entangled with experimentation with bodies in spacetime, or infraphysics of becoming. This research proceeded through a nonlinear series of encounters with other-than-human bodies to which i sought or was called upon to become response-able in the context of contemporary social apparatuses. Each project below is an attempt at a making of a naturalcultural performative apparatus.

Each project description begins with an analytics of a specific apparatus of capture, situating myself within it, and locating the extra-human entities within. This analytics is a process of learning the diagram, disposition, translations, *modus operandi* of the apparatus. After the analytics, i move on to describe development and enactment of performance that aimed to re(con)figure the apparatus so that it becomes more hospitable and open towards expressions of inhuman matter.

The title of this Part, *infraphysics*, indicates an onto-epistemic entanglement of the artistic practice. 'Infraphysics' is a double homage to Karen Barad's agential realism, to its intra-active onto-epistemology and to the world of quantum physics. I have learned immensely from Barad's electrons. This neologism is also meant to defamiliarise the traditional genres or media of visual art, in my case, site-specific performance, durational performance and performance of everyday life. Physics is to indicate the materiality of the work, its disposition towards a becoming-minor of the grids and scales of human operativity in favour of more subtle, situated, and intimate intra-activity with molecules of the inhuman. Physics is also a 'political physics' (Kirby, 2011), embedded and affirming a 'more-than-human sociality' (Tsing, 2013).

In this Part, the images on the left side of the spread follow the sequence of the text on the right.

3.02. *confluence 0.1*. Performance documentation (detail).

3.1. Assembling ecologies

3.1.a. *confluence*

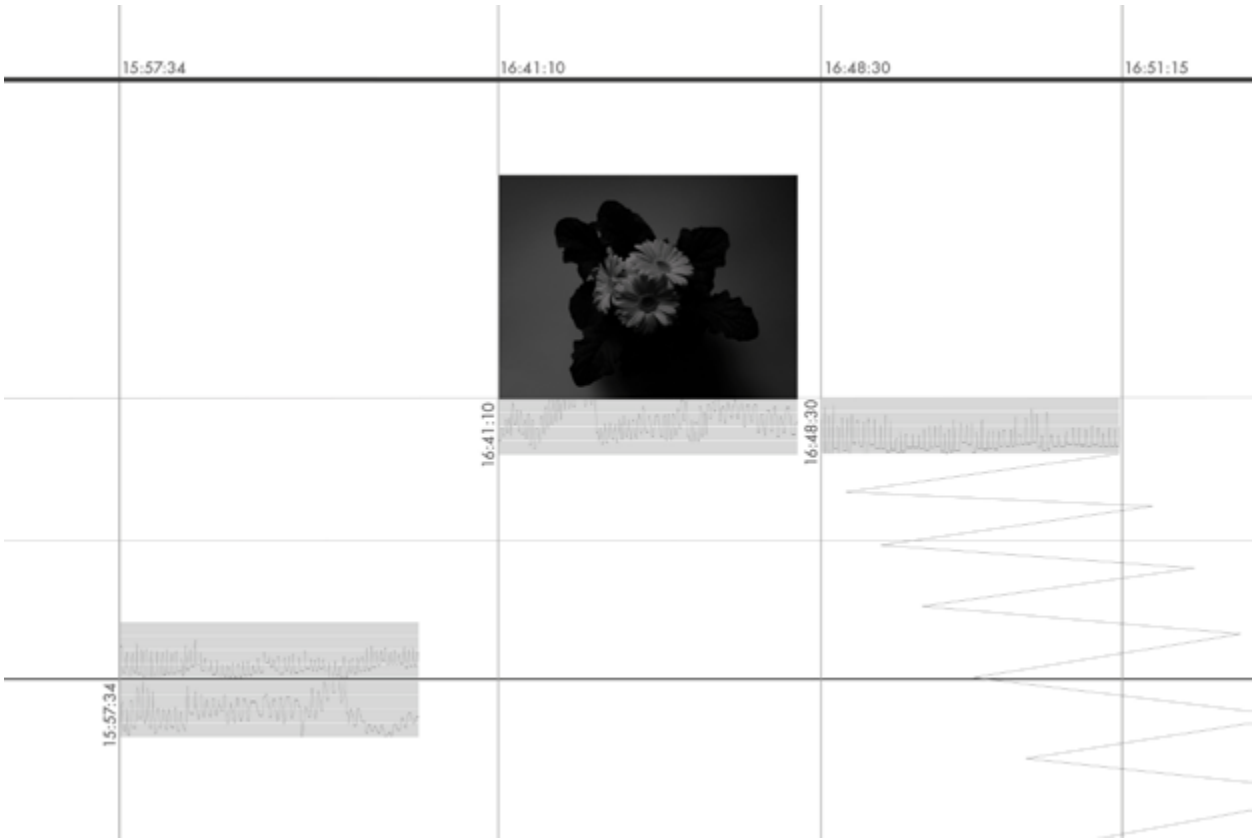
They are among us. In silence, they plot bright plans. Conductors between skies and earths. They support all that moves. Yet, for most of the time for most of the humans, they are a form sitting in the corner. Urban decor, a garden. This is what we see in the corner of our eyes as we run about important business, around the clock. Yet, they work too, labour hard. All day long, and overnight too. This planetary labour project called photosynthesis keeps going for about 3500-2500 million of years.

Sometimes we stop and pour some water into a glass or a jug, and then water them. We feel good. Sometimes we may even slow down to take off some decoloured leaves, to cut some of the branches to enhance growth, etc. Sometimes their flowers mesmerise and make humans dream. These moments, rare compared to the time an average pet-holder gives to her/his animal companions, are extraordinary meetings across the evolutionary kingdoms. More subtle meetings occur continuously, with each and every breath.

As all the other animals, humans have since always already been most deeply entangled with vegetation. Breathing. Eating. Uniquely, for some time now, for reasons too complex to know, humans have in important ways been against the vegetals[1]. Imagine a modernity without felling immense swathes of forest, or without extirpation of weeds, or without domestication of seeds, etc. Far from innocent stand-byers, plants played some part in these processes too.

Plants are smart in seduction. They have made their way even into containerised dwellings of modernity, so devoted to building defences from the environment. They have been charming insects for millions of years. And thus gained legs, moving around and about at the speed of flight in an astonishing cross-kingdom

1 Divergence of vegetal and human interests may have started with the beginning of the Neolithic, that is with the development of agriculture.



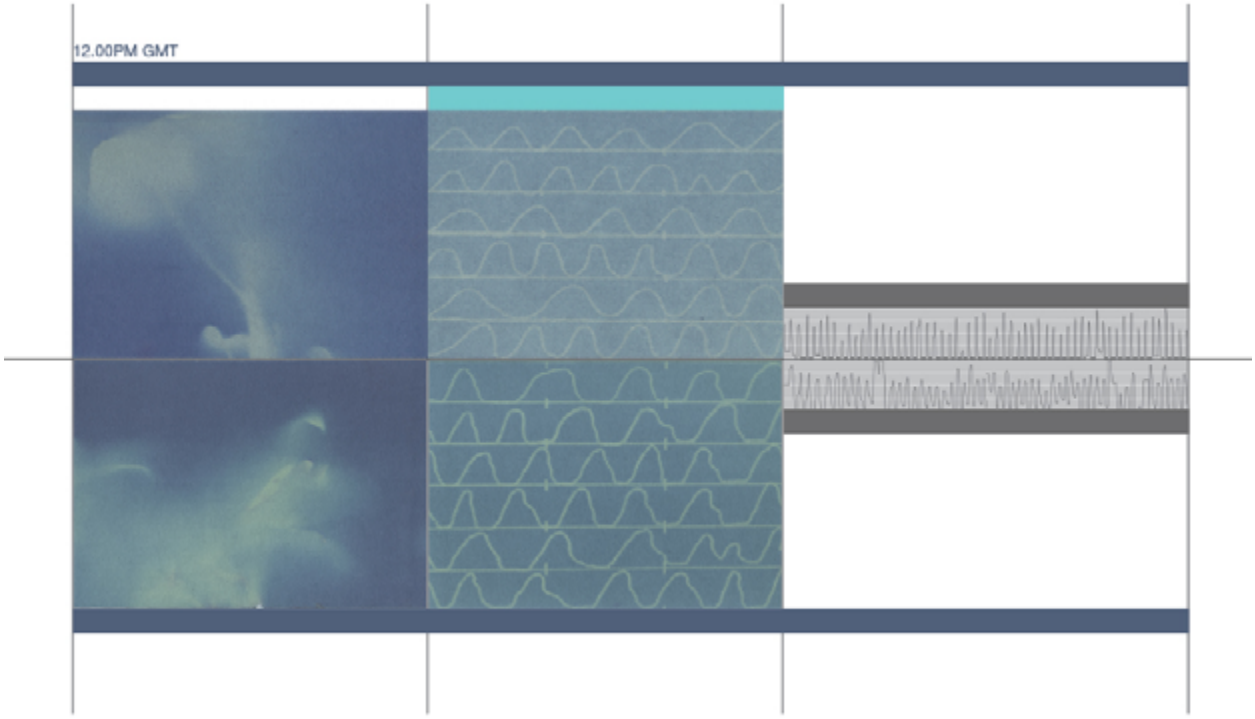
3.03. *confluence 0.1*. Performance documentation (detail).

symbiosis or interchange of bodily affects. This is not to say that plants desire to be colonised by humans. Properties have been exchanged through asymmetrical exchanges of properties. However, with humans, they may have found an unprecedented nemesis.

I wish to talk about a special type of plant. An office plant. Apart from the necessary elemental particles of air, they are one of the few organic other-than-human entities who gain clearance into the spaces of production of capital. To different degrees of popularity, some plants are office 'furniture'. They are *outsiders within*, motionlessly witnessing the ebbs and tides of capital. If they were could speak, they might know secrets deeper than the murkiest WikiLeaks. But they are either loyal or uninterested in these affairs. Their presence however is an intrusion, an act of occupation, a reminder that there is no breathing without them, that capital cannot wipe out the whole of atmosphere. Perhaps the environmental impact of a company could be inversely (or proportionately) correlated with the number of plants in their offices.

Plants are perfect office workers. They do their job laboriously, or fail to do so elegantly. If they wane, they are substituted with little fuss and no wave of complaints. Air-purifiers and aesthetic testimonials. Office plants are inside the system physically, but they are external to it. Location does not equate to networkedness. There have been various proposals to 'include' 'ecosystem services' into economic calculus. This is not a place to discuss these proposals in-depth. I've got a much simpler, smaller-scale idea of how to inter-work us with vegetal economies.

I am writing these pages in an office. It's called J.G.44, situated on the ground-level of the Harrow campus of the University in Westminster. This is one of the two so-called 'PhD rooms', assigned to doctoral students only. Since moving to London in fall 2012 on invitation of the University to pursue a practice-based research degree, i have been spending most of my working time in this office. It is just a common 'PhD room' with a row of desks with desktop computers along the walls, and a large conference table in the middle. No posters, no book-



3.04. *confluence 0.2*. Performance documentation (detail).

shelves, no decoration. And no plants. It feels quite sad to spend days on end here. So i bring in a new guinea plant. I am trying to read and write about environmental thought, yet i am sitting inside an office with one window only, and with one plant only. Ecology is usually about environmental problems out there, in the environment. But ecology is also everywhere, everything is local. Any given point is an entry, so i need to start treading through the meshwork of nature-culture nexuses and separations exactly from where i sit. Ecology, the way i think of it, is a practice and thought of living together with other bodies, it is a story about associations, groupings, coalitions and partnerships. My first partner is this little new guinea right here.

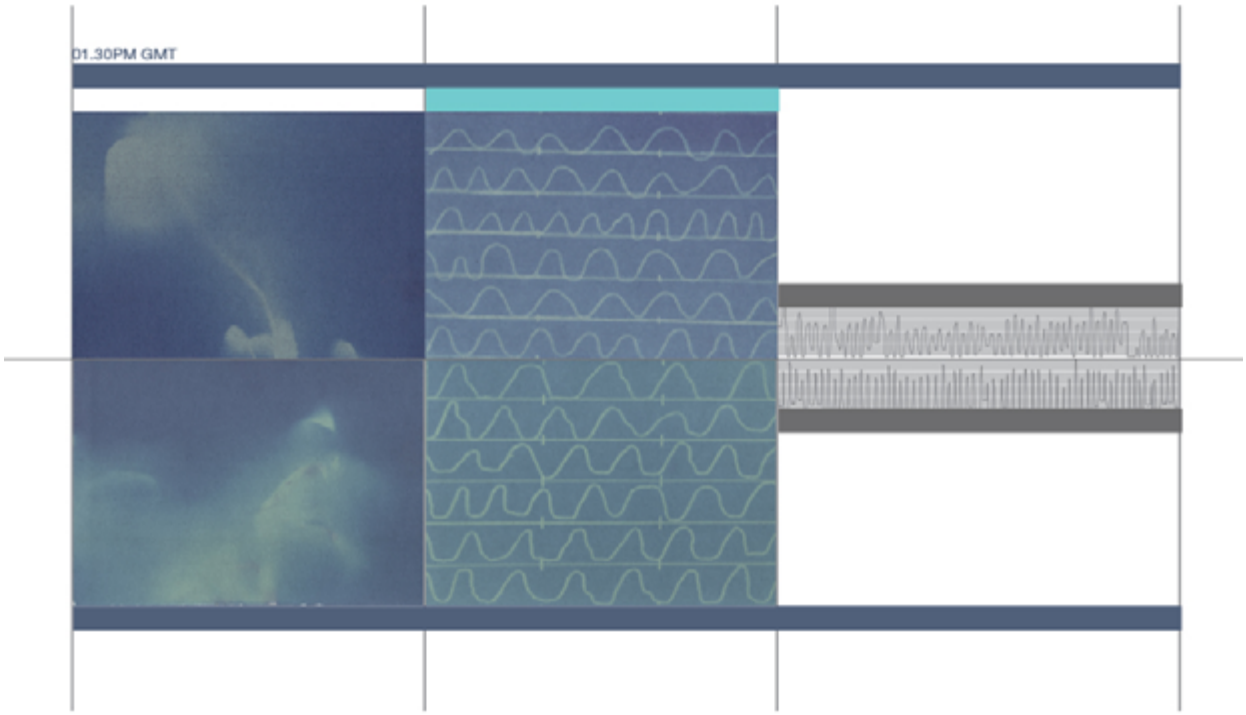
How can a new guinea and i 'work together', or, how can we know how to do something together?

confluence 0.1.
date / location: 9 April, 2013 / Harrow on the Hill
performers: white gerber, yellow gerber, Liubov Kozorezova, me
medium: photography, heartbeat drawing app

confluence 0.2.
date / location: 5 July, 2013 / London, Dalarna.
performers: pink new guinea, pelargonium, Marika Troili, me
documentation: photo-sensitive paper, heartbeat drawing app

As many eco-philosophies and environmentalists suggest, one must change patterns of 'everyday life'[2]. First experiments towards 'assembling ecologies'

2 The 'critique of everyday life' originates in the work of the geographer Henri Lefebvre and his encyclopedical three-part inquiry published throughout his career, in 1947, 1961, and 1981. Lefebvre treats the question of everyday reality as the under-studied area which is outside economy and politics, and yet, at the time of his writing, was the sphere that capitalism will try to colonise (which,



3.05. *confluence 0.2*. Performance documentation (detail).

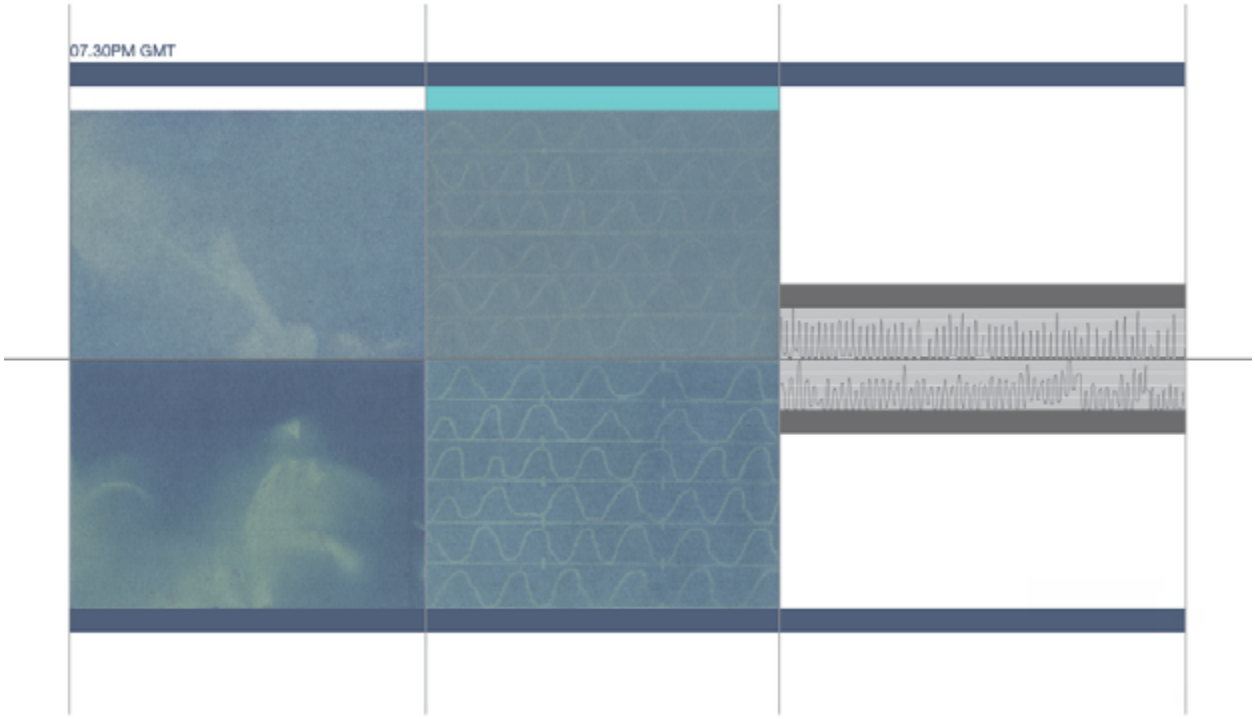
involved creating very small-scale ecologies of care of two people and two plants. The idea was to interrupt the patterns of work once per hour and engage in performance of 'tracking-with', attentively registering a physiological activity of another entity – of a plant and of the other human. The humans' would 'track' each others' heartbeat for 60 seconds at a time with a makeshift computer app to draw a cardiogram (fig. 2.01.)[3]. In the first instantiation of the performance—*confluence 0.1.*—the plants' activity was recorded by a still shot from above with the same exposure throughout the day. Differences in exposure would indirectly indicate the strength of the light (fig. 3.01.–3.03). In *confluence 0.2*, instead of camera, we used photo-sensitive paper that we would place between the branches of the plant for 15 minutes (fig. 2.02). The resulting documentation displays the micro-performances of 'tracking-with' the other body, periods of affective engagement and perception of another human or vegetal body (fig. 3.04. – 3.06.). Following heartbeats and trying to infer photosynthesis was about trying to 'track' with processes that are commonly not perceptible to bare eye, but that is fundamentally the problem of human perception. However, the project gave too much weight to (human) sensing without plugging into the inter-species affective space.

The next move was to facilitate and expand sensing through digital technologies. In the period that followed, i experimented with the idea that the Internet of Things (IoT) could provide a platform for creating more egalitarian intra-actions. Acknowledging the wider debates surrounding IoT[4], my interest was, first, to introduce technological agency, and, second, to better mediate what it is that plants are doing. Hence, in this segment of the research, i collaborated with

eventually, took place, with the general flexibilisation and precaritisation of work). Though i do not work explicitly in this register, my work is indebted to *The Production of Space* (1991) and *Rhythmanalysis* (2004). Especially relevant is also the conjunction of the critique of everyday life and 'spatial practice' in Michel Certeau's *The Practice of Everyday Life* (1984). From these psychogeographical and psychotemporal grounds my research and practice have veered into posthumanist space, but that would not be possible without the attention these authors invoke into what is interstitial in everyday surroundings, the in-betweens of the power apparatuses. Their work goes in hand with the performance art and, in general, avant-gardes of the 1950's and 1960's who tried to dissolve the boundaries between life and art, public and private.

3 The performer will hold the other person's wrist and draw the intensity of the beat in a makeshift drawing application on the computer.

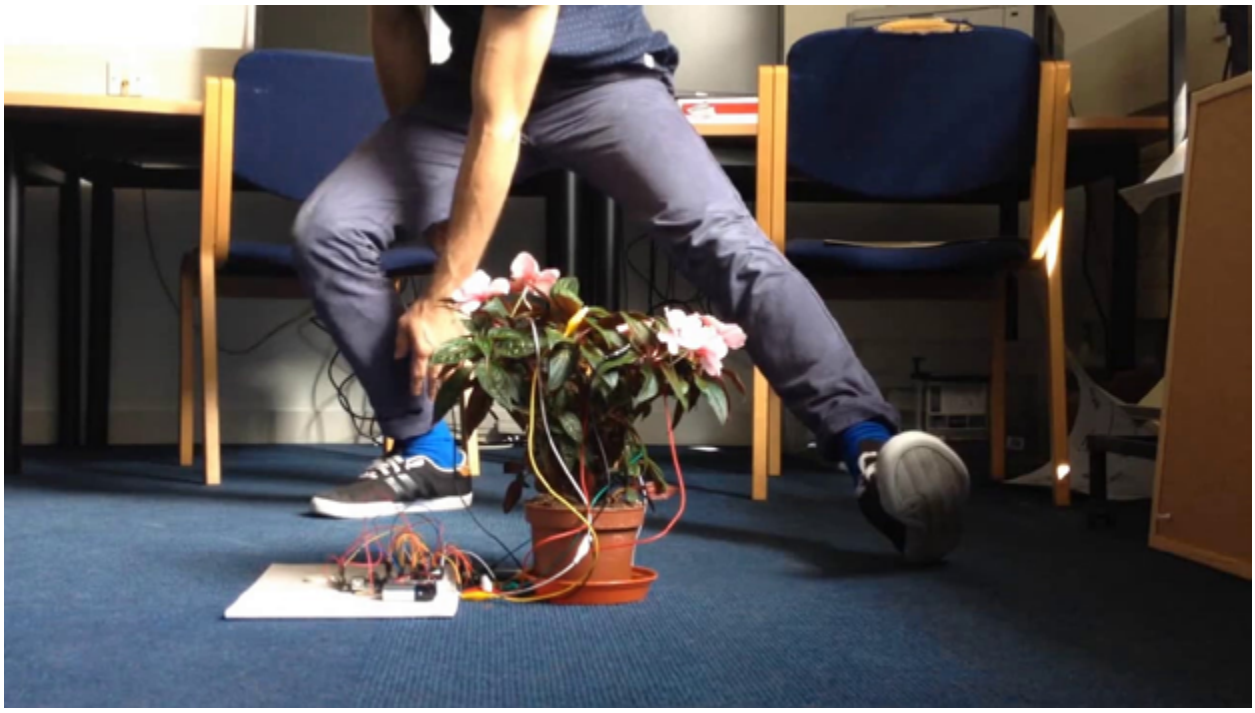
4 For a critical analysis of the Internet of Things, see 1.3.4.



3.06. *confluence 0.2*. Performance documentation (detail).

physical computing practitioner Emilie Giles in developing interactive garments that would allow the performer to measure the galvanic skin response of another person, and to gather data of plant's exposure to light (fig. 2.03 – 2.04.)[5]. Work towards higher integration of digital devices was left aside due to a critical re-valuation of the ideas about cybernetic feedback loops. Namely, through the prototyping process it seemed that possibilities of intra-action were getting reduced, and i decided to move towards more open-ended configurations with larger margins of freedom for the performing bodies. This shift was underpinned by an evolution in the spirit of the research, the gradual transformation towards a more-than-human ethos of practice. In this context, perception is not necessarily the primary concern, and aesthetics becomes only one of the multiple onto-epistemic entanglements. This first period of research was led through the lens of network ontology, but an intimate engagement with bodies—human and vegetal—started revealing the limits of an informational mode of work. An increasing sensitivity towards the autonomous or withdrawn powers of extra-human bodies, which i started perceiving and conceptualising through these early performances and readings, would have a major impact on the projects that followed.

5 In our iterative prototyping process, Emilie and i chose to work with galvanic skin response (GSR), an Arduino-platform circuit which translates electrical conductivity through finger contact with a sensitive metallic surface. Moreover, conceptually, GSR materialises the concept of 'feedback loop' as it requires a person to touch two sensors in order to close a circuit. A further advantage was that a very similar type of circuit could be deployed to measure the intensity of light. We also experimented with the use of conductive yarns that could be sewn into clothing and thus make interfaces 'wearable'. This would allow for situations of 'tracking' to take place in different locations. Connected with this, another result of the adoption of Arduino was that the data gathered through sensing could be outputted on the spot, thus providing an opportunity for instant reaction on behalf of the performers. After several months of prototyping, we produced a sweater with an embroidered circuit that was capable of measuring the GSR of the wearer (Fig. ...). The measured data was played as sound emitted by small hand-sewn speakers.



3.07. *dancing ecology 0.10*. Performance documentation, video still. 24 September 2013, Harrow on the Hill.

b. *dancing ecologies*

date / locations: September—October 2013 / various
performers: multiple plants, Arduino interface (light sensors, piezo speakers), me
documentation: video

To dance with plants. To slow down our information economies, step by step. What if, in offices, every 45 minutes, the workers suspended all working activity, to then spend 15 minutes dancing with vegetals? What would be economic impacts on production? And health, of humans and of the biosphere?

In *dancing ecology* i exercised a dance to the resonance of the photosynthesis of the plant, a biological process that was translated into sound through a circuit of sensors and speakers. The sensors positioned on different points of the plant captured the intensity of light that fell on its leaves (fig. 2.05). An Arduino circuit translated this data and output it to beeping sound. The work involved dancing around the plant following the rhythm and the pitches produced by the Arduino circuit. I would repeat the exercise once each 45 minutes, suspending my daily activities to create spacetime for the atmosphere. The 15-minutes dances were temporary withdrawals from the circuits of human economy and contributions to an imaginary human-plant economy. This is what i called 'infra-dance', a first attempt at a minoritarian infraphysics[6].

dancing ecology was practised at different times of the day and in different settings, indoors and outdoors, implying different light situations, degrees to

6 The moniker for 'infra-dance', and, more broadly, 'infraphysics' was inspired first and foremost by Karen Barad's ontology of 'intra-action'. Slight modification in the first word is derived from infrastructure studies. Photosynthesis can be understood as *infra*structural work supporting the animal ecologies. Further, infra-dance is also homage to Andrew Pickering's 'dance of agency' (1996). Pickering uses this artistic metaphor to describe how scientists, first, construct an experiment, then see what nonhuman agencies do, then fine-tune the experiment, and so on. Science is a dance or choreography between scientists and the 'material performance' of the machine and the bodies involved in the experiment. More on performative onto-epistemology, see 2.1.3.

3.08. *dancing ecology 0.45*. Performance documentation, video still. 2 October 2013, Utrecht.

which my body interfered with the light falling on the plant, as well as weather conditions (fig. 3.07 – 3.11). All these factors contributed to creating different melodies and rhythms.

'Infra-dance' aimed to entangle two ways of 'working': photosynthesis and dancing, materially connected through the process of breathing, and conceptually through the notion of 'immaterial labour'[7]. Counter-intuitively perhaps, i take plants to be immaterial workers, representatives of 'bio-proletariat'[8]. They are *material networkers*, plants materially weave webs of life. This material networking is also affective care-taking of animals by offering them life-necessary oxygen. However, this re(con)figuration of plants into immaterial labourers, is both a recognition of solidarity and a critical operation. Very often, care-taking and affective labour are underpaid or not paid at all. Immaterial labour is often 'feminised' or 'housewifized', i.e. assumed as 'natural' for the female gender, therefore it does not need to be remunerated. Immaterial labour is a wide platform for potential solidarity across classes, but it could also mean solidarity with plants. Their work is invisible to our senses, but even more so, it is *invisibilised* by the modern organisation of economic apparatuses. Oxygen is one of the innumerable 'free gifts' of 'nature'. It is not even considered a resource in mainstream economics, since it is already there. It does not even

7 The notion of 'immaterial labour' was introduced by post-Autonomia philosopher Maurizio Lazzarato: "[i]mmaterial labour produces first and foremost a 'social relationship' . . . Immaterial labour continually creates and modifies the forms of communication, which in turn acts as the interface that negotiates the relationship between production and consumption." (Lazzarato, 1996: 137). Lazzarato coins the term to refer to new modes of productivity characteristic of the rising informational economy of the 1990s. Subsequently, Michael Hardt and Antonio Negri develop the notion further by distinguishing three types of immaterial labour. "The first is involved in an industrial production that has been informationalised and has incorporated communication technologies . . . [second] of analytical and symbolic tasks . . . [third] involves the production and manipulation of affect" (2000: 293). *Dancing ecology* mobilises the three understandings to different degrees, as it activates information technologies, symbolic manipulation of data (from data to sound), and affect. This last mode, what Hardt and Negri call 'affective labour' is the most important. "Affective labour is better understood by beginning from what feminist analyses of 'women's work' have called 'labour in the bodily mode'. Caring labour is certainly entirely immersed in the corporeal, the somatic, but the affects it produces are nonetheless immaterial. What affective labour produces are social networks, forms of community, biopower." (ibid.) What is stressed in Lazzarato and, even more, in Hardt and Negri, is that the output of labour may be immaterial or intangible, but it always involves *material* body work.

8 Rosi Braidotti and Donna Haraway use the notion of 'zoo-proletariat' to describe livestock animals in the context of bio-capitalism.

3.09. *dancing ecology 0.50*. Performance documentation, video still. 4 October 2013, Harrow on the Hill.

need to be mined.

The performance attempted to create a situated human/nonhuman collaboration through a *rapprochement* of two heterogeneous rhythms of work. My activities oriented towards the 'human economy' were suspended, and i'd try to transverse my efforts with a plant and create a more-than-human economy[9]. But this was not an economy of exchange even though it involved several feedback loops, *dancing ecology* was a work of solidarity and recognition, as well as celebration of the gift of photosynthesis. Two workers, one nonhuman and one human, were together joined as differential participants in 'immaterial labour'[10], a sort of more-than-human labour alliance[11]. The idea of 'dancing away' the emissions, if practised socially, could lead to further insights and imaginative re-imaginings of economy at large. How would our economies look if they operated on work/dance interplay basis[12]?

Plants are highly sophisticated network operators. Every leaf is a small factory, all part of a larger system of photosynthetic activity. Plants work like a network,

9 Here i am activating the second meaning of the word 'ecology' in its original Ancient Greek meaning, *oikonomia* as 'economy'. Though this semiotic linkage has important problems, i believe it can be used as a strategic essentialism.

10 Dance is another form of cultural work that has least to say uneven patterns of pay. This brings in wider considerations about the importance of immaterial labour in the contemporary visual arts context. It is barely possible to do anything without insane amounts of 'networking'. A similar dynamic can be observed in the academia as well.

11 In classifying plants as immaterial workers, i am clearly anthropomorphising them, an always problematic semiotic operation with imperialist undertones, especially having in view my belief in ecology of difference. However, in this context it is a conceptual operation of radically expanding the realm of economy to embrace ecology, but in order to increase accountability and responsibility of humans for their part and parcel in the general ecology of economy. For this, i hope that the participating plants do pardon me for their unwilling introduction into the labour force.

12 The dancing idea has a complicated genealogy. There are some significant meetings of dance and capitalism. One of the seeds for the idea of dancing at the workplace was planted by a friend who works at a bank, who once told me that he enters his office each morning by performing a 'moon walk' from the door to his desk in a gesture of freedom affirmation. More centrally, i draw upon one of the artistic forms of protest that lit up in the galaxy of the Spanish anti-austerity anti-capitalist 15-M movement, popularly known as *Indignados*. Flashmob group Flo6x8 staged a number of flamenco performances in banks. Large groups of women and men, sometimes accompanied by guitar players, would occupy the lobby area of the bank and burst into signing and dancing. In this, they were drawing on social history of flamenco which was born among the lower classes of Andalucia, and was means of expressing social injustice. Dancing as a form of protest or reclamation of freedom reaches farther and deeper still (e.g., capoeira, twerking, etc.).

3.10. *dancing ecology 0.63*. Performance documentation, video still. 5 October 2013, Harrow on the Hill.

they are networks[13]. If the findings of plant intelligence studies are taken to their logical conclusions, vegetals would be understood as key networkers of this planet. However, human economies are scarcely entangled with these far more complex biotic assemblages.

To wrap up and move forward, *dancing ecologies*, and the *confluence* from which it evolved, was a year-long learning curve that 'produced' little, but opened a number of problems to follow up on. It foregrounded an inner tension in using technology as mediator and/or autonomous agent. The promises of digital sensing, in my view, hardly opened to other realities of the pluriverse. In physical computing, not only the instigator of the action were humans, but it was Emilie and me who coded the interface, positioned the plant and constructed a situation. It was a closed loop system based on representation, allowing little space for other-than-human performativity. I tried to counterbalance this asymmetry by dissolving or flattening my position of privilege by trying to adapt to the plant's rhythm. It was me who was dancing *around* the plant, the plant would become the centre of my universe (inverting the centre—environment power relation). However, the dance was based on a narrow band of information, leaving out too large parts of the possible gamma of plant's affects. This conclusion was conducive in challenging the ontology and

13 Plants' extraordinary communication capabilities are subject of a rather small but on the rise research field. It can be said that everything started with the best-selling book by Peter Tompkins and Christopher Bird *The Secret Life of Plants* (1973). The book was spurred by the experiments of a former C.I.A. polygraph expert Cleve Backster, who in 1966 attached the 'truth detector' to the leaf of a small plant in his office. It is a fascinating irony that it a technique usually used for discipline and control would open towards space for cross-species recognition. (An interesting contingency or not is also that the arduino circuit that we used in *dancing ecologies* is basically a DIY replica of the police truth detector. Namely, it is a modification of a galvanic skin response device that Emilie Giles, together with Alexandra Jönsson designed for the workshop *Rebooting Computing* in July 2012 with Open Systems Association.) Since Tompkins and Bird's book, a lot of the science advanced in the book was discredited, and the book's popularity and far-fetched claims may have slowed down research in this area. But lately, the plant intelligence studies have been making major steps (e.g. Pollan 2013) and biosemiotics is making waves. Plants are wired into wider networks too, as their roots establish symbiotic patterns with mychorriza mushrooms, effectively creating world wide webs of vegetals and fungi (this has come to my attention in Anna Lowenhaupt Tsing's *The Mushroom at the End of the World* (2015)). An appreciation of this mode of living and collaborating is Deleuze and Guattari's transposition of rhizome from biology to an epistemological paradigm (1987), to which i will return in chapter 3. Further i am very much indebted to artists/researchers Bartaku and Essi Kausalainen, from whom i have first-hand learned immensely about plant communication.

3.11. *dancing ecology 0.70*. Performance documentation, video still. 7 October 2013, Harrow on the Hill.

aesthetics based on information and translation. Eventually, this was the key contribution of the project, as it invited me to move outside of humanist thought-space and take on board posthuman perspectives. Second, and equally important, *dancing ecologies* was a carefully conducted experiment *in vitro*, off-site from the flows of capital and power. It is not sufficient to work 'on yourself', as deep ecology or ethics would have it. Following Guattari, social ecologies are inextricable from mental ecologies.

dancing ecologies was a condensation of multiple strands of research, and it was propitiatory in shaping an *ethos* for subsequent research. The project branched out in multiple directions, leading to several workshops[14], and project designs[15]. *dancing ecologies* was thus a cycle of experimentation with ideas, technology and dispositions. Through dialogues and workshop formats, i questioned and re-iterated the basic premises of the working methodology and slowly gravitated towards posthuman paths. Beyond this, i was intrigued by the mystery of plants and the glaring discrepancies between social practices and their modes of being. From now on, i will be following the subjugated sides of the assemblage.

14 *assembling ecologies* was a series of three workshops given to Masters students at the Department of Architecture at the Royal College of Art, London in November 2013, upon invitation by Jon Goodbun. The workshops combined theoretical presentations about actor-network theory, Object-Oriented Ontology, and ecological thought jointly given with Nina Trivedi, together with practical lessons in the basics of physical computing given together with Emilie Giles. The proceedings of the workshop itself are not of relevance to the flow of the research strictly speaking, but the conclusions fortified my doubts about system theories and technological mediation. A different version of the workshop, this time centred around the idea of 'infra-dance' was presented at the Inter-format Symposium on Flux of Sand and Aquatic ecosystems at Nida Art Colony (NAC), Lithuania in May 2014. *infra-dance with trees, wind and sea* consisted in a group discussion about posthumanist ecologies followed by dancing exercise on the sand dunes of the Curonian Spit. The workshops created interesting discussions, but i consider them as a parallel line of inquiry that would feed the research more on the level of concepts than practice.

15 One of the plans was to develop *assembling ecologies* into a three-week long workshop that would combine physical computing, dance, and ecological theory. More importantly, many elements from *dancing ecologies* will come to inform the projects that were eventually realised. Another project was an Internet of Things environment with a host of objects, a plant, and a cat, to be engaged through dance.

3.12. Research for *grow buy cut sell*. 18 February, 2014, Dalarna, Sweden.

3.2. Paper works

3.2.a. *grow buy cut sell*

time / location: 18 February, 2014. Dalarna County, Sweden
documentation: video

Another quite in/visible extra-human body in office work is paper, or, more precisely, wood. A trail leads into a forest, and to a 'clearance in the woods'[16].

For all the talk about information economy and big data, paper production keeps rising (WWF, 2012). Even if one takes care not to print e-mails and buys only e-books, the massive piles of free newspapers lying abandoned or unread lying on London's sidewalks every evening are a good reality check. How many trees for each pile, how many centuries and millennia of vegetal lives? Forest cutting is one of those long-standing but less flashy environmentalist issues that simply does not go away[17]. As with most of the so called 'resource economies', forest felling is something that takes place outside towns. Most dramatic felling practices may take place outside Europe, but Europe has its fair share. It is the geographic area where modern forestry has developed and been exported around the world, and, at the same time, it is still participating in global forest economies. Scientific and economic examination of modern forestry as a field of practice is beyond my expertise, but i am interested in *time*, speed and rhythm of production. How long does it take for a tree to grow? How quickly is it felled and consumed?

Sixty-nine percent of the surface in Sweden is forest. Good part of the country's wealth was built on pulp. When driving along its forest roads, it is hard not to

16 Martin Heidegger invited thought to beat the 'forest roads' (*Holzwege*), or to go 'off the beaten track' in the English translation. Through these meanderings amidst the thick of things, eventually a thinker might reach a 'clearance'. Quite a modernist progression, with problematic Romanticist undertones, but Heidegger is the key thinker on the very edges of the much criticised 'correlation' between subject and object (see 2.4.1.).

17 Beyond paper, cardboard is the next big thing for pulp industries thanks to the vertiginous rise of online shopping.

3.13. *grow buy cut sell*. Video still. 18 February 2014, Dalarna, Sweden.

notice large clearances, and massive piles of tree trunks laid beside the roadway. Stora Enso is one of the largest pulp and paper producers in Sweden. According to some accounts, Stora may be the first limited liability or share company in the world, the first registered stock dating to 1288. Interestingly, its first productive activity was copper mining. Only towards the end of the 19th century, when copper and iron grew scarce, the company focused principally on timber. In 1998, it merged with the largest Finnish forestry company Enso, and since then Stora Enso became a global force, expanding its operations to Uruguay, Pakistan, China, and Brazil. The company is stock listed on NASDAQ Nordic OMX exchange based in Helsinki and Stockholm. This single company's history embodies the history of resource economies of European modernity over *longue durée*.

In province close to Falun, where Stora began its operations in Middle Ages by mining the Great Copper Mountain (Stora Kopparberg), i find myself in the middle of the forest, amidst a large swath of cut wood scattered around in the snow. It is technically a clearance, which means that it is filled with branches and stumps. It seems cut recently. Red and blue paper bands are tied around the trees in the area, on them the logo and the block letters of the company, who owns this part of the forest.

On my smartphone, i find the web-page of the NASDAQ OMX with the price of the company updated live. I place the phone on one of the trunks (fig. 3.12 – 3.14.). Elements and processes that are (kept) distant come closer towards an assembly. Through a number of material operations called supply chain, the biopower of the trees is turned into economic value. Data ticking on the small screen shows changes in the shares value. The branches are swinging slowly in the wind. The trees are growing imperceptibly (to me). The taller ones might be felled sometime soon. Others may be spared for years to come.

Grow buy cut sell was a thought experiment in assembling bodies kept distant in the socio-economic material organisation and in the conceptual imagery. Instead of following the chain, thus playing the logistics game, my intent is to

3.14. *grow buy cut sell*. Video still. 18 February, 2014, Dalarna, Sweden.

reorient and bend some of its nodes, to bring bodies together into a common spacetime. It involved background exploration into the dynamics of the company, on-foot site visit, and, finally, a material gathering. Nevertheless, the leap or the gap between the forest and the stock market was too abyssal. Too many bodies and material processes were left out. Networking always implies exclusions (see 1.3.4), but some networks are more attuned to the dynamics of life than others.

The next step is to introduce my body deeper into the network and become one of the conductors, a mediator[18] or a relay[19] between the bodies. Supply chains cover hundreds and thousands of kilometres, and insinuating one's body into these geographies can be rather challenging. Contexts with higher intensity or density are more disposed towards this end. Most of the stock exchanges of the day operate via the internet, but the trading companies have addresses, often clustered in urban centres. From ground zero of this particular chain, the forest clearance, i travel to where the value is negotiated, the seat of the stock exchange in Stockholm.

18 In Latour's sociology of associations, mediators are actors or bodies that "transform, translate, distort, and modify the meaning of the elements they are supposed to carry" (Latour, 2005: 39). Though not following his metaphysics fully, i find the concept evocative to describe the *modus operandi* of the two performances that follow.

19 'Relay' is a concept that Deleuze used to describe mutual passages between theory and practice. In his 1972 conversation with Foucault, Deleuze describes practice as "a set of relays from one theoretical point to another, and theory is a relay from one practice to another" (1977: 206). Here i take relay to stand for a semiotic-material nexus that a performance can intra-act among the bodies, human and extra-human ones.

3.15. Paper share convoy at the seat of NASDAQ OMX Nordic. *black box white paper*. Stockholm, Sweden.

3.2.b. *black box white paper.*

time / location: 20/21/24/25 February 2014. Stockholm.
performers: paper, trolley, me
documentation: photography, data

NASDAQ OMX Nordic, the Nordic stock exchange, is seated in a warehouse in the port area of Stockholm. A dozen of big companies, authorised traders, are spread around the city. NASDAQ OMX is an offshoot of NASDAQ (National Association of Securities Dealers Automated Quotations), the first fully electronic exchange, registered on Wall Street. People do not meet, all trading is performed through clicks or, increasingly, via algorithms. However, vectors of finance always land somewhere, on someone's desktop. How would it be if the shares were traded on foot as means of slowing down the world, or simply trading in a post-fossil-fuel world?

Trading is one of the earliest modes of communication between people and places. Material exchanges were accompanied by linguistic and body performances. How this scales up is an ecological problem[20]. Trading by container ships, trucks and planes, facilitated, promoted and enforced by world trading organisations and 'free trade' treaties, is beyond doubt unsustainable. But there are very different scales and modes of trading, as well as modes of exchange that are outside monetary[21]. What i am interested is non- or ante-

20 Financialisation of economy begins with this first big cycle of accumulation of the modernity, already with Venetian's invention of debt trading in 1300's. The process gathered momentum with the first wave of European colonisation, and proper stock exchanges were born in the 1500s, first in Antwerp, then Brussels, Amsterdam, and later London. The process of the 'great acceleration', rather than with the Industrial revolution, might have begun with the long 16th century (Moore, 2015), when the structures for 'spatio-temporal compressions' (globalisation) were set in motion (Harvey, 1989). The early stock exchanges were marketplaces where traders would meet and negotiate at length. The negotiations were also pursued in the neighbouring inns, pubs, and afterwards, in the booming coffee houses of London. For several centuries the trading proceeded face-to-face, and contracts were agreed by shaking hands. It goes without saying that since its inception, and up to the present, finance has been the realm of men. I will return to this shortly.

21 Anna Lowenhaupt Tsing in her ethnographic study of matstutake mushroom supply chains makes a claim that capitalism is not a homogeneous system that fully circles the globe (Tsing, 2015). She helpfully individuates capitalist and noncapitalist zones, with 'pericapitalist sites' operating

3.16. *black box white paper*. Performance documentation, slideshow still. 25 February2 2014, Stockholm.

modern interconnectivity as a mode of 'alter-globalisation' or *autre-mondialisation* (Haraway, 2008: 3). I refer to the times of Marco Polo and before. According to a historical source from the 14th century:

> to arrive from Tana in Crimea to China, a merchant employed around 9 months, in the following sequence: 25 days with cart pulled by oxen, 9 across water, 50 days in camel caravan, 115 on donkey, and 75 on horse [Larner 1999]. (Farinelli, 2003: 17)

Such was the nature of these trips that Polo would spend years to get to China, "riding without rush, stopping at caravanserais for months on end, for necessity or for pleasure, in cities, learning languages and usages, information and stories" (ibid.: 16). Polo is one of the last European premodern nomads, different from the modern globalisers that were soon to come[22].

Even in their early modern instantiations, stock traders were sedentary, they would hang out in a bar or a covered market and swap immaterial shares that *represented* material companies or commodities. There is a distinction between a peasant bringing his/her produce to the green market, and the reseller with a stand[23]. Pre-modern commodity trails can re-emerge in a post-fossil fuels age,

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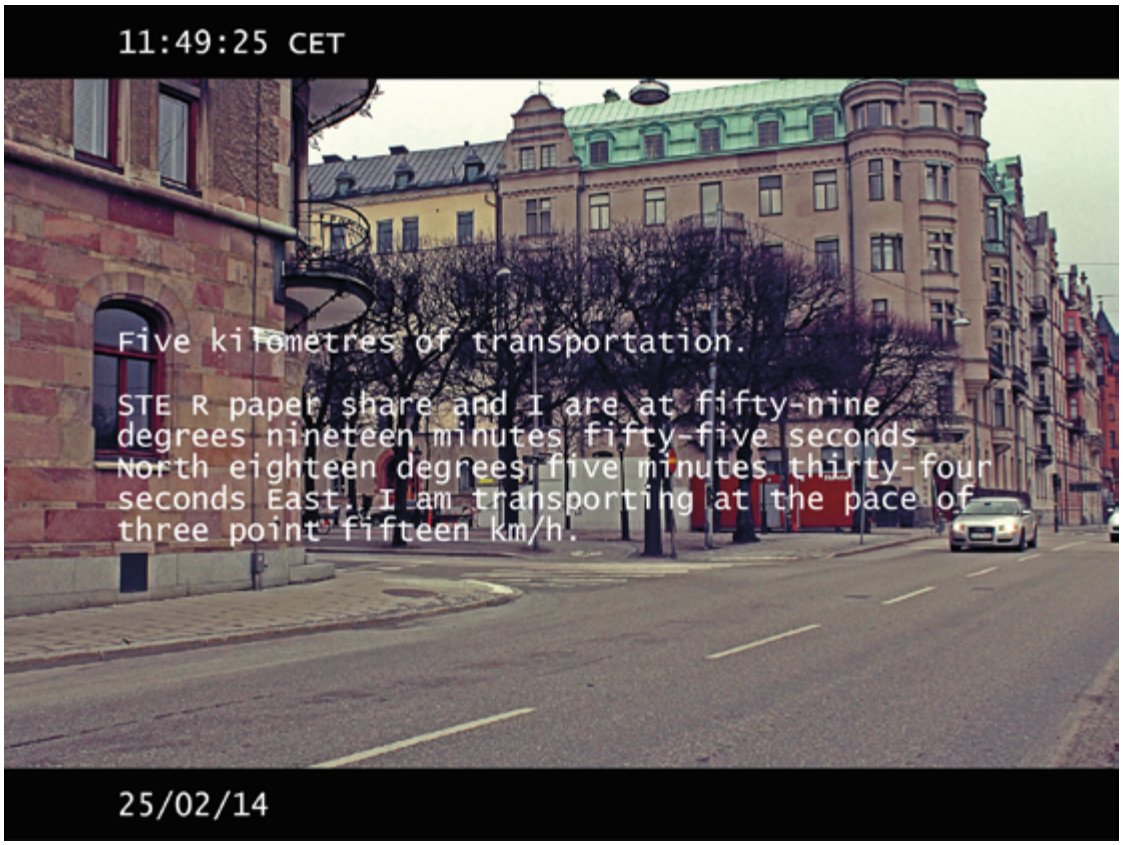
translation between them (ibid.:63). J.K. Gibson-Graham (2006) individuate geographies of postcapitalist or alternative economies already in act in the proximity of capitalist networks.

22 Marco Polo's trajectory is different from that of Christopher Columbus. Contrary to Polo, Columbus was all but impressed by the indigenous cultures, their customs and idioms. His world-view is radically different. Polo was travelling through time and places, as the above excerpt states. Columbus operates through *space* by way of the cartographic logic which reduces the globe to homogenous dots on the map. For Columbus, there is no place, only space, extension to be crossed. (Farinelli, 2003). This dialectic can also be analysed through the lens of DG's distinction between smooth and striated space (1987). Smooth is the space of nomadism, and striated is that of the State. Space is never one or the other, but various practices of crossing, occupying or controlling the space create specific striations or smoothnesses. In the above example, Columbus tries to striate the smooth space of the sea, while Polo smoothens the complex topography of Middle East and Asia. "Smooth space is filled by events or haecceities, far more than by formed and perceived things. …. It is an intensive rather than extensive space, one of distances, not of measures and properties." (DG, 1987: 479)

23 Modernity runs at different gears. At the local green market in Belgrade, until the transition to liberal economy in the 2000s, the vast majority of sellers were farmers themselves, who would drive in their produce each day at dawn, and then spend the day in the market. With the advent supermarket chains, the green market is now full of resellers. However, the produce does not parachute into the market by drones, the resellers still travel to the wholesale farmers' market in the periphery of the town.



3.17. *black box white paper*. Performance documentation, detail.25 February 2014, Stockholm.

when the gas field run out, and trading re-commences on foot (or bicycle). Or when the supply chains become unsustainable, socially and/or environmentally[24]. I prefigured this possibility by performing trades of Stora Enso paper and pulp company through the cityscape of Stockholm.

After charting the companies that are involved in trading, and learning their code names used in the electronic platform, i was able to *follow* the trades. I was to be a workhorse, or a mule, literally transporting what the shares stand for. Through a naïve accounting operation, i estimated that one share of Stora Enso, based on their production for year 2013, would give its owner an alleged 'right' to 14,12 kilograms or 2830 sheets of A4 paper[25]. I piled this amount of their branded paper on a small shopping trolley, thereby instituting an 'STE R paper share' (fig. 2.11; 3.15)[26]. Paper, trolley, and me—a 'paper convoy'—performed *infra-trading*. The 'paper convoy' was re-enacting the bouncing to and fro of *one single stock* of Stora Enso as it kept changing its owner. The 'transportation' was performed in the following manner: the convoy moved from the headquarters of the trader A (seller) to the address of the trader B (buyer) via the seat of the stock exchange (intermediary). Upon reaching the seat of the trader B, the trail continued by locating a company which bought the shares from the company B[27]. Thus the itinerary would proceed towards the trader C, again via the seat of the stock exchange. Throughout the walks i was gathering data, that became a slideshow documentation (fig. 3.16 – 3.18)[28]. I will not go

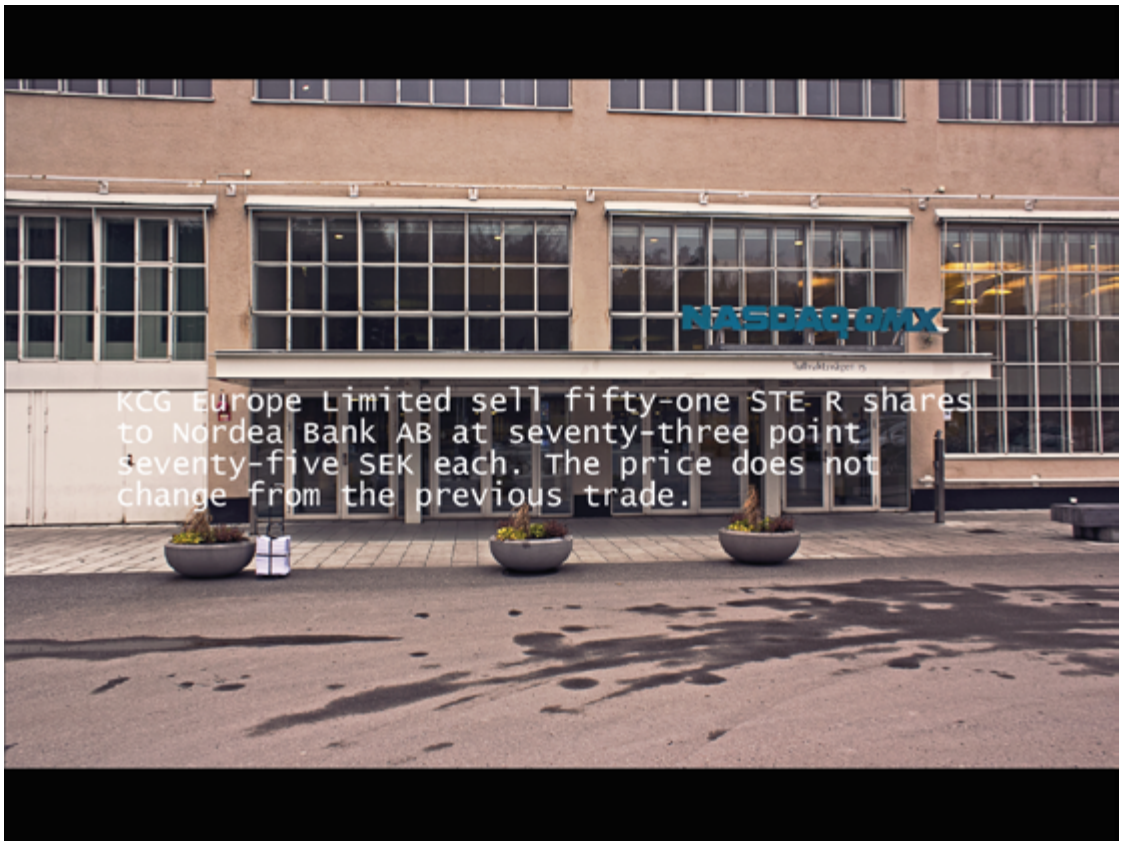
24 A recent historical example of supply chain breakdown happened in Greece in view of financial meltdown and subsequent debt crisis. The so-called 'potato movement' bypassed the supply chain set up by supermarkets. The farmers, in collaboration with local communities and municipalities, would bring food to townships and sell directly to the locals.

25 Obviously, possessing shares in a company does not materialise in this way. I am approaching the question from a lay standpoint trying to open up things that are very complex to understand for someone from another discipline.

26 STE R is the stock exchange symbol of Stora Enso. It should be noted that shares (in the old days) refer to "pieces of paper that denote ownership in a particular company, called stock certificates" (Investopedia).

27 This was done by consulting the web platform of the stock exchange. NASDAQ OMX publishes identities of buyers and sellers for each trade on their web platform. Since trades mostly consist of a multiple number of bundled shares, it is clear that i was not able to enact the volume of exchanges.

28 The gathering of data proceeded in the following way: 1) frontal shots of cityscape were taken every 10-15 seconds; 2) a tracking app (*GPS Tracks* for iOS) was used to record my locative data: geographical latitude, longitude and the speed of movement; 3) simultaneously to the walks, NASDAQ OMX's trading page of Stora Enso was screen recorded. The slideshow consisted of two screens that would show two parallel trading threads, the walks and the electronic exchanges. On the



3.18. *black box white paper*. Performance documentation, detail. 25 February 2014, Stockholm.

into details about the visual aspects of the work, as similar, but more elaborate, tactics will be employed in the next project, so i will expand on them below.

I walked the trades through the February weather of the Baltics, while the electronic exchanges (that really mattered) buzzed by at speeds and volumes that i could not possibly re-enact on foot. By the time i completed one single contract swap, tens of thousands of shares would have already changed owners. This performance was an apprenticeship in the materiality of financial flows that can with difficulty be experienced by merely reading the spreadsheets. Large areas of the geography of the trading were physically beyond reach, but even this small-scale re-enactment was an intense affective experience. The performative exercise on an embodied level disclosed the absurdity of the speeds of financial trading. *black box white paper* was in this sense more a critical than a counter-proposal, but through this work was developed the next project, *all that is air melts into city*.

Materially-discursively, the 'paper trail' led the research convoy to another extra-human body: carbon-dioxide. NASDAQ OMX explorations evolved into examinations of another type of market: 'carbon trading'. The City of London, with very few green spaces, is the converging point of the Carbon Routes of Europe.

left screen, the cityscape photos were superimposed by the locative data. The right screen showed the history of all trades of Stora Enso shares.

3.19. *air 261*. Near-infrared photograph, performance material, *all that is air melts into city: speculative geohistory of a EU emission allowance*. 14 May 2014, London, UK.

3.3. "All that is air…."
a. How carbon-dioxide comes to matter (and not)

Carbon-dioxide (CO_2) takes a panoply of embodiments as it circulates between the atmosphere, animal bodies, plants, rocks, motor engines, etc. Various bodies capture, transform, or release carbon-dioxide, contributing to the carbon cycle (Volk, 2008). This vital circulation is all-pervading and ubiquitous but, in a twist of evolution, it is all but intangible to human senses. Through advancements of the climate science, carbon-dioxide has eventually become a major (or minor) public 'figure'.

The concentration of CO_2 in the atmosphere is meticulously tracked since 1958 when Charles David Keeling began measurements in the laboratories at Mauna Loa, Hawaii. The in-progress Keeling Curve, colloquially called the 'hockey stick graph', informs us that *CO_2 is rising*. Having in mind that CO_2 is one of the primary greenhouse gases, these values are strong indicators of the rising temperatures or global warming (see IPCC, 2013). The shadow of this (for humans) odourless, colourless and quite rarefied element looms heavily over our societies. Less heavily on some than others.

Since 2005, in Europe, CO_2 is also a commodity, it can be bought or sold per metric tonne. It is the object of the European Union Emission Trading Scheme (EU ETS). EU ETS is the "cornerstone of the EU's policy to combat climate change" (EU Commission, 2013: 1). The stated mission of the trading scheme is to progressively reduce pollution so to meet the sustainability targets of the EU in view of the Kyoto Protocol[29]. The rationale for setting up the market is laid out in these terms:

29 EU ETS is the largest greenhouse emission trading scheme in the world, but 'carbon trading' is a global phenomenon. Other major markets are South Korean, Australian, New Zealand, and Californian emission trading schemes. Kyoto Protocol also includes four mechanisms for carbon emission trading among nations, signatories of the treaty.

3.20. *city 261*. Near-infrared photograph, performance material, *all that is air melts into city*. 14 May 2014, London.

> By putting a price on carbon and thereby giving a financial value to each tonne of emissions saved, the EU ETS has placed climate change on the agenda of company boards and their financial departments across Europe. A sufficiently high carbon price also promotes investment in clean, low-carbon technologies. (EU Commission, 2013: 2)

The medium of the Scheme are 'allowances' to release CO_2 or 'equivalent' greenhouse gases into the atmosphere. One EU Allowance Unit (EUA) amounts to one metric tonne of carbon-dioxide or the corresponding amount of nitrous oxide (N_2O) or perfluorocarbons (PFCs). As a whole the market is capped, each year a regulated number of allowances is issued, a number decreasing each year to meet the emission reduction targets, currently at a rate of 1,74% every year (in view of cutting emissions by -20% by 2020, and -80-95% by 2050). Sectors covered include "power and heat generation", "energy-intensive industry including oil refineries, steel works and production of iron, aluminium, metals, cement, lime, glass, ceramics, pulp, paper, cardboard, acids and bulk organic chemicals" and "civil aviation" (EU Commission, 2013: 3). The market covers "around 45% of total EU emissions" and currently involves around 12,000 power plants and factories, as well as commercial airlines within the EU (ibid.)[30].

Part of the Scheme is also the electronic financial market for trading in Allowances. EUAs are sold as futures with quarterly expiry date (e.g., June 2016, September 2016, December 2016, etc.). If the EUA is not 'used' by its expiry date, a tonne of emissions is 'saved'[31]. Each EU country is allocated a certain amount of emissions through the National Allocation Plan, which are then either allocated freely ('grandfathering') or auctioned to the local industries and businesses. The incentive to reduce the emissions comes from the fact that the

30 Note that transportation, households, small businesses and agriculture are exempt from the trading scheme.

31 This is the brilliant logic of Amy Balkin's *Public Smog* (2004-) series of works. One of them consisted in buying carbon shares and *not* using them, thereby withdrawing them from the market. My work further has great resonance with Balkin's *Today's CO2 Spot Price* (2009), a chart installed in the public space of Cajarc, publishing daily updates on the spot price of EUAs, derived from European Energy Exchange.

3.21. Measuring carbon-dioxide concentration. Carbon convoy in *all that is air melts into city*.

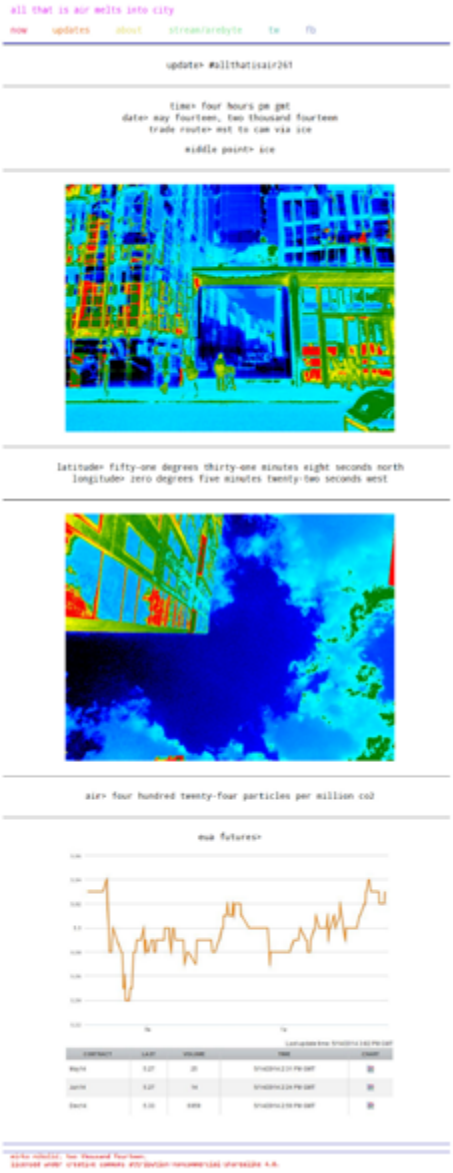
company is permitted to sell the unused allowances, and, in a perfect scenario, this surplus will incite investment in greener and cleaner technologies. But, what is this "sufficiently high price"?

In reality, the prices have been depressed for most of the market's history, even dropping to zero in September 2007, and sinking for 80% over the past eight years (Krukowska & Parkin, 2016). In the current Phase III of the Scheme (2013-20), EUAs have stayed invariably below 10€, and often below 5€, situation that came to be called the 'carbon glut' in the press[32]. Throughout the years EU has attempted various measures towards keeping the market running[33]. Estimating what a 'competitive' price for one tonne of emissions would be is too complicated an issue to resolve here, but an onto-epistemic analysis of the market is far more simple.

EU is betting on "a market instrument" to sort out one of the major causes of a complex and transversal problem such as global warming. EU ETS is arguably a highly sophisticated legal-financial apparatus but, in the last instance, it institutes a rather simplified cut between economy and ecology (while claiming to inter-link the two). The Scheme deals exclusively with *emissions*, thereby *excluding a multitude of entities from* (political and economic) *existence*. Hence all the other participants and processes in an infinitely more complex ecology of carbon circulation are invisibilised. By doing so, their appropriation continues. Clamorously overshadowed is *what/who is going to re-absorb* (or 'fixate') *all the emitted* CO_2. The answer is straightforward: photosynthetic organisms. Plants, trees, shrubs, phytoplanktons, algae, and many others who day after day labour from dawn to sunset to absorb the CO_2, and through a series of most astonishing chemical metamorphoses, give out oxygen. This multitude is fully out of equation of the carbon market apparatus. EU ETS thus perpetuates the established economic tradition of environmental 'externalities', even as it partially internalises greenhouse gas emissions. EU ETS, an advanced political-

32 Bloomberg News and Economist are good sources to follow the dramatic history of EU ETS.

33 Despite the reform EU announced in 2015, Jos Delbeke, EU Commission's director general for climate, recently said: "Massive surpluses in emissions certificates mean that there's hardly an impulse to reduce CO2 right now" (in Krukowska & Parkin, 2016).



3.22. *#allthatisair #update261*. Website screenshot, *all that is air melts into city*.

economic instrument forged in one of the most developed parts of the world, shows, how, almost 50 years after first scientific alerts, magically and perversely, global warming is not real. Or, CO_2 is not as real as financial-political interests.

To intra-act with global warming, economy would need to take in 'deep times' where fossil fuels come from and also 'future future' (Morton, 2013). The 'lifetime' or the rate of absorption of greenhouse gases in the atmosphere ranges from a couple of decades to thousands of years:

> Within several decades of CO_2 emissions, about a third to half of an initial pulse of anthropogenic CO_2 goes into the land and ocean, while the rest stays in the atmosphere. Within a few centuries, most of the anthropogenic CO_2 will be in the form of additional dissolved inorganic carbon in the ocean, thereby decreasing ocean pH. Within a thousand years, the remaining atmospheric fraction of the CO_2 emissions is between 15 and 40%, depending on the amount of carbon released (Archer et al., 2009b). (IPCC, 2013:472)

Can we comprehend these timescales with carbon emissions with quarterly expiry dates? This is not to say that EU is not trying to reduce the emissions, but that the case is to radically rework our apparatuses to tune them to more-than-human realities.

The problem is not only to get the volume or the price of the carbon allowances 'right'. The main issue with EU ETS is that it is firmly grounded upon anthropocentric premises. At best, it follows an old understanding of sustainability, which worries only about (some) humans' interests. The market is still firmly embedded in the 'anthrobscene' (Parikka, 2014). How would it look in a post- or pre-anthrobscenic world?

One of the marketplaces where EUAs are traded is physically located in London. Through the office buildings and outdoors, myriads of CO_2 molecules silently

3.23. *all that is air melts into city*. 'Office' after day two of performance. 3 May 2014, arebyte gallery, London.

float through the air. As things stand, the market and the air in the City are quite far from each other.

3.3.b. *all that is air melts into city: Speculative Geo-History of a European Emission Allowance*

date / location: 1 – 18 May, 2014. London, arebyte gallery, Hackney Wick
performers: 46 dracaena marginata trees, one areca palm, a red trolley, field data worker (Declan Driver), office data worker (Steffen Michels), me
media: photography, GPS Tracks app, CO_2 meter, website, paper prints
documentation: http://allthatisairmeltsintocity.cc/

all that is air melts into city was a performative re(con)figuration of the carbon emissions market for a post-oil world, seeking a more responsive and accountable assemblage of humans with carbon-dioxide and vegetation. The performance consisted in a ten-day walk across London, a physical transportation of one 'real carbon share' through the street-level topography of the EU carbon trading electronic market. The 'transportation walk' took place over ten working days, from 1st to 16th May 2014, starting at 10am and finishing at 5pm every day from Tuesday to Friday. The transportation was rhythmically interposed with periodic environmental sensing and makeshift data measurements. This field data were then transmitted to the gallery space ('air office') where they were processed, archived, and mapped. Finally, the data 'updates' were published online through dedicated website and social media accounts. By embodying and decelerating financial exchanges of carbon stocks, the project tried to re-assemble the out of joint speeds of economic flows with the rhythms of bio- and atmosphere.

Performance operated transversally across sites and three main action lines: 1) transportation walk: carrying of a material carbon share through the city; 2) environmental data gathering, and 3) data processing and presentation, as well

3.24. *#city051*. Normalized Difference Vegetation Index (NDVI) performance documentation photo, *all that is air melts into city*. 2 May 2014, London.

as archiving and mapping. The processes 1) and 2) took place on street-level, whereas 3) was happening in the gallery space. I will now describe these distinct performative processes one by one.

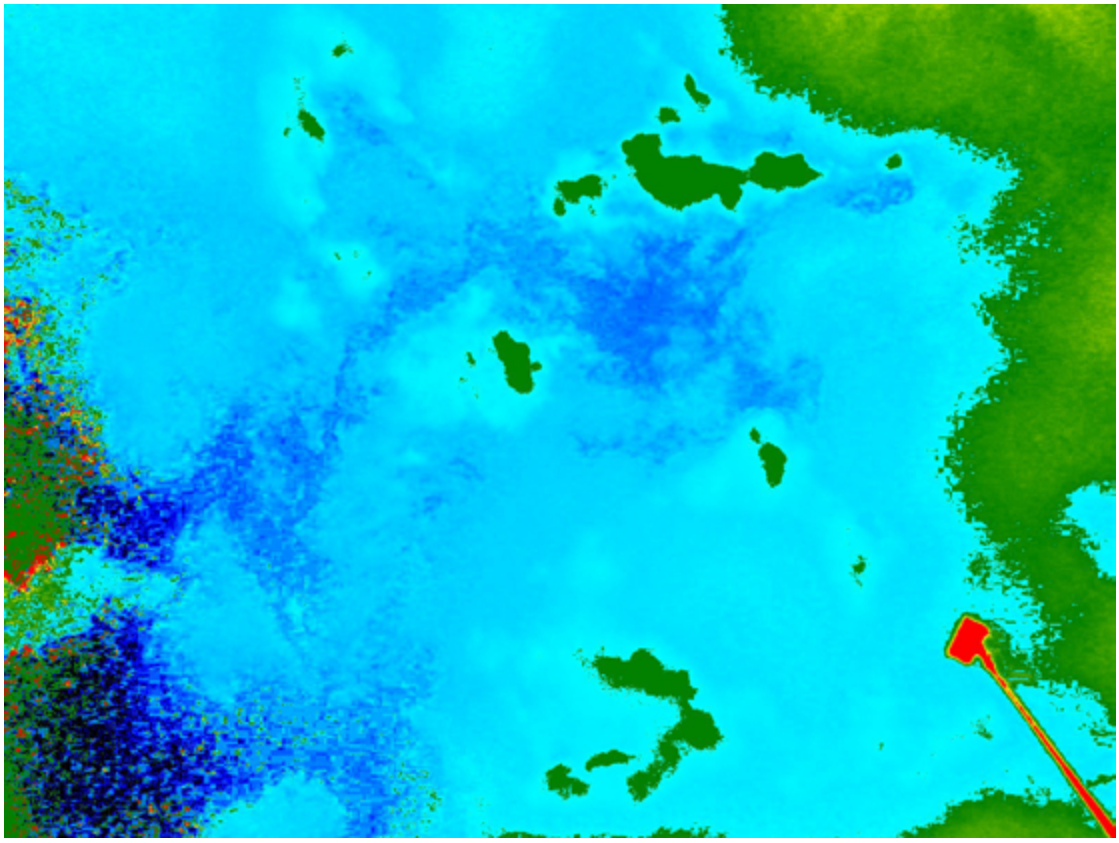
1) Transportation walk materialised what appears to be invisible in everyday life – carbon-dioxide and carbon shares (EU Emission Allowances). These two invisibilities-cum-immaterialities were embodied in the 75cm tall dragon tree mounted on a red trolley (fig. 2.18)[34]. The 'carbon convoy' was completed by myself—the 'motor' of the trolley-palm assemblage—and Declan Driver—the 'field data worker'—who was documenting the proceedings and communicating with the air office.

The carbon convoy treaded a narrative of a slowed-down material circulation of 1/272th fraction of a EU carbon stock through the cityscape of data, glass, steel, and air. The walks in the public space re-actualised the trades that were taking place in the electronic space. The convoy was moving on foot (and two wheels) between seats of the trading companies active on EU ETS, physically based in London, from West End, through the City to Canary Wharf[35]. The route traced a chain of potential/speculative transactions among companies[36]. The walks repeated the infra-trading methodology from *black box white paper*. We started from company A (a seller), proceeded via the seat of the trading platform ICE (Intercontinental Exchange), then to the company B (a buyer). At this point, one trade was completed (A → B). From point B (a seller now), again through the

34 One European Emissions Allowance stands for 1kg of CO_2 or equivalent emissions. The weight of carbon in one tonne of CO_2 amounts to c. 272,72kg. The tree trunks contain around 50% of carbon. Having in mind that our tree was c. 2kg of weight, it amounted to circa 1kg of carbon. Hence the carbon share would be only 1/272th part of carbon present in one tonne of CO_2, one trading unit in the EU ETS. The abyssal difference in volumes shows how each tonne of CO_2, which is sold for relatively little price, requires quite a few vegetal bodies to reabsorb.

35 From the list of the trading companies available on the website of Intercontinental Exchange, i derived a list of forty-five companies, traders on the market that are physically located in London, most of which are concentrated between the City of London and Canary Wharf. It should be noted that these companies are only intermediaries on the market, and that the end-users are one (or more?) steps behind this first layer. The fact that most of the trading companies are banks or trader agencies is quite interesting having in mind the nature of the market and its goals.

36 The itinerary of the 'carbon convoy' did not follow a 'true' history of an EUA because the stock exchange data published by the ICE does not disclose the identity of sellers and buyers. In the project development phase, i considered gaining access to the electronic trading platform, eventually i decided to work with information that is in the public domain, exposing its limitations.



3.25. *#air190*. Normalized Difference Vegetation Index (NDVI) performance documentation photo, *all that is air melts into city*. 9 May 2014, London.

ICE, to company C (B → C), and so forth (C →ICE →D →ICE → E …) (fig. 2.15).

2) Throughout the walks, at intervals of about every 10 minutes, the carbon convoy stopped to collect and collate data[37]. We collected: current geolocation; two landscape photographs in near-infrared vision (fig. 3.19, 3.20); and concentration of carbon-dioxide on the spot (fig. 3.21). The first landscape photo (*#city_*number, fig. 3.19) was taken in parallel with street-level showing the carbon convoy with its environs, and the second (*#air_*number, fig. 3.20) was taken by inclining the camera at 90 degrees towards the sky from the same spot. Geolocation was recorded via a GPS app on field data worker's iPad. After performing these actions, the data were e-mailed to the office data worker sited at the arebyte gallery in Hackney Wick.

3) In the air office/gallery, office data worker Steffen Michels was processing, formatting the field dispatches and adding another layer: current futures prices of the EUA futures (fig. 3.23). In line with the ethos of deautomation / deceleration, Michels was performing a series of 20+ steps per each 'update'[38]. If everything went smooth, around 10 minutes after the data was dispatched from the field, #allthatisair update would surface on the project website[39]. The website presented data in the following vertical sequence and subsections: time/date/trading route — *#city_xyz* (landscape photo) — geographical coordinates - *#air_xyz* (sky photo) — CO_2 measurement — EUA futures screengrab (fig. 3.22). The layout was based on simple top-down format to emulate the 'newsfeed' which does not prioritise one piece of information over the other. To emphasise the liveliness, when the website is accessed, only the

37 The breaks were timed in sync with the 'office data worker'. When he processed the data and published it online he would give us 'green light' to send in a new batch, so a new 'update' cycle would begin. This was the only way we could keep our small apparatus sustainable. There was no automatic 'refresh' button that we could have pressed to make the web-site publish the new data.

38 The choreography of the office data worker involved went from using the photo-editing software, translating the numbers into letters ('handwriting numbers', see below), screen-grabbing, page design, and finally printing of web updates and their placing on the walls.

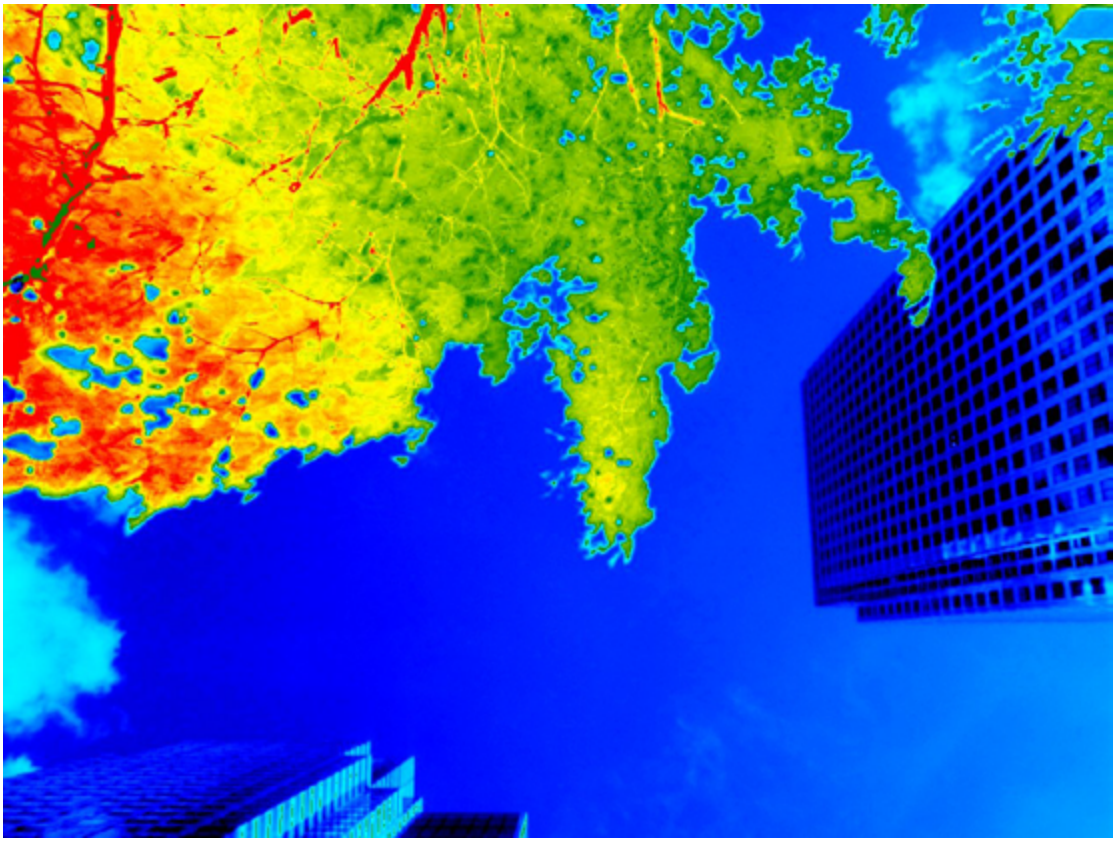
39 The time of the *city* photo was used to time each 'update'. The last operation in data assembly was the price of EUA on the EU ETS, because the ICE trading platform publishes the prices of carbon shares with a delay of 10 minutes. This temporal buffer implied that the 'office data worker' had to wait at least 10 minutes to collate this piece of information, before publishing our #allthatisair update.

3.26. *#city111*. Normalized Difference Vegetation Index (NDVI) performance documentation photo, *all that is air melts into city*. 7 May 2014, London.

latest update is on the page.

Now i will delve deeper into some of the methods of performing with data. Landscape photographs revealed a world in near-infrared spectrum, a reality in which the observer can catch glimpses of what '*plants do*'. Human eyes do not register waves in the near-infrared part of the spectrum, but even a basic digital camera has potential to do it, capacity blocked in manufacturing. Following an online tutorial by media activist group Public Lab, and using their Infragram filter, i modified a Canon Powershot camera to capture near-infrared frequencies. The technique of near-infrared imagery is in use since the launch of the first Landsat satellite in 1972, "to estimate the productivity of vegetation by comparing the amount of red light reflected (there is not much from healthy plants) to the amount of near infrared light reflected (there is a lot)" (Public Lab). Using an open-source photo-editing plug-in Photo Monitoring[40], raw near-infrared shots were processed to produce NDVI (Normalised Difference Vegetation Index) images. The NDVIs disclose "how much of the available light plants are metabolising into sugar via photosynthesis" (Public Lab). This type of imagery is used in forestry to examine the health of the vegetation cover. In the context of this project these images tell about *the intensity of labour of vegetation's labour*. The warmer the area in the image, the more photosynthetic activity, thus work, takes place. In NDVI imagery, the built environment, vehicles, and humans are rendered in colder hues, and thus fade into background, while the vegetation comes forth in fireworks of greens, yellows, and reds (e.g., fig. 3.24, 3.26). In the photographs we took pointing towards the sky appear strange patterns and fluorescent clouds (fig. 3.25, 3.27). These images however do not capture the gas *directly*, they are only invitations to gaze upwards. To sense carbon-dioxide, another type of inhuman vision is needed.

40 Photo Monitoring is a freesource plug-in for the open-source photo processing software Fiji. The plug-in was developed and kindly made available by Ned Horning via GitHub (https://github.com/nedhorning/PhotoMonitoringPlugin). Fiji is an image processing software, bundling together plugins with the distribution of scientific analysis software ImageJ (Schindelin, Arganda-Carreras & Frise et al., 2012).



3.27. *#air198*. Normalized Difference Vegetation Index (NDVI) performance documentation photo, *all that is air melts into city*. 9 May 2014, London.

Carbon-dioxide gas analyser 'sees' CO_2 by measuring how much of a specific infrared wavelength is absorbed by the air inside the instrument[41]. The gas analyser displays the measurement outcome in parts per million. As a reminder, the world mean level of CO_2 for 2014 was 397.16 ppm (Dlugokencky, E. & Tans, P.)[42]. Throughout the performance, we made 349 measurements, with the final average being 412.57 ppm[43]. Our measurements cannot be counted as scientific evidence, they served as a performative way of bringing CO_2 into the picture.

Beyond near-infrared images and the graph from the stock exchange, the remaining information on the 'update' page was in textual form. Numerical data —the carbon convoy's geographical coordinates and CO_2 concentration—were written down in words. It is not necessary to expound on the central role numbers play in the financial apparatus[44], it should be noted that environmental processes are usually expressed in scientific measurements (temperature, emissions, pH values, etc.). To get some hold on this, i wished to reveal the material side of the numerical apparatus, taking a bit more time to write and read the numbers, in alphabetical form.

Geographical co-ordinates of the convoy, e.g. 51°31'15"N 0°5'28"W become *fifty-one degrees thirty-one minutes thirty-one seconds north zero degrees five minutes twenty-eight seconds west*[45]. A carbon-dioxide measurement of 430ppm CO_2 writes as *four hundred thirty particles of CO2 per million*. The

41 Molecules of CO_2 absorb a specific infrared wavelength (4.3 µm). A nondispersive infrared analyser allows air to come inside a chamber, where infrared light is emitted from one end and the light wavelengths are measured on the other end. As the light passes through the chamber, part of the light spectrum is absorbed by the molecules of CO_2, which computes to the concentration of the gas in the air.

42 In the meantime, in March 2015, global measurements surpassed 400ppm for an entire month for the first time since the measurements began in 1958 (Kahn, 2015). "The 400ppm milestone is a largely symbolic one" (ibid.), but according to the influential environmentalist group 350.org, 350 is the level needed "to preserve a liveable planet".

43 These numbers are indicative only and do not make scientific evidence. CO_2 concentration is very sensitive to environment, and it soars close to sources of emissions such as human breath or fossil fuel vehicles. For this reason, Mauna Loa observatory is based on top of a mountain in Hawaii. Our measurements were performed over the duration of 60 seconds, which gives some time to the instrument to stabilise. Out of 349 measurements we performed, 106 were below the 400 mark. Only 2 days of 10 averaged under 400, and these were after the Bank holiday.

44 This very issue will be further examined in the project below, *counting live stock(s)* (see section D).

45 This format degree/minute/second (DMS) format maintains a conjunction to time, whereas the decimal one is purely mathematical, i.e. 51.52083 N, -0.09111 W.

3.28. *all that is air melts into city*. 'Office' after day four of performance. 7 May 2014, arebyte gallery, London.

method of 'handwriting numbers' is about *slowing down* reading, and *intensifying* the affective experience of the number, destabilising the graphic compactness of numbers as mathematical symbols.

In the exhibition/'office' space, the off-site part of the performative assemblage, the data were processed, mapped, published online and archived. The exhibition space was divided between two areas covered in office-like carpets. The main space featured a sea of electric blue carpet, that was gridded in gold lines scaling down the geographical grid of London (fig. 3.30). The adjacent space with a beige carpet was the working space of the 'office data worker'. On the walls of this area were affixed the website updates in chronological order thereby creating a dynamic archive of the work[46]. Michels' co-workers in the space were 45 young dragon trees (*dracaena marginata*) and one more grown-up areca palm (*dypsis lutescens*), all planted in transparent plastic bags. The dragon trees and the areca palm are excellent air-purifiers, hence they formed a tiny factory of clean air (Wolverton, 1997). Beyond aerobic labour, the palms were also the cartographers of the transportation walk. As different trading destinations (seats of the companies) were reached, dragon trees were placed onto corresponding geographical positions on the gold grid drawn on the blue carpet. Day after day, the usually backgrounded landscape of EU ETS trading platform was shaping, its glass towers materialising into a forest of tiny palms.

At the end of day 10, we exited the routes of trading among companies, and walked the carbon convoy back to the gallery. On day 11, with a performative story-telling in front of an audience, the 'walking' palm was rejoined with other palms (fig. 3.33, 3.34). This marked a leaving or an exit from the financial apparatus, a will to go elsewhere.

46 The website was designed in such way that the visitor can only see one update at a time, which made the comparison of values through time complicated. This operation was facilitated in the gallery space where one could see the printouts, but only the recent 80. However, the printouts were printed in black and white, so the near-infrared images were essentially unreadable. Each part of the apparatus provided only a partial view of the ensemble, thus inviting the audience to perform their own assemblage of bits and pieces found online and in the gallery space.

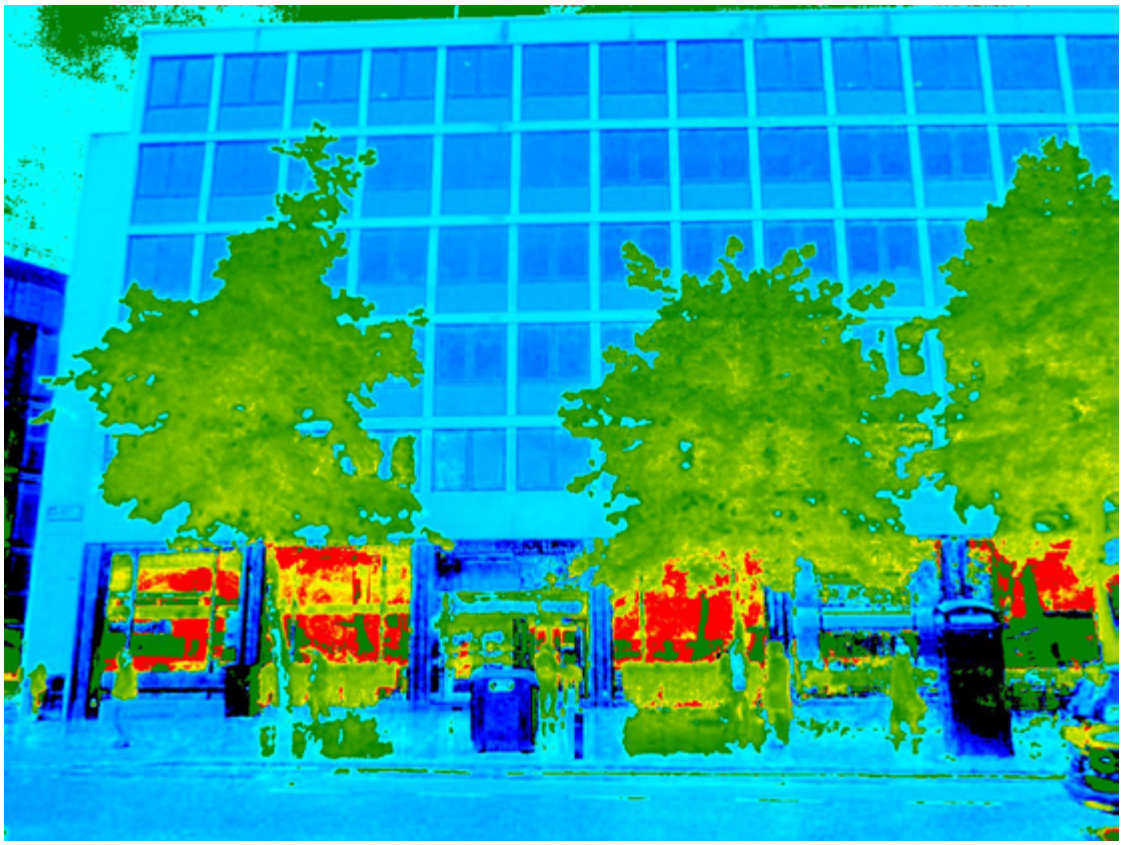
3.29. *air that is air melts into city*. ‘Office’ at work.

3.3.c. 'Outsiders-within' apparatuses

In this section i will analyse the outcomes of the performance, with especial considerations given to the power dynamics and labour patterns that were developed within our performative assemblage, and through our intra-actions with the City and wider environment. *all that is air melts into city* aimed to set in motion and maintain a small-scale/minoritarian apparatus traversing a number of large-scale assemblages. The intent was, first, to bring together a number of agencies commonly kept separate, and, second, to iterate this re(con)figured minoritarian territory. Clearly, the power of the EU ETS trading apparatus operated on an entirely different power plane and topology. It kept going its own way undisturbed. However, for a time and space, *all that is air* envisaged a possibility of a more responsive and accountable intra-action with trees, shrubs, grass and CO_2.

Inasmuch as we were weaving an alter-narrative, *all that is air* was performing in close proximity or within the territories of existing economic and juridical networks. We were "walking the lawscape" (Philippopoulos-Mihalopoulos, 2015: 94-106) of the financial districts handling the highest volume of capital in the world. Thus we became part in the interplay of procedures of 'in/visibilisation' (ibid.) these lawscapes enact. On the one hand, the carbon convoy melted with the general hustle and bustle of deliveries—mail, food, office supplies, waste—trolleyed in, out and around the buildings. Thanks to these flows, the convoy was not unusual, but, at a closer look, the DIY packaging of the plant and our lost-in-space attitude 'betrayed' us. In addition, taking souvenir photos in front of the business buildings in the City "is not a smart idea", as a security officer of the building in which the ICE is seated admonished me. According to the regulation of the Corporation of London, it is allowed to take pictures, but they advise to be informed in advance of the photo shoot[47].

47 According to the application on the website of the Corporation of London, photo shoot is an activity in a precise spot over a specified period of time. Our peripatetic trajectories could not be planned in advance in this way, so our visits were unannounced. As DG insist, nomadic practices often do not fit well into the regulatory frames of the State.



3.30. *#city212*. Normalized Difference Vegetation Index (NDVI) performance documentation photo, *all that is air melts into city*. 13 May 2014, London.

Legal complication could emerge from the smoothness between private and public spaces in the City, which makes photographers subject of possible intervention by security forces of the owner. This created a heightened sense of territorial awareness, and wherever possible, we took images from the pavement, which is public land.

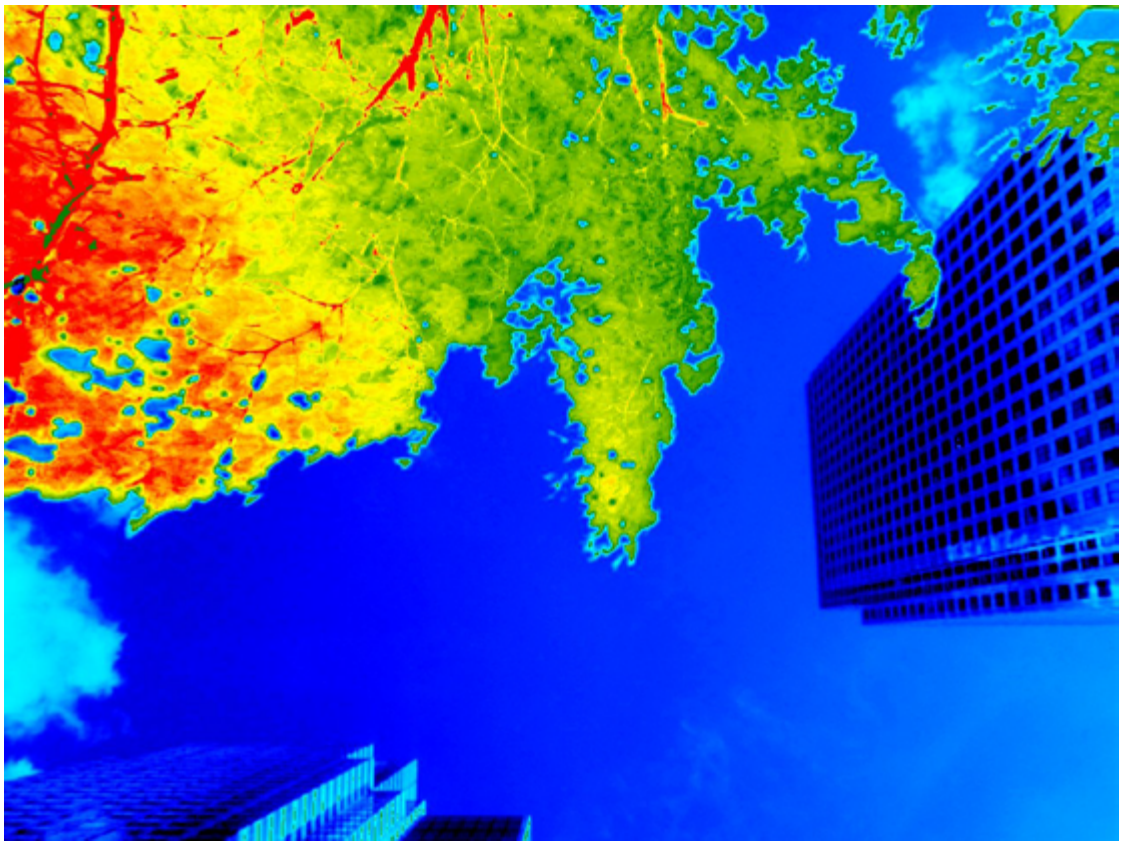
Canary Wharf, the other major business complex in London, sits entirely on private land, owned by Canary Wharf Group Inc., thus right of passage could be revoked. The area is much more visibly policed and, on one occasion, we were questioned by the security staff of the complex[48].

Beyond this largely mute dance with the legal-security apparatus, permanent challenge was posed by the labyrinthine geography of the City, its numerous walkways, foot bridges, inner yards, its numerous construction sites, which are never fully mapped on digital maps and change from one week to the next. This multi-level pedestrian geography was more difficult to negotiate because of the trolley with a living plant on top of it. These factors made the daily seven-hours walks into a physical and psychogeographic endurance exercise, one that swarms of delivery and other logistics workers perform each day to make possible the informational labour in the high-rises.

The choreography of data handling was purposefully made pedestrian, a series of decelerated steps that troubled the distinction between manual and digital, the mind and the body. This tactics was part of a critical and speculative de-automation/deceleration collaborative ethos of the work. The attempt was to trouble the hierarchies of labour, to question the primacy of informational labour which is enshrined in the financial apparatus. The informational labour is in the informational-financial context also strongly correlated with gender disparity patterns[49]. Beyond the gender gap, what is of interest here is that this

48 After acknowledging that they were watching us since the first visit, the security wanted to know if were performing some kind of protest ("green against glass", in the words of the chief security officer). Protesting is not permitted by the Canary Wharf regulation, neither is photographing of the building entrances. After some reassurances that this is a research project on 'urban greens and architecture', we were allowed to proceed.

49 Historically, the banking and finance in the City have fostered macho culture in workplace. It is hard



3.31. *#air198*. Normalized Difference Vegetation Index (NDVI) performance documentation photo, *all that is air melts into city*. 9 May 2014, London.

gap was historically produced throughout modernity through the gendered division of labour. 'Computer' was initially a job title—a human who computes—a role mostly fulfilled by women[50]. Data gathering/assembly/processing in the performance were made into slow repetitive procedures, essentially manual labours, in a gesture of re-thinking the primacy given to mental operations and highlighting the embodied experience of informational labour. *Decelerating informational labour, intensifying affective or ecological labour*[51]. What is at stake in *all that is air*, and in several projects that will follow, is ultimately a question of how industries that are understood to be dedicated to production (of value), can be reoriented towards reproduction (of ecological relations). In

to know what is going on behind the glass walls, but it seems that gender disparity is far from gone. Although 50-50 gender balance has purportedly been achieved by many companies, gender division is evident in the pay gap and working positions. The farther up one goes in management, the less women one encounters, the rule of the "glass ceiling". In 2010 Equality and Human Rights Commission report, among the 100 top ranking companies on the London Stock Exchange, women were represented with only 12,5% in the boardrooms. Following the report, the Treasury issued recommendation to reach 25% of representation, which was achieved in 2015. However, less than 10% of executive director roles are occupied by women (Kollewe, 2015). According to a Financial Times research of top 35 companies in the City, though overall staff numbers are close to gender balance, only 19,5% of the senior roles are held by women (Jenkins & Agnew, 2015). Gender pay gap also widens from 9,4% for all employees to 15,9% for managers, directors and senior officials (ONS, in ibid.). The larger picture is more concerning, in 2015 World Economic Forum stated that it "may take 118 years to close" the gender gap on the world level.

50 First 'computers' were women, working mostly in military and scientific contexts.

> In the history of computing, the humbler levels of scientific work were open, even welcoming, to women. Indeed, by the early twentieth century computing was thought of as women's work and computers were assumed to be female. Respected mathematicians would blithely approximate the problem-solving horsepower of computing machines in "girl-years" and describe a unit of machine labor as equal to one "kilo-girl." (Skinner, 2006)

The 'digital age' would not come into being without "the age of female computers" (ibid.). Gendered division of informational labour is far from being only a relict of the past. For example, according to the American Association of University Women 2015 report, the gender gap in the U.S. in the computing sector *increased* in 1990-2013 period (Corbett & Hill, 2015)!

51 By deceleration of informational labour i am not arguing to ditch away PCs and the internet, but i am gesturing towards thinking alternative nonlinear modes of organisation where some critical operations could be re-adapted/de-automated while others could be automated. It is fairly obvious that computing, assembly and logistics roles are probably best gradually delegated to machines. In ecological context, i very much doubt that merely placing digital sensors to 'track' environmental processes leads to better environmental policies. I believe that even numbers require affect and care. Politically speaking, i am not sure that 'full automation' as proposed by the accelerationist manifesto would automatically translate into social emancipation at large (Williams & Srnicek, 2013). While i am very interested in Williams and Srnicek's prospect of 'post-work world', what we now call reproductive labour will still be necessary (Power, 2015). Reproductive affective work that operates transversally within and beyond the realm of the human is what i call 'ecological labour'. Its seeds and present manifestations are varied and many (e.g., communal forestry in Japan, see Tsing, 2015), yet there is still a lot of space for envisaging more-than-human patterns of collaboration.

3.32. *all that is air melts into city*. 'Office' after day eight of performance. 14 May 2014, arebyte gallery, London.

ecofeminist tradition, i take that reproductive work is more generous towards the environment (Shiva & Mies, 1993). What would it mean if computing would in its essence be reproductive affective work? In *all that is air*, i tried to imagine this possibility as each measurement and translation was a bringing together of heterogeneous bodies and processes (molecules, organisms, devices, numbers, colours, words). To feel photosynthesis, to smell carbon-dioxide, to touch the naturalcultural relations abstracted in market prices. And to keep doing this again and again, re-producing care for the bodies, visible and invisible.

Our measurements were *not* trying to produce scientific knowledge or "to help the world by revealing mystic truths" (Nauman, 1967), but they tried to trouble the boundaries between politics, law, economy and the 'great outside'. EU Emissions Trading Scheme, i imagine, would be radically *different* if the traders walked from one London park to another to talk carbon emissions, and in the process they saw or smelled photosynthesis and carbon circulation. Then, perhaps, the market's mission could be to conduct "shared respiration: cospiration, conspiracy, growing together" (Berardi, 2012: 127) between industry and the atmosphere.

By way of conclusion and moving forward, i have to recognise that the work, though oriented towards atmosphere and biosphere, because of the structure of the apparatuses we were working with, turned out to be quite anthropocentric. Plants do not have access to the internet to see our novel gatherings of data, and we did little that could make the difference to the extra-human bodies involved. As a matter of fact, the plants trolleyed around town suffered heavily. Connected with this, much too weight was given to data aesthetics and dynamics, which in turn to an extent perpetuated the operative methods of the finance. The whole performative apparatus produced an operational closure of its own, making itself less permeable to unexpected encounters with other bodies. Thus, even though the apparatus of *all that is air* was hopefully more minoritarian than that of the EU ETS, we 'cut out' other bodies that could have intersected our

3.33. *beginnings and ends of all that is air*. Video still, performative presentation of *all that is air melts into city*. 17 May 2014, arebyte gallery, London.

spacetime, e.g. insects, birds, passers-by. The hospitality of our minor apparatus was precluded because, first, in a certain sense we wished to 'out-perform' the majoritarian apparatus, and, second, because of a certain feeling of deterrence produced by the complexity and immensity of the City's mechanisms. Fundamentally, we repeated a networking logic that is constitutive of financial apparatuses.

The main lesson learned was that reorienting an apparatus even only at the level of imagery means getting implicated into its power dynamics. Because of the physical and discursive proximity to the (infra)structure of the market, the dynamics of the performance was not fully in our control. While we were trying to symbolically slow down the racing of the market, in reality we felt like rushing and racing *against* it. Acceleration is a mental construct, a desire deeply present in subjectivities living in capitalist societies.

The question of mimicry and critique is crucial. If one abandons the critical stance of modernity, by which the subject distances her/himself from the object, in favour of 'critique by proximity', how close can one get to the centre without becoming the same? Luce Irigaray opposes phallogocentrism of Western philosophy by "find[ing] transgressive leverage from *within*" the discourse (Kirby, 2010: 112). Through her "close attention to the openings and folds of these phallocentric logics her perverse form of fidelity discloses the value of their repressed and disavowed interiorities" (ibid.). Vicki Kirby further likens Irigaray's methodology to Derrida's 'play', "the discovery that a different economy of valuation, indeed, different worlds, can be found in the very 'scene' from which we might hope to escape" (ibid.: 113). The field of these thinkers is quite defined, it is Western metaphysics. Tentacular operations of finance, law, and power are perhaps harder to detect. In this generalised power field, majoritarian apparatuses exert strong gravity pulls, and it is not easy to pick and choose the tools, sometimes they are chosen for us.

Yet, one must not give too much credit to the majoritarian operations. Even in the presumed interiority of capitalist apparatuses, there are zones that do not

3.34. *beginnings and ends of all that is air*. Video still, performative presentation of *all that is air melts into city*. 17 May 2014, arebyte gallery, London.

answer to the majoritarian logics (The Invisible Committee, 2015: 169-95), a plurality of alternative 'noncapitalist' insides (Gibson-Graham, 2006). For an eco-oriented practice, of especial interest are 'pericapitalist sites' where translations between life and capital are performed (Tsing, 2015: 63). In these sites, 'salvage accumulation' is in full swing (ibid.), but they also reveal where cuts have not yet been made. Perhaps *all that is air* gave too much credit to the centre, or it tried to assert peripherality too close to the centre, geographically, and discursively.

3.35. *counting live stock(s)*. Performance documentation, video still. 2 October 2014, Čigota, Zlatibor.

3.4. Wool futures

3.4.a. "Sheep came" and left

Financialisation and informatisation have almost completed the cartographic/monetary project of modernity[52]. Through protocols of quantification, space and time are 'striated' into homogeneous units, and, accordingly, living and non-living creatures are reduced into measures, making them compatible with the 'functional interoperability' of markets (Berardi, 2012). As cartography tamed the globe, debt captures time and life (Lazzarato, 2012). Beyond their capitalist function, numbers mediate what is unknown or unnameable, those 'strange strangers' that humans encounter in the world. Many times numbers are the only channel by which to grasp imperceptible entities (carbon-dioxide, nuclear radiation, things and processes micro or macro). This epistemic tension between reduction and infinity encapsulates numerical systems both as potential obstacles to nature-culture hybridisation and as possible participants in trans-species assemblies.

Sheep herding is, according to some sources, the most ancient stock-breeding activity of humans, and sheep are mythological creatures in many traditions. Wool is a nomadic shelter, a becoming-hybrid of the human. Being hugged by a warm wool jumper is a sensation to which few can compare. This nature-culture exchange was asymmetrical probably from the start, sharply exacerbated when sheep-breeding becomes industry. Industrial-scale accumulation in the UK begins with a revolution in sheep herding – wool was the key raw material in

52 The beginning of the process can be traced to the Renaissance Florence, where the concurrent invention of banking and the visual device of perspective creates a central point of view, and conceptually, the modern subjectivity (Farinelli, 2009). Renaissance perspective not only computed and represented depth, but with the existence of the vanishing point, it tames infinity previously accessible only to God. With this seemingly visual operation, bounds to economic accumulation were removed. A combination of skills and knowledges converged to create modern banking and perspective, and the overlaps between the two are extraordinary. Michael Baxandall showed how the techniques of gauging, arithmetics (the Rule of Three) and geometry (proportion) used by merchants were identical tools that painters and architects used to create images of unprecedented precision (1988: 94-108). Projection, transposed from architecture and painting in cartography becomes an operative protocol of reduction of space into a flat plane.

3.36. *counting live stock(s)*. Performance documentation, video still. 2 October 2014, Zlatibor, Serbia.

this phase of accelerated expansion of mercantilism. Large portions of land were transformed into sheep-walks, and agricultural populations were displaced. White woolies were unwitting colonisers in the hands of textile capitalists (to be later superseded by deer-walks).

Wool is today far from the days of its glory, it can hardly compete with cheaper synthetic substitutes. The popularity of sheep meat has also declined, because other animals 'yield' higher rations and are easier to breed. However, sheep herding is also promoted as a sustainable farming practice, encouraged and subsided by, for example, the European Union's Common Agricultural Policy. In terms of its financial presence, until 2013, wool was sold as futures on the Australian stock exchange, and, before that, in several others. At the moment there are strong spot markets in Australia and New Zealand.

Upon invitation from KC Grad to take part in the residency at the Open Air Museum Sirogojno, i found myself within a pericapitalist landscape of Western Serbia. The Museum is an ethno-village, situated in a village on the mountain Zlatibor. Apart from the Museum, unique of its sorts in the ex-Yugoslavia, this tiny village is well-known for its trademark wool sweaters. In 1962, fashion designer Dobrila Smiljanić formed a co-operative of local women, and, through their joint labours, local traditional patterns were translated into a national and even international brand. In the socialist Yugoslavia this was an extraordinary woman-run success story, and, moreover, the company was quite unusual for its rare blend of private and public enterprise. Women from the village knitted sweaters at home, as they used to do before, but now they were remunerated[53]. According to the brochure of the Museum of Wool, which is owned by the company, this is an interesting example of alter-industrialisation. Namely, in many smaller areas, following the decentralising patterns of post-war socialist modernisation, women had started working in factories, which challenged the

53 As in many other places, knitting wool garments was one of the unpaid labours women performed for their family members. Before modern times, these garments would be part of bride's dowry. This is another example where capital 'presupposes' a certain skill, as still happens around the world in garments manufacturing where women get employed on the basis of the crafts that they learn at the household.

3.37. *counting live stock(s)*. Performance documentation, video still. 2 October 2014, Zlatibor, Serbia.

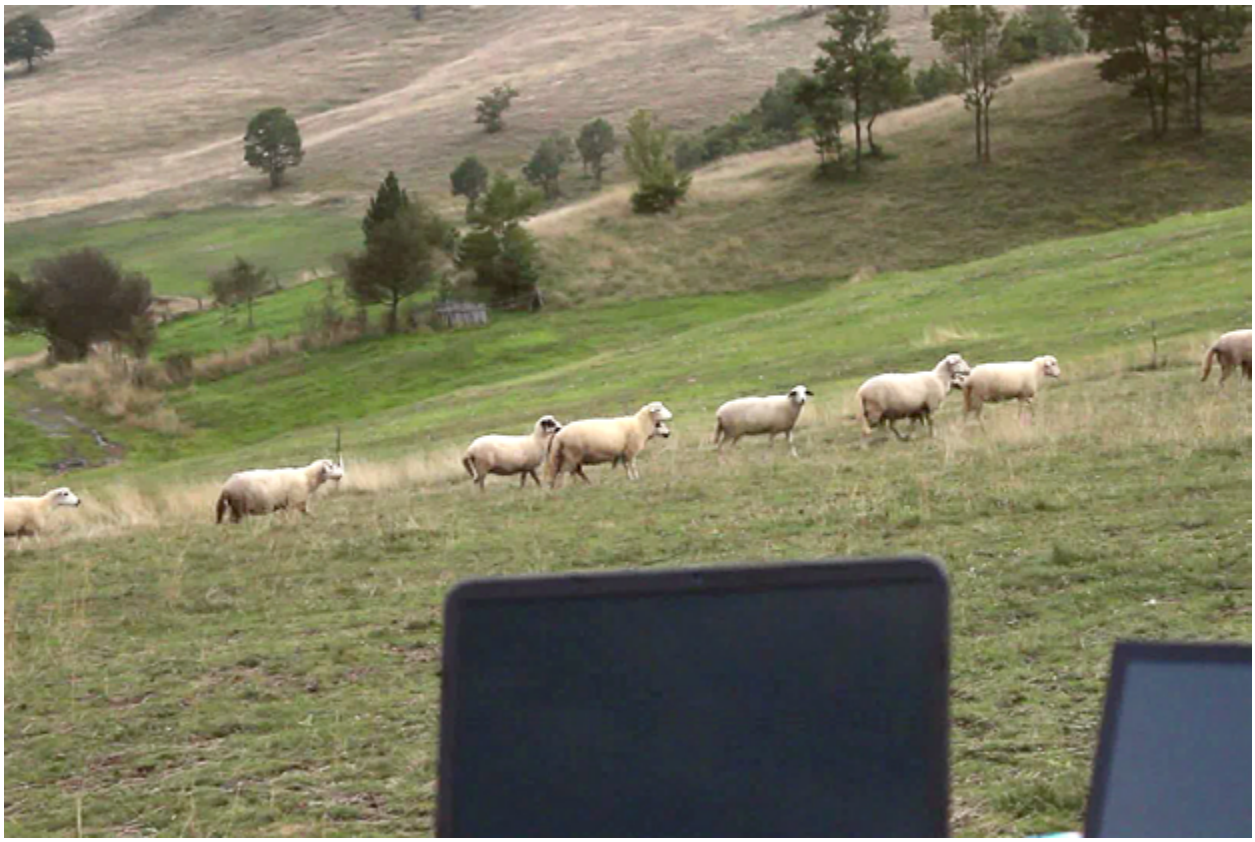
domestic economies base on patriarchal division of tasks. In the case of Sirogojno knitting company, women worked from home instead, which meant they could still perform household and childrearing mores, but also earn money for themselves[54]. The company garnered international success, but, after the economic embargo of the 1990s and the dissolution of Yugoslavia, the company was privatised and became part of a larger enterprise. The finely patterned sweater production continues, albeit at a significantly smaller scale. Another fascinating curiosity is that *wool used for sweaters does not come from the local flocks*. For fashion purposes a finer Icelandic yarn was imported since the inception of the company. Yet, as throughout the Balkans, mountains are full of sheep. Even this remote place embodies multiple contradictory vectors of industrialisation.

Counting live stock(s) will take these socio-economic semiotic-material practices and try to situate them against the realm of unquantifiable practices that create, sustain and reproduce life. Wool, a commodity, and sheep, a life, there is a yawning dualism, but can they be embraced as part of a continuum of naturalcultural materiality? Amidst the unceasing violence of phallogocentrism, is it possible to assert autonomies that would remain outside measurement, 'beyond measure' (Hardt & Negri, 2000)?

3.4.b. *counting live stock(s)*

date / location: 2 October, 2014. Čigota, Zlatibor, Serbia
performers: Divna Jovanović, Miladin Dabović, Mitar Ćaldović, Radmila Radosavljević, sheep, the Woolmark Company & AWI data, wool, me
audiovisual documentation: Hans de Wolf
editing: Hans de Wolf and me

54 From what i have gathered from the locals, there were periods in time when the women knitters would earn significantly more than their husbands working in factories or farming. It is fascinating to see photographs of the local knitters travelling to Paris fashion weeks in the 1960s and 1970s to present the pieces next to the designer Dobrila.



3.38. *counting live stock(s)*. Performance documentation, video still. 2 October 2014, Zlatibor, Serbia.

A shepherd counts the flock (fig. 3.37). A knitter counts knots in her pattern (fig. 3.39). A trader counts stocks (fig. 3.42). They all use seemingly identical discourse, but the apparatuses their numbers interpellate are mutually incommensurable. One sheep is a being, a life. Each sheep counts, because it breathes, eats, senses, bleats. But it is also a zoo-proletarian, exuding biopower, part of which can be translated into gain. However, the shepherd, the owner, is also accountable to the flock, s/he takes care of the sheep. Knitter weaves algorithms of warps and woofs into garments. Sweaters can be knitted at home or in factory, family presents or fashion commodities. Trader's stock numbers race through electronic circuits at speeds close to light. Stocks refer to the fluctuations of wool prices in the Australian market, the largest one in the world, whose repercussions might have impact on the sheep lives in Zlatibor.

We should first get to know who the performers are. The sheep in question are fifty-one, some of them part of the shepherd's flock, and some are kept only temporarily for a fee. The shepherd, Miladin Dabović, has lived all his life on the slopes of Zlatibor. From him i learn that these days sheep herding is almost a non-sensical venture, as the government subsidies are very low, and there is no real market, especially for wool. Most of the wool sheared gets destroyed because he cannot sell it. Some is used by his wife for household knitting. The two knitters, Divna Jovanović and Radmila Radosavljević, are part-time employees of the ethno-Museum. Divna gets called in to the Museum as a cleaner, and Radmila is occasionally hired as a 'demonstrator' of traditional skills and crafts. Besides, they both knit jumpers on commission for the company Sirogojno Co. This village is a very precarious and flexible economy[55].

Miladin counted the sheep, as he usually does. It would seem unnecessary these days when the flock is smaller, and they are inside the fence most of the time. However, some sheep are brave enough to run through the electricity-powered

55 For the performance, the knitters were employed for a day of work by the Museum to perform a 'demonstration' of knitting. Sheep and the shepherd were not paid for their participation, the family was offered a gift in kind. In consultation with the guard Mitar Ćaldović and the Museum curator Nikola Krstović, this exchange economy was considered to be more appropriate for the situation.

3.39. *counting live stock(s)*. Performance documentation, video still. 2 October 2014, Zlatibor, Serbia.

wires, so the count must be kept. Furthermore, the count is for various reasons required by the authorities, as state subsidies depend on the so-called headage.

Divna and Radmila, sat on two chairs placed on a rug, continued to knit the sweaters they were making at the moment, on a slightly different location from where they usually work. For the performance, Divna counted knots she was making on a jumper sleeve (fig. 3.40)[56].

I was counting the average national Australian wool index from the Australian Wool Exchange (AWEX EMI)[57]. With a laptop in one arm, i was circling around an office-like desk on which i kept the score (fig. 3.42, 3.43).

Miladin counted fifty-one sheep. Divna counted around one hundred knots. I counted one thousand twenty-three cents. Each of us uttered numbers aloud, one by one. In this way, numbers were substantialised into a process, quantity into duration. Inspiration for this 1-2-3 mode of counting comes from children games, and one that everyone knows — counting sheep to fall asleep. This is a reminiscence of another practice, shepherd's keeping numbers in field. This activity, performed daily by shepherds, has two slightly differing connotations. Numbering transforms sheep into exchangeable units, by summing up a flock, it creates a continuity which transforms sheep into economic value, capital. But, at the same time, keeping number is a way of taking care of sheep, of taking care they are all present[58]. Counting comes close to naming them (some sheep have names too), of recognising their individuality. Numbers sometimes form tangible connection between humans and other-than-humans.

I was substantiating numbers through *yan-tyan-tether* counting rhyme. *Yan-tyan-tether* is an ancient counting system used throughout the British Isles,

56 Divna was knitting a linear circular sleeve pattern that is not based on a numerical sequence, so the counting was not needed to make it. Therefore counting in this case was not functional, the idea was to intensify the affective rhythm of the work.

57 The price i used referred to the week before, since the reports are published on the website of AWEX EMI once a week. I e-mailed the contact at AWEX EMI to receive the latest data. Initially, the person was open to collaboration, but eventually i never received the data.

58 Similar care-taking counting mode can be observed when teachers count the pupils in school or on a day trip. It would be quite complicated to see if everyone is there by saying names.

3.40. *counting live stock(s)*. Performance documentation, video still. 2 October 2014, Zlatibor, Serbia.

gone all but extinct with the advent of Industrial Revolution. It was used specifically by shepherds, but, apparently, by knitters too. There are many different instantiations of this counting system (as documented on the Wikipedia page). The variation i adopted was a "Knitting Song" used by "the knitters in the sun in Wensleydale" (R.S.T., 1863:205):

> 1: *yan,* 2: *tyan,* 3: *tether,* 4: *mether,* 5: *mimph,* 6: *hither,* 7: *lither,* 8: *auver,* 9: *dauver,* 10: *dic,* 11: *yan-a-dic,* 12: *tyan-a-dic,* 13: *tether-a-dic,* 14: *mether-a-dic,* 15: *mimph-it,* 16: *yan-a-mimphit,* 17: *tyan-a-mimphit,* 18: *teher-a-mimphit,* 19: *mether-a-mimphit,* 20: *jig-it*

The peculiarity of *yan tyan tether* counting system is that it is base 20. Since the flocks are often larger than 20, shepherd needed to keep a score, either by placing stones from one pocket to the other, or by marking a line on a stick (Ingram, 1977). To keep the score, i chose a highly charged object which i noticed in the Museum of Wool at Sirogojno – a ball of yarn. Each time i reached *jig-it* (20), i would extract one ball from the sack on one side of the desk, and place it in a row. *Yan tyan tether* is very melodic, when iterated, it becomes a chant or a refrain. I imagine that its harmonic qualities were one of the modes of singing at work characteristic of pre-industrial times[59].

Counting live stock(s) sought to deterritorialise common hierarchies of human labour and to create a plane of common work with animals (see fig. 3.35). Tasks that shepherds and knitters perform share some structural consonances with informational precariat of the day, e.g. mobility and multi-tasking[60]. Further,

59 Most of the manual labours, crafts and agricultural, were performed to signing (Korczynski, Pickering & Robertson, 2013: 64). Strikingly, with the industrialisation, singing at work disappears. Another note of interest is that singing was a form of human-animal interaction or even collaboration, for example, when ploughing, which was "at least in part to encourage oxen" (ibid.:49).

60 The location of work of both types of workers is mobile, which is something believed to be a specificity of today's creative or informational work. Ages before nomadic offices of urban creatives, shepherds were mobile or nomadic workers per definition, as the flock does not stand still. Similarly, the knitters are also not bound to a specific place of work. One can knit in the kitchen, bedroom, living room, outside the house, in open field, or on the Tube. Knitting is an activity unbound from a specific location, very different from most of hard industrial or craftsman activities which involve hard machinery fixed to a place. Further, both shepherds and knitters are usually experts in multi-tasking, another celebrated virtue of workers in the 'new economy'. Shepherds must have gifts of

3.41. *counting live stock(s)*. Performance documentation, video still. 2 October 2014, Zlatibor, Serbia.

knitting is an activity based on numbers that shape patterns. Even if it is considered manual labour, it is an algorithmic thus information processing activity[61]. Beyond their communicational and manual skills (see note 60), shepherds are experts in cognitive mapping, not only of the landscape, but also of mazes of private land ownership, zoning and lawscapes (Philippopoulos-Mihalopoulos, 2015: 151-163). Sheep—shepherd is in some contexts even nowadays a nomadic assemblage that troubles patterns of land control asserted during modernity. Sheep herding springs from and invokes a commons. In many ways, these nonmodern jobs have never been fully industrialised. Decolonisation of the modernity's classifications ought also imply de-hierarchisation of labour division and organisation.

Various commonly separate activities and bodies were re-assembled, brought together and apart to various degrees. Each of us performed their own action or duty, but in a context which was defamiliarised. Crucially, village-based knitters and a urban 'trader' went out to meet the sheep[62]. Whereas *all that is air* was an endurance exercise spread across three weeks, in this case it was a one-off gathering of intensity. This was based on the priority of affirming and maintaining respective autonomies of the bodies involved, animal and human. I tried not to subsume or reduce bodies into actions that would alienate them from their everyday practices, the goal was only to intensify these singular territories through intra-action in proximity. Key concern of the piece was how to approach an other, an animal or a human, but not to penetrate other's existential territory, at most to touch on its boundary, to acknowledge a mutual

inter-species communication, empathetic attentiveness, as well as possess basic veterinary skills. The are often adept at shearing and other animal, farming and house-keeping crafts. Knitters, as mentioned before, often perform a number of other activities throughout the day. Contemporary working patterns of informational economies are far from being extraordinarily unprecedented or unique, and it would be interesting to explore possible transversal labour alliances along these lines, potential lines of decolonisation of hierarchical division of labour.

61 This numerical basis allowed for the automatisation of textile industry by use of punch-cards in Joseph Marie Jacquard's looms, thus starting the textile industrial revolution. Weaving and computing have a parallel and intertwined genealogy, and overlaps go even further.

62 The development of the piece was an important learning experience. The initial idea was indeed to bring the sheep into the open-air Museum and to perform in one of the fenced off areas. As i engaged more with the mountain, the village and animal bodies, it became clear that the museum in the village was a majoritarian location in respect to the surrounding mountainous areas.

3.42. *counting live stock(s)*. Performance documentation, video still. 2 October 2014, Zlatibor, Serbia.

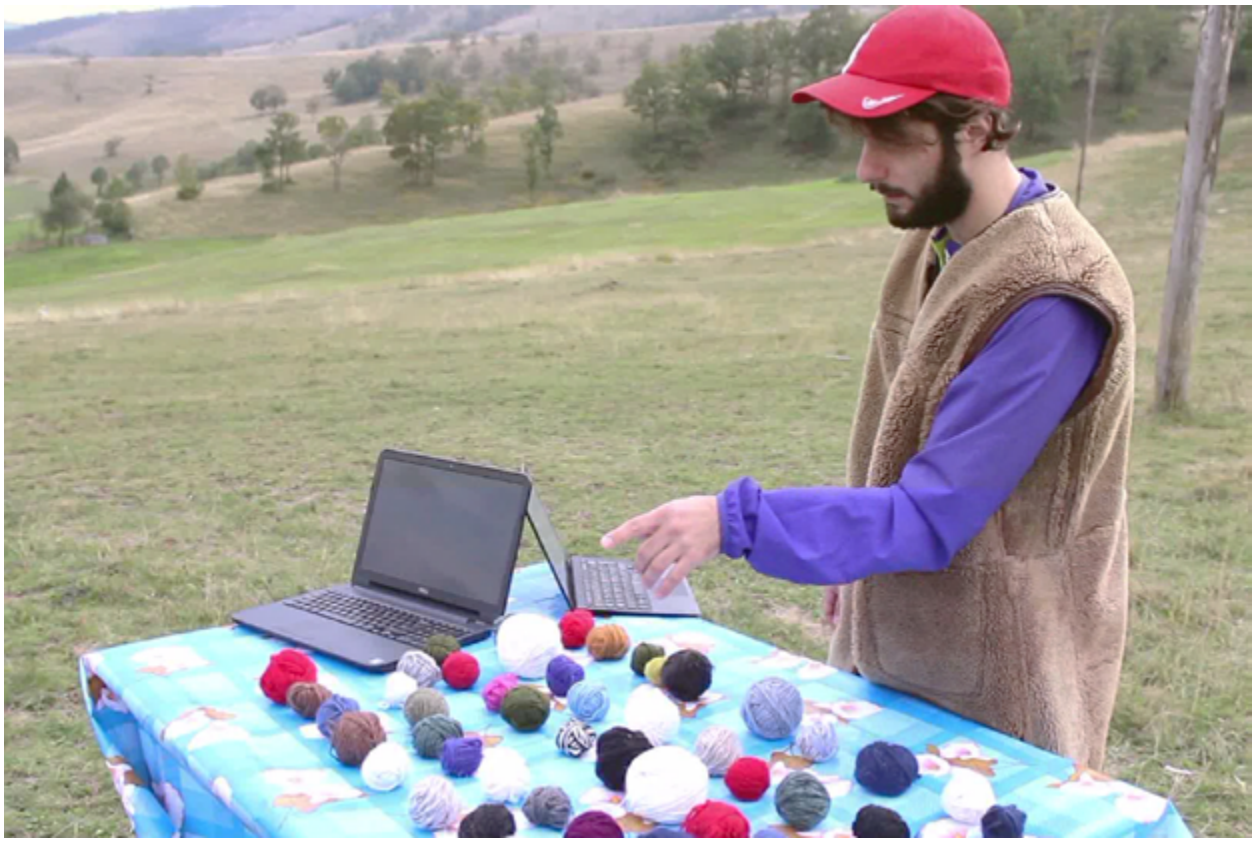
entanglement. Among humans, counting created a plane of assembly of humans where differences in work became more evident but also closer to each other.

Because of this relative disjointedness and margins for withdrawal, i believe a sense of solidarity took shape. Everyone was in their place, and simultaneously also 'out of place'. Most out of place was me, that's why i had to re-invent a territory with the computer, counting in a foreign language and a silly outfit[63]. These were attempts for accounting for my own privileged status as a urban artist/doctoral student, and creating some place for me. The shepherd was merely looking after the flock, and before and after that, performing other activities around the house. The knitters made some progress with their sweaters, just in another location. The sheep were bothered by the shepherd for a short while, but quickly they left, and engaged in their own important business (fig. 3.38). Across or through these multiple and interlocking differences in being and working, a shared existential territory was made possible. However, knitters and i did step into the sheep enclosure, and they decided to withdraw almost to the farthest corner. The sheep remained a minority, i hope this became clearer to the humans involved.

Performing on a mountain in remote Western Serbia clearly does not amount to a more just reconfiguration of the global wool market. Its power centres are far away, but the beginnings and ends of its chains of command and control wash these slopes as well. It is easy to get deceived by the beauty of the landscape. It is a wonderful picture, but lives struggle there. The mountain is prey to uncontrolled urbanisation, to the youth leaving for the city, to the global agricultural markets. Similarly as in the 18th century landscapes, sweat and pain of animal and human bodies is easily hidden[64]. These people and sheep are not

63 My intruder status was made explicit in my dubious if not infamous character of the 'trader'. Without representing the industry, this role was closest to mine since i come from the capital of the country, and my parlance is notably different from the local one. Beyond that, living in another country my financial position was enormously better than the shepherd's and knitter's. However, each of us is also precarious in different ways, and i believe that some of that came across in our conversations prior and after the performance.

64 Questions could be raised as to the aesthetics of the documentation, and its inevitably picturesque



3.43. *counting live stock(s)*. Performance documentation, video still. 2 October 2014, Zlatibor, Serbia.

on some bucolic 'outside', they are in 'the middle', and with this performance, we hoped to reasssert their 'in the middle' positionality[65].

Thanks to the cultural networks, something transversal was afforded. Different bodies and processes, scattered across the systems, were now folded closer, shaking ever so slightly the neat boxes of supply chains and of the great divides. And, i hope, we worked towards opening a possibility, that, after all, we can work together, more entangled with and different from each other. What if the sheep, the knitters, the traders really worked neck by neck? What kind of patterns of work and rest would emerge? What speeds, what affects would be forged through these intra-actions?

The performance attempted to push through our economic/accounting apparatuses, to bend them outwards towards the sheep. It is not enough to just socialise with sheep in free time, enjoy their innocence and cuteness, or their wool (which should also be done). Deterritorialisation needs to be performed from the human pole, tracing and reworking the intersecting threads of political/economic/cultural oppression and exploitation. Only through transversal withdrawal from the assigned human roles will be be able to meet the sheep one day. These acts of withdrawal are not lonesome escape acts, they are acts of meeting. As things stand now, the sheep would benefit little from being reterritorialised into the cultural domain. The pressing task is to make the sheep herding a becoming-sheep of the human, establishing relations that come close to sheep affects, rhythms and desires. Perhaps, at some point in this becoming, sheep may want to share their wool with us.

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connotations. There are also intentions of strategic landscape use, whereas the apparent beauty is 'used' to create an 'atmosphere', but with different intents from a pastoral story. Instead of inventing a new visual vocabulary from scratch, this is another instance of 'mimicry' as in Luce Irigaray, playing with the discursive field to reveal its blind spots. And being enchanted by it, as we, urban artists, were. Tension between the aesthetics of documentation and the performance act will be further heightened in the works that will follow.

65 In DG's ontology, "[a] rhizome has no beginning or end; it is always in the middle, between things, interbeing, *intermezzo*." (1987:25). Their nomadic philosophy asks for "proceeding from the middle, through the middle, coming and going rather than starting and finishing" (ibid.). In another context, 'the Middle Kingdom' is the name by which Bruno Latour calls the region of hybrids, of all things that are *between* the poles of the modernity. "Natures and societies are [the Middle Kingdom's] satellites" (Latour, 1993:79).

3.44. *office of ecological labour: surfacing deep correlation,* performance environment. *Despite Efficiency: Labour*. 2 December 2014, Herbert Read Gallery, University for the Creative Arts, Canterbury.

3.5. Clouds and atmosphere

3.5.a. Unbearable lightness of data

In libraries and classrooms, comfortably typing or drawing vectors, humans, through nonhuman 'materials', touch the atmosphere and the lithosphere. "Spooky action at a distance"? Myriads of invisibilised steps lie between a laptop and trees outside the window, passages running through 'mutual cores' of micro- and hyper-objects. Chains of causes upon causes stratify into agglomerations of effects. Or correlations, more or less probable, provable, pliable to graphic or algorithmic revelation. How can we ever know, who makes causes and effects in a networked planet?

The internet can also be seen as an astonishingly massive 'backgrounding' machine which, while connecting some, in/visibilises innumerable other bodies. First of the massively opaque entanglements the internet successfully overcodes is energetic. Quite weirdly, relatively little information is available about the energy use of the world wide web[66]. Are we hiding behind the complexity of our own making? Or, who is hiding behind whose complexity?[67] The internet is one

66 Power use of Information and Communication Technologies (ICT) is occasionally debated in press, and a certain amount of research has been done. One of the oft-quoted estimations is that the energy use of the internet was 8% in 2012 (in De Decker, 2015). The problem with the estimates of ICT energy consumption is mostly what they include and what they leave out from the calculus. Manufacturing of the ICT devices is rarely included, as well as power used to charge portable devices. Further, it is often said that the internet service 'substitute' more energy demanding offline services, e.g. ia videoconference "takes at most 7% of an in-person meeting" (in ibid.). However, these numbers should not be taken at their face value as they are more or less fine estimates, and they differ to order of magnitude from one another. De Decker rightly insists that increasing power efficiency in manufacturing and data handling are sometimes offset by consumption patterns. More and more devices are bought, and more and more data is used. A report *The Cloud Begins with Coal* by Mark P. Mills, published in August 2013, attracted attention in mainstream news by claiming that an iPhone consumes more than the latest generation of refrigerators (a claim which was fiercely contested) (Walsh, 2013). Beyond accounting merely the current energy use, what is more startling are future predictions, as the ICT sector is the fastest growing economic sector in the U.S. and wider. A recent report by Greenpeace claimed that data centres, or cloud computing are the main drivers of the energy use (Cook, 2012). Considering that Mills report concluded that the main energy source of the ICT sector is still coal, this indicates that 'the cloud' has deep affinities with the unsustainable economic patterns.

67 The energetic unknowability of the internet resonates with the epistemic opacity of the stock exchange, and, in particular algorithmic high-frequency financial trading. To date, no one was able to determine the exact causes of the Flash Crash on May 6, 2010 at 2,45pm on Wall Street (brilliantly

3.45. Saribus rotundifolius (footstool palms) and installation, *office of ecological labour*.

of those networks or systems that is too complex to be comprehended from the human viewpoint. IT companies have been taking great steps towards green data centres[68], but only imagining distances that data travels in order to visualise a single web page brings about vertigo. Energy and materials implicated stretch far beyond the plug in the wall. This standpoint implies a radical embeddedness in the Great Acceleration of resource extraction, but could this implication be harnessed towards better commoning with the atmosphere?

Arguably, streaming a video online may be more energy efficient than buying a DVD. That is besides the point. I want to insist on the invisibilisation processes in act with each internet connection. Clearly, this is but the latest instantiation of commodity alienation via supply chains by which the potatoes in the dish do not bear the marks of the farmers. The internet merely upscales and smooths out the game. There is a quantitative shift inasmuch it is globality that is interpellated but there is also a deeper epistemic modification.

A key semiotic-material entanglement of the internet with the material reality is encapsulated in 'data', which is made of very actual molecules. The materiality can be best observed in the case of 'big data', the accumulation of unprecedented amounts of data through search engines, digital sensing, etc. Materially speaking, big data requires immense resource expenditure both to gather and analyse, such that it creates novel types of concentration of power in hands of a handful of companies and governments (as Snowden leaks in 2013 revealed).

On the semantic side, big data revolution brings the promise of supplanting any

documented in Marije Meerman's documentary film *Money & Speed*, 2012).

68 Apple has in 2013 published reports showing that their data centre efficiency has reached 100%, while Google publicises their continual energy efficiency improvements and greening of their energy mix, as well as holding a symposium about the topic in 2013. However, this is but a fraction in the much larger sea of internet infrastructure covering the globe, and small and medium data centres are the lion's share of energy use. According to some analyses, switching over to the cloud would dramatically reduce global energy consumption related to the ICT (Kanellos, 2013). Perhaps one of the internet's futures, after all, is a certain centralisation, which makes the discussions about property and location of the internet infrastructure even more important.

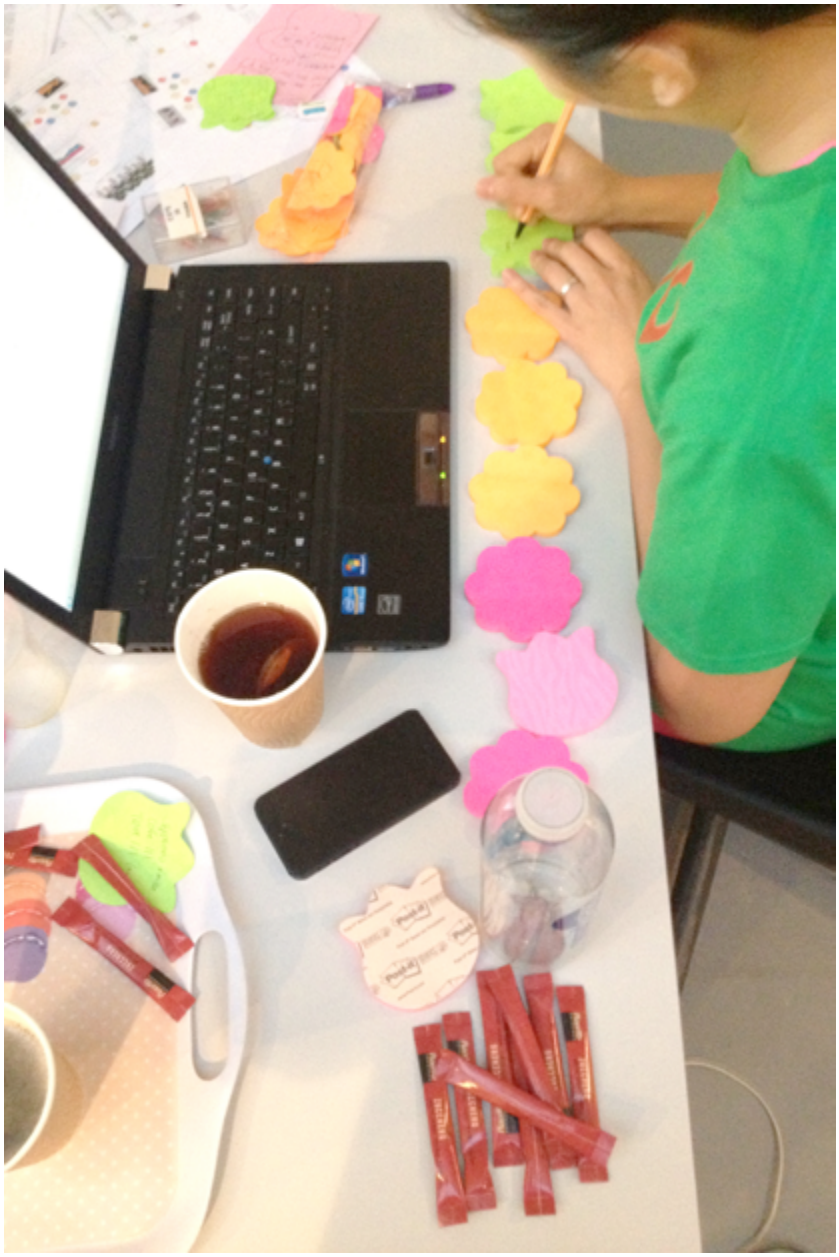
3.46. *office of ecological labour*. Performance documentation, video still. Video: Louisa Love.

theory or decision-making in favour of a mathematical analysis of relations between data streams. The conceptual/mathematical mechanism upon which big data phenomenon is premised is that of 'correlation'. Statistically speaking, correlation is a function that determines to what extent two variables are associated, thus indicating the level of dependence among them. But, as a fundamental statistician axiom admonishes: "correlation does not imply causation"[69]. Big data is closely wedded with correlation because it is an efficient method to squeeze out some meaning from the growing volumes of data gathered. However, reliance on big data has profound epistemic consequences (see: boyd and Crawford, 2012). In a boosterist article in *Wired*, Chris Anderson even announced "the end of theory", because "with enough data, numbers speak for themselves" (2008). Correlation, ecologically speaking, is a scaling-up of reduction of complex process to relatively linear causal linkages among them based on a set of measurements and pre-established parameters.

Materially speaking, big data re-organises labour patterns in new ways that often seem to limit the worker's rights. Beneath the more well-known digital labourers at the front-end of IT companies, there is also a 'digital precariat', workers who perform lowly paid activities that feed the data economy[70]. Through radical upscaling of computing, big data companies are able to atomise labour to the advantage of the employer, a phenomenon called 'mechanical turking' or 'crowdworking'. It is *cheaper* to hire humans to perform some analytical tasks than it is to program computers. Amazon calls them 'Human Intelligence Tasks'. Some examples are transcribing an interview, as speech recognition softwares are still lagging in this area; translation; pattern detection in images, etc. Crowdworking online markets are particularly harsh for the hired workers, whose rights are basically next to none; the pays are low, and the

69 The fact that divorce rates in Maine are positively correlated with per capita consumption of margarine in the US does not mean that they are *causally* co-implied (one of the many hilarious examples from the website *Spurious Correlations*).

70 Take, for example, the case of ScanOps, the unit of Google that is assigned the task of scanning digital books. Sometimes fingers of these workers appear on the scanned pages. Their working conditions are dubious, as Andrew Norman Wilson, a former Google employee, documented in his works *Workers Leaving the Googleplex* and *ScanOps*. They are the carnal infrastructure of the big data engines.



3.47. *office of ecological labour*. Performance documentation.

payers are not required to register any taxes. Crowdsourcing seems to multiply 'digital divides'[71]. Especially significant is that crowdworking seems to recruit mostly women workers or workers from or based in Third World countries (Marvit, 2014). These modalities of 'employment' have been massively expanded over the past years with the explosion of platforms such as Uber, TaskRabbit, and others. Delimitations between affective, informational and physical work are being dissolved beyond recognition, or perhaps there never was a clear-cut distinction among these categories.

In the networks of ICT, the backgrounding and objectification of work(ers) is at least threefold: power (energy sources), big data (correlation), and digital labour (crowdwork). These backgroundings with especial force push against the bodies of earth others (across the lithosphere, the biosphere and the atmosphere), and the humans on the lower side of the digital divide. Beyond the laconic truisms that the nature of 'work is changing', IT industry in important ways grows on the back and nurtures unequal divisions of labour and causes significant impacts on extra-human bodies. It is hardly possible to 'demonstrate' or 'prove' to what extent information networks impact upon the earth system, but it is at least 'likely' that they participate in the process. This constitutive doubt may be an invite to entangle more intimately with the naturalcultural processes that are beyond measurement. How to intra-act in more just ways within presently unobvious entanglements between informational pathways, humans and the atmosphere? The human-engineered networks are so deeply enmeshed with extra-human processes, that the point is not to accumulate more (connections), but to become occupied by what was 'always already there'. This is what, i imagine, Donna Haraway intends when she asks that, in the times of the Chthlucene (her alternative to the anthropocene), we should 'stay with the trouble'.

71 "The term 'digital divide' refers to the gap between individuals, households, businesses and geographic areas at different socio-economic levels with regard to both their opportunities to access information and communication technologies (ICTs) and to their use of the Internet for a wide variety of activities." (OECD, 2001) Digital divide is often measured on the country level, but, i believe, in the above context, it has molecularised and penetrated social tissue at large. Crowdworkers are in the North and in the South. The Internet has probably dissolved these grand geographical labour divisions for good.

3.48. *office of ecological labour*. Performance documentation. 2 December 2014, Herbert Read Gallery, UCA Canterbury.

3.5.b. *office of ecological labour: surfacing deep correlation*

date / location: 3 December 2014, 10,30am—5,30pm. Herbert Read Gallery, University for the Creative Arts, Canterbury. *Despite Efficiency: Labour*, curated by Emma Brasó
performers: Adelia da Silva Nieto, Charley Vines, Helena Martin, Lauren Gray, Kiron Muhammad, Naomi Ching, and Sasha Adamczewski, palms, me
video documentation: Louisa Love

office of ecological labour (OOEL) is an attempt to situate and embody a connection between the use of the internet and greenhouse gas emissions *on a local level*. It was a participative group action in which a group of performers engaged in performing correlation between the local internet traffic on the University camps and the CO_2 in the gallery space. The performance took place within the show *Despite Efficiency: Labour* curated by Emma Brasó, set up around the idea of inefficient work[72]. The performance was developed in collaboration with Brasó to relate to the educational and institutional context of the show and the University.

72 In the exhibition abstract, Brasó writes the following ideas, which was the beginning of the performance development:

> Inefficiency can be understood as an effort without reward; as the negative result of a system designed to produce a benefit, to be profitable. In relation to present conditions of labour, the dialectic of efficiency/inefficiency is at the core of new working paradigms. From life-hackers who propose efficient uses of technology to minimize the time spent at work, to the vindication of sleep and its power to resist capital's constant demand of attention, and from the rise of the artist's job –self-motivated, flexible, unstable– as exemplary, to the reliance of many creative industries on the exploitation of unpaid work (internships), labour is today intimately connected to debates around (in)efficiency. (2014)

If not efficiency, what else? Georges Bataille's notion of 'general economy' was based on 'excess', dispensation of surplus energy that every organism and social system produces (1988). This is a striking idea in times in which austerity is one of spectres haunting large parts of Europe. I relate more to the discourse of exhaustion (not scarcity) both of human bodies, as well as the earth (e.g., Brennan, 2000; Berardi, 2012). Excess and exhaustion do not exclude each other, as exhaustion from capitalist labour may open affective territories for exuberant performances of affirmative affect.

3.49. *office of ecological labour*. Video: Louisa Love. 2 December 2014, Herbert Read Gallery, UCA Canterbury.

Computers used on the campus were manufactured and shipped from many places. Correspondingly, the energy used to power the devices springs from various sources. Online connections made while surfing the web materially fire up other switches and connection points across the globe. The project tried to materialise these entanglements locally and, by doing so, to avoid the enclosures, first, of the screen, in order to foreground the bodies, and, second, by spilling over the internet infrastructure to tune into the planetary atmosphere.

On 3rd of December 2014, at Herbert Read Gallery, the team of *office of ecological labour* (OOEL) performed a one-day test in which we produced, analysed, and performed a series of data translations with relatively simple means. The hypothesis was that there was an unresolved link between the volume of the internet traffic on the university campus, and carbon-dioxide concentration in the air of the campus. The correlation between elements needed to be modelled, estimated, if not guessed. OOEL was in pursuit of the carbon shadows of digital data.

Following upon insights gathered in *dancing ecologies* and *all that is air*, this work further materialised the desire to slow down the 'great acceleration', to withdraw from the production of things or (immaterial) services, and create a territory of alternative naturalcultural practice that cannot be reduced to neither economy nor science. The intention was to test what it would take to create a small-scale team that would track, inefficiently, complex processes.

A number of human performers, together with plants and bits of technology, created a small-data machine for tracking the variation in the local internet use and the local carbon-dioxide levels. The performance included eight 'work positions': 'intranet tracker', 'CO_2 gatherer', 'cartographer', 'internet painter', 'CO_2 painter', 'flip charter', 'correlationist', and 'public relationist'. Each of them, as the 'job title' says, was assigned a specific duty within an apparatus structured as a factory line. The intent behind this division was to heighten *intra-activity* among the performers, and to *slow down* the general

3.50. Plotting correlation, *office of ecological labour*. Performance documentation. 2 December 2014, Herbert Read Gallery, UCA Canterbury.

proceedings, but it was also contextual, as i will explain in a moment. Lastly, the OOEL apparatus would have the goal of performative embodiment of the atmospheric-informational entanglement.

The OOEL workers/performers were 'recruited' from the school. They were mostly Interior Design BA students that took part in designing the set-up of the exhibition. They were therefore already engaged with the show and the concepts behind it. However, this performance was outside of their learning duties, and they were not compensated. Because of this, it was important for me to find a way to make their 'volunteering' less invasive to their other duties. Hence i chose not to arrange any rehearsals, and instead to create a score that would be straightforward since *learning would take place during the performance*. Also, it was critical to achieve a balance between the intensity of the work and off-time. The previous experience with *all that is air* led to physical and mental exhaustion of everyone involved, not quite a slowed-down work. Lastly, the context was made familiar, class-like, aesthetically speaking and on the level of the score. OOEL was supposed to be more like a slightly odd workshop than a performance.

OOEL reproduced the time frame of one office day, running from 10,30am to 5,30pm. The work was divided in 'blocks' made of a different number of 'rounds', three in the morning and three after the lunch break. Each round consisted in a sequence of steps connecting eight workers[73]:

- 'intranet tracker' writes down the current volume of internet traffic on a post-it note, and passes the post-it to (fig. 3.47):
- 'CO_2 gatherer', who notes the measurement from the CO_2 meter and passes the piece of paper on to:
- 'correlationist' at the other end of the desk, who types the intranet and CO_2 into a computer spreadsheet and calculates correlation between them (fig. 3.48);

73 For visual score, see fig. 2.25.

3.51. *office of ecological labour*. Performance documentation, video still. Video: Louisa Love. 2 December 2014, Herbert Read Gallery, UCA Canterbury.

- ‘cartographer’ marks the two values on the timeline, registered on the continuous roll of computer paper (fig. 3.49);
- ‘internet painter’ fills the area representing the move between the two measurements with a highlighter (fig. 3.49);
- ‘CO_2 painter’ fills in the band between two CO_2 measurements (fig. 3.49);
- ‘flip charter’ marks the three variables on a plot chart (fig. 3.50, 3.51);
- ‘public relationist’ publishes the three variables (internet, CO_2, correlation) via twitter and facebook (sitting on the right, fig. 3.51).

Each step was materially marked by the passage of the post-it note from one position to the next. At the end of each round, the ‘public relationist’ would stick the post-it onto the wall (fig. 3.54). Then the ‘internet tracker’ would start a new round.

The performance consisted of six blocks made of 9, 12, 3, 8, 10, 4 rounds (fig. 2.27). As we performed, the rounds varied greatly in length, from 3 to 7 minutes, on average between 4 or 5 minutes. The effective engagement of the ‘workers’ was periodical, it consisted of one circumscribed action that was rather simple and quick. Once the performer did his/her part, there was plenty of free time to play with phone, chat, walk around, browse the literature, etc. After several warm-up rounds at the start, the linear progression of the score was through agreement sped up a bit so we started overlapping the rounds. This was spontaneous and decided on the fly, as it was simply too slow to wait for 4 or 5 minutes in order to perform something which takes only 10 or 15 seconds and than wait again. We were discovering and adjusting to a rhythm we could sustain.

As seen in the score above, the main activities had to do with data gathering, processing, marking. Different standard formats for working with data were used: accumulated area graph, a plot graph, and a spreadsheet. Graphing and plotting were performed by hand, emphasising manual labour. This, as any

3.52. Mindfulfillness meditation, *office of ecological labour*. Performance documentation. Photo: Louisa Love. 2 December 2014, Herbert Read Gallery, UCA Canterbury.

other activity in the performance could have been automatised and done by digital sensors, lines of code, printers, projectors, but we were performing sensing/printing/computing, together and next to some computers.

At the end of each block, the whole group performed an 'outset exercise', an activity intended to suspend the data tracking activity and invest us into the reproduction of atmosphere. The length of each exercise round corresponded to the number of rounds in that block, so, for example, after 12 rounds we 'outset' for 12 minutes. There were two possible modes of 'outsetting', and the choice was determined by the degree of correlation resulting from the previous measurement block. Correlation coefficient that we used ranges between -1 and 1[74]. If the correlation was negative, we performed a 'mindfulfillness' exercise, we had to slow down more in the face of uncertainty (fig. 3.52). CO_2 because or despite the decreased internet use, or, even weirder, the internet traffic was rising as the CO_2 was decreasing. To process this, the workgroup sat and watched/listened to one of the mindfulness breathing exercises downloaded from YouTube. In case of positive correlation, we performed 'aerodynamic' exercise (fig. 3.55, 3.56). According to the data, that meant that indeed the internet traffic and the atmosphere were correlated, i.e. if the traffic decreased, the CO_2 would start falling. We followed a set of aerobics dancing exercises from the web, performed at a speed corresponding to the ratio of correlation[75]. Quite the opposite; here exercising is an intense entangling with the atmosphere, the more we exercised (and used internet less), there was a better chance that CO_2 concentration would get back to lower level. Since measurements in either case did not go even close to -1 and 1, our exercises were always based on weak signs of correlation.

74 In the project we used the Pearson product-moment correlation coefficient, which indicates linear correlation between two variables in the range between -1 and 1. 1 is a total positive correlation, which means that both variables rise or fall in sync, 0 means that there is no correlation, and – 1 is a total negative correlation, i.e. when one variable rises, the other decreases, or *vice versa*.

75 The aerobics videos were played at one of the three different speeds: 0.6 (slow), 0.75 (medium), and 0.9 (fast) of the original. If the correlation was 0 - 0,33 we would dance to the slow version of the video, if it was 0,34 - 0,67 the video was played at medium speed, and so on for the upper echelon of correlation.

3.53. *office of ecological labour*. Performance documentation, video still. Video: Louisa Love. 2 December 2014, Herbert Read Gallery, UCA Canterbury.

Beyond humans, the distributed architecture and infrastructure of the internet was doing its work[76]. The desk at the centre of the working space was also the site of gathering of a group of extra-human bodies. Occupying the central part of the table was a mini-garden composed of twelve *Saribus rotundifolia* or Footstool palms[77]. These palms were the silent part of the workforce in the performance (fig. 3.45). The concern of posthuman polytics—how to reassert and maintain autonomy of other-than-human bodies—was here acknowledged through vicinity but not interference. Instead of being brought into interaction with humans (beyond the breathing intra-actions), the plants withdrew into their busy world[78]. The autonomy of the other ubiquitous extra-human bodies—molecules of carbon-dioxide—was affirmed by the fact that the 'CO2 gatherer' was the only worker without a specific position (a chair), and was invited to roam about the space and 'follow' the molecules with the CO2 meter.

Following the principles of contemporary creative work, contrary to the silent professionality of a stage performer, OOEL created a lively atmosphere. Chatting was 'allowed', as well as use of smartphones. Throughout the piece, i engaged in conversations about the topics of the performance, and the participants explained the details to the visitors. One major decision that i took collectively with the participants was to swap positions after each round. Therefore, what at first sight may have turned out to be a Taylorist factory, became a dance between the fixed positions. By the end of the performance, everyone took parts in all the different stages of the process—tracking, graphing,

76 In the initial draft of the project, i planned to include the ICT infrastructure into the installation, placing one of the University servers in the gallery. IT department of the University dismissed this possibility, so the internet infrastructure remained in its (invisible) place, which is in effect the usual state of things.

77 Beyond its excellent air purifying capabilities, footstool palm's rich foliage is the unofficial symbol of the Philippines, which is an important nexus in the production of IT components and circuits, as well as global networks of labour migration.

78 In the initial drafts of the performance, which were outlined before *counting live stock(s)*, the palms would have a number of light sensors (the interface used in *dancing ecologies*). In this scenario, the performance would have triangulated the internet use, solar power (corresponding to the degree of photosynthesis), and CO_2 concentration. In view of the encounters with sheep in Zlatibor, i have grown convinced that palms are already doing more than enough, and there was no need to extract anything more from them. They did not need a (technologically mediated) voice, they were already fully expressing themselves in their own molecular biospheric-atmospheric entanglements, and other ways less known to us.

3.54. Data measurement post-its, *office of ecological labour*. Performance documentation. 2 December 2014, Herbert Read Gallery, UCA Canterbury.

tweeting, etc. Some participants had never filled in a spreadsheet before, or even tweeted, or plotted graphs, so these simple skills were learned on the go. More than an office obsessed with agonistic efficiency, performance looked more like a semi-chaotic laboratory or workshop. The result however was not 'science in action', but a prefiguration of posthuman intra-active knowing.

3.5.c. Planetary situated-dispersal

OOEL tried to enact a performativity of knowing in an expanded posthumanist continuum. The performance relied on the statistical tool of correlation in order to both trace its inherent limitations, and also to put it to unexpected, naïve and playful uses. The performance embraced various degrees of statistical uncertainty in order to become responsive to what we did not know, and to what is not ours to know, but that is known. This outside-within is all the inhuman knowings that support our world-making projects. The mere fact that the internet exists and 'works' is deeply entangled with the creativity and artistry of matter that has been able to self-organise itself, and keeps doing so. OOEL was a celebration of the creativity of the worlding projects that supports ours, but are rarely acknowledged and are mostly suppressed.

From where we were 'in particular', with our bodies we attempted to intra-act with the atmosphere, the part we could touch and were touched by, and with a human-made information system, the segment with which we were involved locally. By doing so, we intensified the unsuitability/unsustainability of representational epistemology which thinks itself as separate from the bodies it refers to. The performance tried to reorient a statistical interface into *a collective material-discursive bodily practice of in/determinacy*. The in/determinacy is a property of how world 'comes to matter', not of a network or a body. Information and communication infrastructures, though currently disposed towards determinacy, because of their entanglement with multitudes of other bodies, are constantly in touch with chaosmic forces. How to co-

3.55. Aerodynamic exercise, *office of ecological labour*. Performance documentation, video still. Video: Louisa Love. 2 December 2014, Herbert Read Gallery, UCA Canterbury.

perform with the wavering field of quantum forces (Barad, 2012), or DG's 'chaos' (1994), is a question of commoning with the matterings/withdrawals of other bodies. DG claim that art begins with 'enframing', or 'text/context' in Derrida, a drawing up of a territory from chaos. However, it is chaos or context that affords the creation of the territory, it supports the practices that happen inside the frame. How to render justice to this generosity of the universe is a question of posthuman commoning.

Capitalist-informational apparatuses are worried about extracting meaning and power from the buzz of liveliness. By doing so, they background and suppress the very possibilities that make them possible. This is primitive accumulation at heart of informational industries of the day. In order to do differently, to create more just apparatuses both for human and extra-human bodies, instead of consistency and (cyber)security, apparatus must be turned *away from itself*. Through the withdrawal on the level of the apparatus, of its boundary-making cut, it renders itself open to the indeterminate. Indeterminate here stands for what other bodies know, possibilities of becoming that are either suppressed or merely withdrawn in the apparatus. Earth others know things that human-made apparatuses cannot fully understand, but this indeterminacy is co-constitutive of any human worlding project.

Making informational apparatuses response-able to the earth means taking in the affordances of matter *and* dispersing the power accumulated. This is how human worldmaking projects may participate in 'more-than-human sociality' (Tsing, 2015), by supporting other bodies' freedoms that we ourselves have been allowed to experience through, in this case, world-wide connectivity. The internet entangles earth, atmosphere, human bodies in unprecedented ways, and with this comes a radical responsibility and accountability. With a relentlessly critical eye on capitalist projects that screen and harness this reality, absolute hospitality of the universe is a reason for joyful affirmation. The world has already invited us to make more-than-human commons, the human body is already proof of this artistry (Grosz, 2008) or nature's creativity in 'writing itself' (Kirby, 2011).

3.56. Aerodynamic exercise, *office of ecological labour*. Performance documentation, video still. Video: Louisa Love. 2 December 2014, Herbert Read Gallery, UCA Canterbury.

Being implicated with modern technology means occupying earthly territory far and deep, but there are different modes of inhabiting it. One seeks consistency and power, the other one faces the indeterminacy. To me it seems that the second one is closer to the dynamics of matter and life. We are already multiply entangled with bodies we do not even know of, how to dissolve and disperse the powers accumulated through theirs and ours asymmetrically entangled efforts is a question of collective mattering/withdrawal. From the standpoint of the user or participant in the technological apparatus as powerful as ICT is now, these accumulated power need to be pulled away from themselves, to afford the possibilities of the universe to trouble the apparatus, to regenerate possibilities for bodies to come to matter, for me to write this text. Matter has been making itself more response-able to humans than the other way around, but this absolute hospitality can be exhausted. Exhausting the material possibilities of human and extra-human bodies that keep us going means, of course, decreasing the possibilities of life for the bodies that exhaust. The internet, because of its marvellous multiplicity of inter-bodily folding, has a potential to be re(con)figured into an apparatus that regenerates earth, a territory of the making of posthuman commons. This tension between extraction of life that takes place through information and communication technologies and how to invert and revert this process is one of the ubiquitous boundary-making protocols that, in my view, environmentalism and eco-oriented art practices should account for.

3.57. *we ♥ copper & copper ♥ us vol.1: #copper #love #maintenance*. Installation view, *Excavations*. June – August 2015, Galleri Augusta, Helsinki International Artist Programme.

3.6. Lives of metals

3.6.a. Minerals data dollars

Metals are the inner skeleton or infrastructure of human societies and technologies. Modern societies are profoundly metallic natures-cultures, and even our bodies are "walking, talking minerals" (Margulis & Sagan, in Bennett, 2010: 11). Human bodies are wired, internally and externally, technologically and physiologically, with 'metallic lives' (Bennett, 2010: 52-61), yet the dynamics of these intimate dependencies are comprehensively black-boxed, offshored, outsourced.

Computers and mobile phones are made of hundreds of chemical compounds, comprising dozens of chemical elements. Each information and communications technology device is a tiny mine of gold, copper, aluminium, platinum, rare earth elements and others (911 Metallurgist, 2013). Most of them are irreplaceable, at least on our planet (Graedel *et al.*, 2013). Elements forged through nuclear reactions of stars and supernovae, millions of years of interplanetary 'nonlinear history' (De Landa, 1997), gathered through mineralisations, are compressed into chips that run calculations in nanosecond velocities.

This immense processing power clearly does not come for free. The anthropogenic global warming and other forcings upon the planet are closely inter-connected with taking out of fossil fuels and other substances from the strata. Naomi Klein's viral slogan that we need to "keep it in the ground" (2014) refers to much more than oil and shale gas. Mineral mining that underpins ICT is an elephant in almost every room, result of intersectional pressures upon environmental and social ecologies. Wars are led for critical metals ('coltan wars' in Congo that took away millions of lives since 1998), tailing ponds of mineral mines spill out into surrounding waterways (e.g. massive chemical spill from a copper mine in Mexico, 2014), children are enslaved and exploited (World Vision, 2013), electronic and electrical waste is dumped in China, Africa,

3.58. *#copper #love #machine*. Installation documentation.

and elsewhere. If we extend the notion of 'conflict' beyond war to include other forms of violence, the question arises whether there is such a thing as a 'conflict-free mineral' and, by extension, a piece of ICT at all[79].

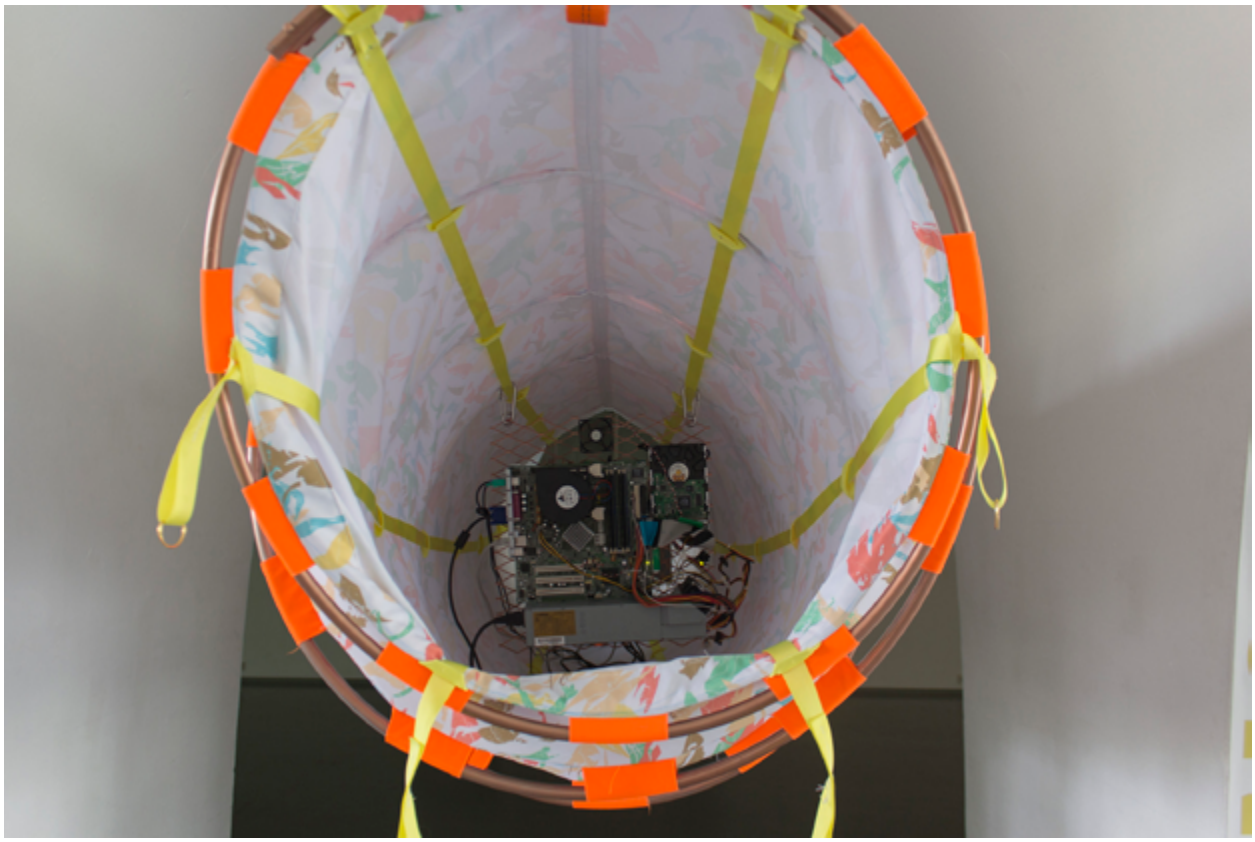
Beyond the mineral dependency, the workings of the ICT companies share a few other traits with the mining industry. For example, they '*mine*' data, big data. Beyond semiotic correspondence, i would like to argue that *mining* data is a linear extension or transposition of a logic that begins with the *digging* of the earths[80]. On the human end, internet users' activity is a resource, to be extracted, smelted (into datasets), sold, moulded into services, resold to the same or different users... The big data thirst of IT juggernauts in many ways replicates, upscales and transposes the craze of gold rush into the digital realm, with one important difference. Contrary to the limits of resource ecologies, one of the reasons for the immense financial success of IT has been an ideology that there are no boundaries to data growth. "Users will share more and more", thus goes Mr. Zuckerberg's mantra[81]. There is no material nor semiotic discontinuum between data and mineral mining, they are part of a unique extractivist mindset (alike what Brett Bloom calls 'petro-subjectivity'). Extraction is hard-wired into the most mundane daily intra-actions with ICT devices and beyond. Foucault's understanding of power crystallises with ICT technologies, which disempower and empower through the same wires. However, earths are in these networks always on the deprivileged end of the apparatus.

These are some preliminary thoughts from which the first leg of my residency

79 The 'conflict mineral' is a policy/activist approach that a number of NGOs used to varying degrees of success since about 2000. (Kinniburgh, 2014) The campaign, started by the U.S.-based Enough Project in 2007 has indeed reaped success when the U.S. Congress passed a financial bill which asked all the companies registered on the U.S. stock exchange to reveal if their products contained conflict minerals from the Democratic Republic of Congo (DRC). However, Kinniburgh argues, the 'conflict-free' approach also complicated matters on ground. In this context, it must be noted that ICT industries are often at the very end of labyrinthine supply chains, which results in IT sector rarely getting bad press on this issue.

80 I use 'earth' in plural to indicate mining of mineral rocks. In this i am referring to the chemical group of elements of 'rare earths', one of the most sought after ICT elements. With this pluralisation of the term i wish to keep present the radical plurality of mineral ways of being. Earth is made of many earths, geology is a pluriverse of ways of becoming.

81 This prophecy seemed true for most of the first decade of Facebook's operations. However, in April 2016, it was revealed that users are sharing *less* personal information.



3.59. *#copper #love #machine*. Installation view.

with Helsinki International Artist Programme (HIAP) began in April 2015. These considerations grew from the work on *office of ecological labour*, and with *lives of metals*, from atmospheric realms i will move into the domain of lithic bodies.

Finland is a country widely known for its high-level education, as one of the early leaders in the ICT sector (Nokia), and for its forests that cover no less than 72% of its surface. But, there are processes that decisively trouble these popular narrative of what the North is. Finland's mineral reserves are not particularly rich, nevertheless, in line with a larger Scandinavian trend (Vidal, 2014), recent Finnish governments have worked towards enhancing prospects of extraction industry. The country has eventually managed to establish itself as one of the world's prime mining destinations (GTK, 2015).

Finland's earliest modern mines date to 1540, thus, as most of European countries, it participates in histories of metallic industry. Of even greater interest is that extraction is acknowledged as a national present-future interest. As of June 2016, there are 5 gold, 4 base metals, and 1 other metal mines in operation, not including non-metallic types of mining. Further to present operations, there are dozens more of explorations claims and permits, trying to materialise futures of extraction. Finland as an attractive mining destination is premised on a permissive and efficient mining regulation, advanced infrastructure, human resources, and highly detailed geological datasets. The state-run Geological Survey of Finland (Geologian tutkimuskeskus, GTK) surveys geological strata and estimates the potential reserves or so-called 'undiscovered resources'. All the highly elaborated data is made available open access on the GTK's website. This data is an attractor for mineral hunters/explorers and investors from across the globe[82]. As a result, "[c]urrently, about 15 per cent of Finland's surface area is one way or another reserved for mineral prospecting and mining" (Grundström, 2014). As a background noise to these developments hovers the massive environmental

82 Curiously, one month after i had completed this part of research, a major new monograph in English about the economic potential of minerals in Finland was published (Maier, Lahtinen & O'Brien, 2015). Many eyes are looking at Finnish bedrock.

3.60. *#copper #love #machine*. Installation view.

disaster caused by leaks from tailing ponds of the then part state-owned Talvivaara mine in 2012 and 2013. This disaster is still ongoing, polluting lakes and rivers, yet, despite popular protests, the extractivist tide seems to continue unabated[83].

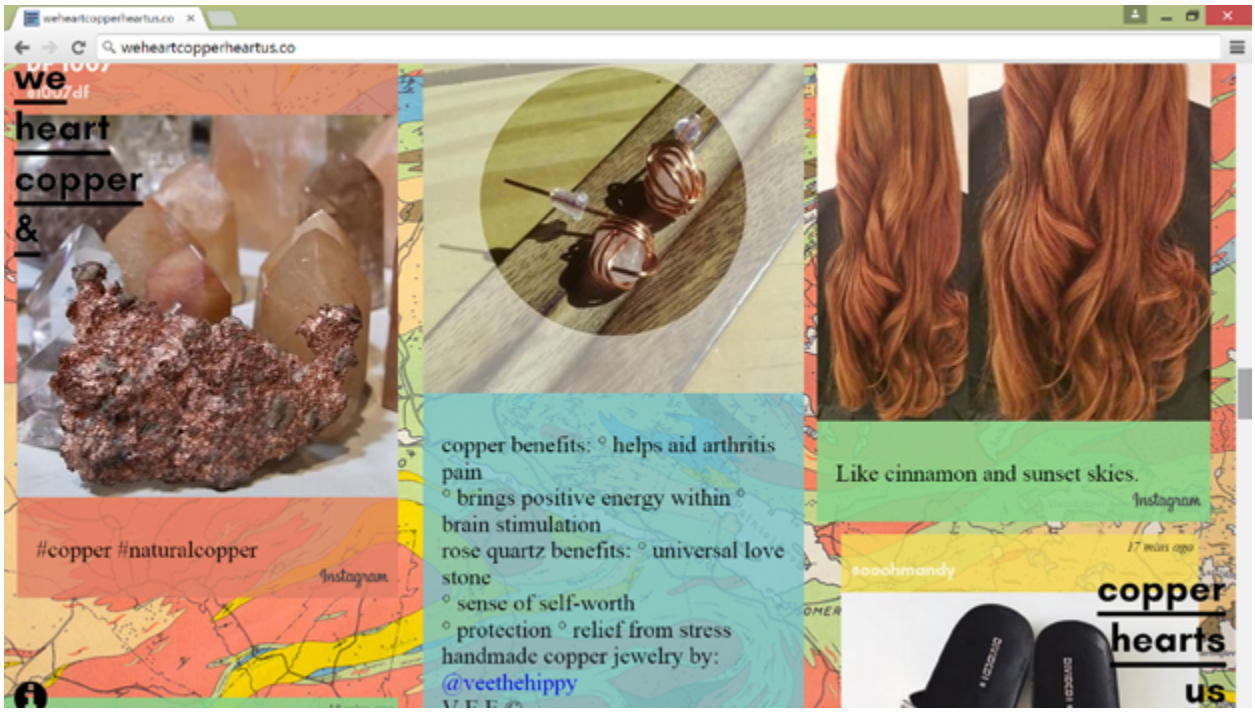
As a parallel process, big data boom has landed into the country in grand style with Google's SF-ish data centre at Hamina, a designer conversion of an old paper mill right on the shore of the Baltic. Across the sea, in Luleå, North Sweden, Facebook built its own gigantic green data centre, the first one the company owns in Europe. Data needs air and cool (Parikka, 2015), resources easy to come by in the European North.

Data and minerals shape convergent or divergent futurities of Finland, different modes of occupation of land and distributions and divisions of labour. *we* ♥ *copper & copper* ♥ *us* springs from this mesh of data, policies, financial interests, and geological strata. Data is made of minerals, and minerals' presents and futures are impacted by data. Can we repurpose the data⨯minerals deep yet suppressed lineage/linkage, reorient it towards more just naturalcultural present-futures?

To make my way through this intricate mess/h, i followed the traces of one extra-human character. Through the circuits of electronic devices, collective imaginaries and my personal nonconscious desires, i was charmed by copper, one of the longest-standing companion elements of humans[84]. Copper (Cu), chemical number 29, has been mined for about 10,000 years, and, even today, it is one of the most widespread conductors of power and data. Biologically, it is indispensable for the health of vegetal, animal, and human bodies. Its economic/technological importance is such that its price is often quoted as an

83 During my stay at Helsinki, i attended several symposia at the University of Helsinki concerning extraction industry in the country. Mining is a topic around which intense activist and academic activity is taking place, especially after the Talvivaara disaster. These academic and activist debates highly influenced my project and impacted the analytical outlook of the research in complex ways. This will become clearer in the project narrative of *mineralizacija* (see 4.6.d.).

84 "The medieval noun-verb …. *charm* [combines] arousal and capture with materiality (a charm is a piece of jewelry or a magic object) and inherent dynamism (a charm is a spell, words come to life, deriving from Latin *carmen*, 'song'." (Cohen, 2015: 132)



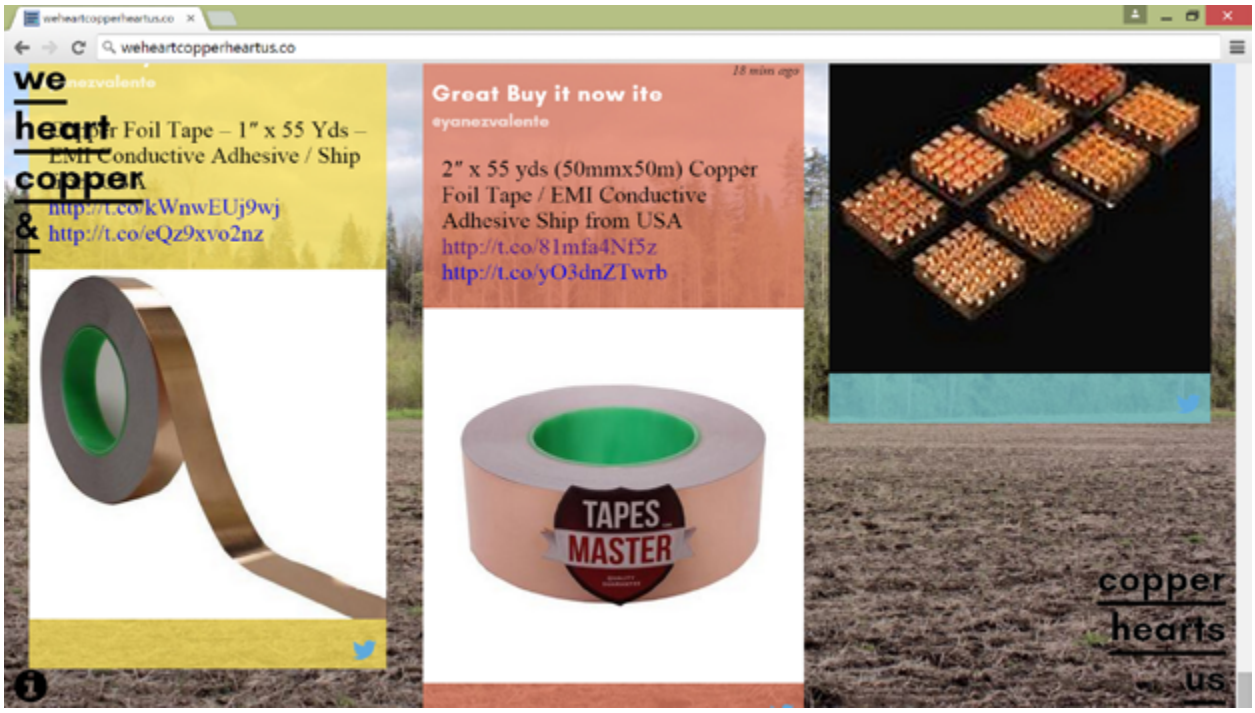
3.61. *weheartcopperheartus.co*. Website screenshot, *we ♥ copper & copper ♥ us vol. 1: #copper #love #maintenance.*

indicator of the well-being of economy. Its possible scarcity is a source of concern, a sibling of 'peak oil' is 'peak copper'. According to EU, it is not considered to be one of the 'critical metals' whose availability is under pressure, but the contemporary techno-society is by all means unimaginable without copper. Beyond its chemical properties, engineering usages and technical applications, how do we humans truly think and feel about this shiny element? It has been a faithful companion to humans, but there is more to it than meets the eye and the electrical spark. *Lives of metals* is an inquiry into the mental and material ecologies that bind copper and humans, a sounding of patterns of desire that run across the organic–inorganic divide and a poetic speculation on alternative affects in common these different bodies might evolve.

3.6.b. *We ♥ copper & copper ♥ us vol. 1: #copper #love #maintenance*

with Mikko Laajola, Romulus Studio, Siru Juntunen
time / location: April — June 2015. Residency with Helsinki International Artist Programme (HIAP), Helsinki. Exhibition *Excavations*, 13 June — 30 August 2015
media: installation, website

#copper #love #maintenance explored the futurities of copper extraction in Finland as well as the present passions of humans with the metal. The complicated entanglements of the element pushed me to work across subjective, social and inhuman ecologies, creating difficult (im)balances between critical and creative, objective and poetic, visual and discursive modes. What before was clearly philosophical inquiry started seeping into the performative modes, theoretical statements started forming a poetic/cosmological core of the praxis. To try to intra-act with the scales of economic, historical, and, foremost, geological processes, the temporality and spatiality of the work itself started



3.62. *weheartcopperheartus.co*. Website screenshot.

dilating. *Lives of metals* is still an open project, some parts of it had already materialised, but some significant lines will come to fruit in summer 2017, and even beyond. Becoming occupied by earths is humbling and challenging for the relatively short timespans of art and research.

Lives of metals started with a question: how to detour the dominant imaginary of extraction presented as economic inevitability in Finland and beyond? On the web site of the Geological Survey of Finland, in the section Green Mining, it is stated:

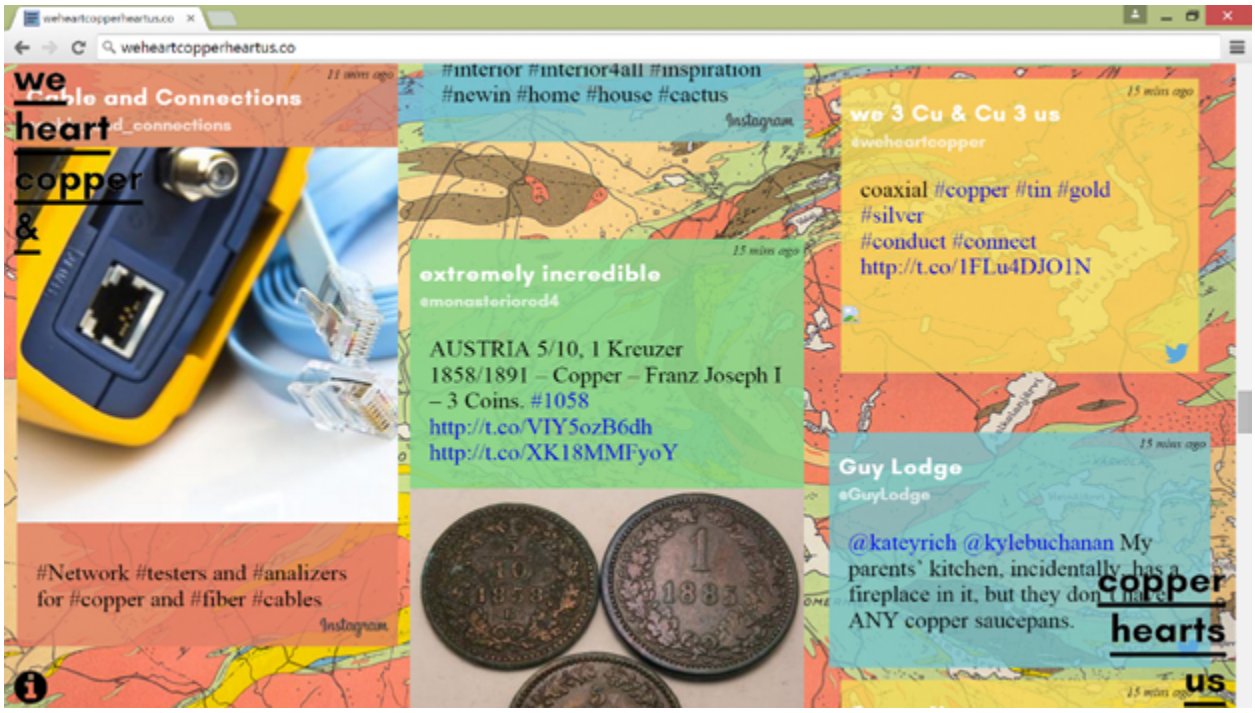
> In order to ensure the availability of mineral resources for future needs and to fulfil the so-called 'mineral debt', we must continue mineral exploration actively and develop our exploration and utilisation methods. (GTK)

Mining is about extracting past to produce a certain type of future. What other futures are possible? I deliberately chose *not* to focus on ongoing mining operations, and to look what may yet come to be, at the border between the possible (exploration) and the virtual (the earth).

Mineral exploration is like looking for a needle in a haystack. Massive resources need to be streamlined into exploration if the company is to have success (a discovery). In parallel with the existing operations, which cover hundreds and hundreds of square kilometres, geologists cover much larger areas. A mine can be in anyone's backyard, clearly someone's more than other's. As in most of the other places in developed countries, looking from the urban perspective, in this case from Helsinki, mining is commonly believed to take place somewhere beyond yonder. Fair enough, most of mineral mining in Finland at the present takes place in the far north, often in Finnish Lapland[85].

At a closer look, the picture is not as clear-cut. Modern mining in Finland, from

85 As it happens too often in the global South *and* North, these remote (resource) frontiers are not as void as the extractivists would have it. In the Finnish North, the extraction industry is drastically at odds with the livelihoods of local indigenous Sami population (Nimtz-Köster, 2012; Vidal, 2014). This is one of the less visible borderlines along which more-than-human futures are being struggled for.



3.63. *weheartcopperheartus.co*. Website screenshot.

the 16th century on, developed in the deep South of the country. *At the moment, there are only a couple of working mines in this part of the country, but there are a number of potential prospect zones or 'permissive tracts' in which lie 'undiscovered deposits'*. What stroke me is that in the maps depicting permissive tracts, no features of the land are presented. Forests are absent, and only large cities are marked.

From the previous considerations about minerals—data entanglement, the operative question of the inquiry became, *is there a way to work with data in order to withdraw extraction*? To begin with, GTK's data is open-access for everyone to use, not only geologists and extractivists. The same reports published on GTK's website, such as *Quantitative mineral resource assessment of nickel, copper and cobalt in undiscovered Ni-Cu deposits in Finland*, provide indices where to plant a geological hammer. Or to intra-act with mineral bodies differently.

Sieving through numerous open-access reports of the Geological Survey of Finland, i 'discovered' a number of places that were drilled for exploratory purposes in search of copper. However, these have been only preliminary explorations, which did not turn into mining operations, yet. Minerals are almost there. Notoriously, as struggles around extraction all across the globe have proved all over again, land ownership is not a guarantee that would divert mining apparatuses. Almost always there is a way to overturn the ownership rights in court, even in the North[86]. Based on this, it seems that little can be done *once the mineral body has been 'found'*. What if it is not found in the first place? What if the indeterminacy of its proximity is instead acknowledged, and there are other nonviolent modes of intra-action that would divert from engaging in extraction? What if these became places where humans and minerals meet outside the logic of domination? Places where humans can revel in the liveliness of the earth's strata and take time to develop different modes of

86 A recent case in Finland is the construction of a nuclear power plant in Pyhäjoki in North Finland. Despite the fact that the locals owning land collectively refused to sell their land in the Hankihivi peninsula in question, the Supreme Administrative Court of Finland ruled against, thereby opening to construction and land evictions.

3.64. *#copper #love #maintenance*. Performance documentation. 17 June 2015, Galleri Augusta, Helsinki International Artist Programme.

desire.

So much of human expression is now inscribed in the rocks, as we speak through wires and data. Sometimes, this data speaks about rocks. I wished to acknowledge the material support of this expressivity and, through this recognition, to incite experimenting with different material-discursive proximities. The project actualised into #copper #love #machine[87], a nomadic data server hosting a web site, a material-discursive apparatus dedicated towards remembering and amplifying human passions of humans towards copper (fig. 3.57 – 3.60). *Copper minerals in electric circuits turn attention to their own materiality as rocks*. This is an inhuman performance, rocks embedded in electrical circuits conduct human affects, and, in turn try to rewire human passions. The true knowing, however, here belongs to the metallic bodies, as i will explain shortly.

One line of work consisted in visiting exploration sites drawn from the maps of the Geological Survey of Finland (fig. 1.33, 1.60, 1.87, 1.90, 1.94). In parallel, an online copper mine was developed in collaboration with the web design studio Romulus Studio. The weheartcopperheartus.co website is an aggregator of public conversations about 'copper' from across the social media (twitter, instagram, tumblr) (fig. 3.61 – 3.63.). The script looks for all the mentions of the word and collates the posts together. The posts are juxtaposed over the images of the exploration sites in Finland, as well as the geological maps of these areas. The page is updated every 5 minutes, so the website is a near-live feed of what (online & social-media active) humans currently say about the element.

The second component of the work was the making of a container for the data server, a nest for the nest. An alternative to the hyped 'cloud computing' is to host data locally. The online mine was set up on an oldish upcycled PC, dug out from a bin, hacked out of its box and turned into an up-and-running web server by Mikko Laajola. As well as bringing the web back home, another intention was to open the sealed architecture of the common data centre architecture. Namely,

87 A spin on Deleuze and Guattari's popular but, in my view, highly problematic notion of 'war machine'.

3.65. *#copper #love #maintenance*. Performance documentation. 17 June 2015, Galleri Augusta, Helsinki International Artist Programme.

data centres are often housed in nondescript suburban buildings with no signage, something which clearly goes against all that internet stands for, or should[88]. Since "data need air" (Parikka, 2015: 39), why not open the wires and servers to the atmosphere?

#copper #love #machine is visually a hybrid of a dog agility tunnel, hoola hoops, a nomadic yurt, a cable shell and a wind tunnel. Instead of a box, the structure emulates a cable with copper heart at the core, which is the most common appeaerance of copper in everyday context. The skeleton of the tunnel is a single spiral of PVC tube bent to produce a cylinder of about 75cm in diameter. The tube carries a fabric emblazoned with digitally printed camouflage-like pattern, composed of shapes extrapolated from Finland's geological maps (fig. 3.58). Thanks to the skills and vision of fashion designer Siru Juntunen, my messy sketches and prototypes materialised into a solid piece of soft infrastructure. The tunnel was furnished with seven ratchet hooks at each ends, with internal straps running throughout the tunnel. This belt architecture allows it to be suspended, thereby keeping its territory volatile. Two pairs of internal loopholes were used to hang the server computer and a monitor showing the website inside the tunnel. Hence, #copper #love #machine was an apparatus composed of the website, the server and the tunnel.

This DIY data server/tunnel landed the website locally, while continually feeding its content from the web. Following the proprietary guidelines of social media platforms, all the posts presented on the website are only links to the original posts using the <embed> feature[89]. On the other side, as the website is powered by platinum, copper, silicon, gold, aluminium, and many other extra-

88 For a glimpse of data centre aesthetics, it is illustrative to do a web search for 'Utah Data Center', the data storage of the NSA surveillance programme, whose existence was leaked by Edward Snowden. After that, it is interesting to web search 'data center building' in general to see that the majority of data centres perpetuates a similar aesthetics of windowless anonymity and enclosure. Data is the new treasure kept in highly policed vaults.

89 On a very small scale the tunnel replicates the archiving of tweets that National Library of Congress at Washington and the British Library have been planning to do. The Library of Congress in 2010 announced that it will start archiving all the tweets generated since the inception of the service in 2006. As of 2015, the project is in limbo, apparently for technical reasons. The British Library's plan is more down to earth, as it envisages conserving only the UK geo-tagged tweets. For the limitations of our hosting service, the #weheartcopper archive covers only 30 minutes of timeframe.

3.66. *#copper #love #maintenance*. Performance documentation. 17 June 2015, Galleri Augusta, Helsinki International Artist Programme.

human bodies, this is also a place where *they, earth others* can potentially track what *we, humans* think about them. And some curious and varied things do 'we' think about 'them'. On the one hand, in 2015, copper was all over the news as it plunged into the 'bears market', reaching 6-year lows on commodity markets. On the other hand, it was trending in areas such as fashion, jewelry, IT and interior design, as well as being a very popular hair dye. This surprising media presence of copper reveals the ambiguous status it has, comparable culturally only to gold, the only other 'coloured' metal. It is discussed a lot, but this buzz does not make it into a social actor, as it is mostly invoked as commodity, material or decoration. But is it only that? What transpires while following the feed is attention and care that humans direct towards the element, potentially there more going on beneath the quotidian instrumental relations. Copper is an element close to heart, and this mental ecology is in my view a crucial existential territory for more just earthly cohabitations[90]. Processes of desire emanating from the extractivist subjectivities participate in a common humans—earths affective field that may be more stratified than the Technosphere itself. These nonconscious, conscious and affective strata may provide openings to re-imagine the agential cuts currently determining asymmetrical roles in human-mineral relations.

#copper #love #machine was exhibited as part of *Excavations* exhibition at Galleri Augusta, Helsinki. Since the launch of the show, my ongoing drifts into the world of metals have been coagulating into intermittent tweets, that thus occasionally blink on the website itself. As part of *Excavations*, on 17 June, together with the BodyBuilding Project, a collective participating in the show, we organised *CONVEY: 12 hours of shared practice*, a joint event where i performed *#copper #love #maintenance*, first of the various earth-oriented performances that continue (fig. 3.64 – 3.66). *#copper #love #maintenance* was an experiment in story-telling, another mode of embodied documentation of sprawling research vectors. It references Mierle Laderman-Ukeles's

90 The title of the work itself crystallised at some point through the multi-layered research and production process, when i perceived the extent to which humans are strangely attracted to the the 'red metal'. This aspect will be explored more extensively in the next phase of this project, in a context where the metal is part of daily life.

3.67. After *#copper #love #maintenance*. Installation view.

Maintenance Art works of the 1960s and 1970s. In this case, maintenance of #copper #love #machine is more affective, than technical. The performance consisted in reading various bits of discursive material gathered in the process, from geological data to industry statements, traversed with poetic matter-realist musings about copper life. In parallel, i was wrapping the straps of the tunnel in copper tape, which me and audience members stretched at the end therefore wiring the bodies with #copper #love #machine. This story-telling performance has since become an iterative practice of bringing the news back to the gallery, and it will keep re-occurring throughout the successive stages of *we ❤ copper ❤ us* project.

The project marked a move towards creating assemblages that can perform without human bodies involved. Weheartcopperheartus.co website follows an ever-evolving reality of online engagements of humans with copper, spanning beyond any single body's performativity, a flow of consciousness about the metal, afforded and transmitted by the metal itself. In fact, the first tweet on my @weheartcopper account was "hello #copper world! // message kindly transmitted by copper & a constellation of fellwow minerals //". At certain moments and in certain locations, this information flow can be joined by a human body performing intensive acts of maintenance.

The questions that this phase of *we ❤ copper ❤ us* scratched and that will be taken forward are:

> can the position of minerals be re(con)figured into assemblies of humans and extra-humans other than linear demand-and-supply chains? how to detour futures from the narrow-mindedness of extractivism? what kind of novel alliances of rocks and human body can be imagined? what other desires than possession and use can be stirred up towards inorganic earth others?

#copper #love #maintenance was a prelude to a longer project that had since evolved into the key piece of this research, which i will talk about in the next

3.68. *weheartcopperheartus.co*. Website screenshot.

section. Beyond that, i would like to note that the one part of the project is to situate #copper #love #machine on top of the undiscovered deposit in a gesture of protection, where minerals themselves will cover their kins that live in the ground[91]. In May 2016, as the outcome of the second leg of my Frontiers in Retreat residency at Helsinki International Artist Programme, i have organised a symposium *earth wants to be free: on rights, autonomy & freedom of other-than-humans* in the island of Kemiöonsaari in the South-West of the country. The symposium invoked a group of about 20 artists and researchers who engage in 'shared conversations' with extra-human bodies. Over two days, we visited two old mines, Klovakärrsgruvan (1558, 1744) (fig. 1.20, 1.68, 1.92, 1.96) and Östergårdsgrufvan (1877) (fig. 1.25, 1.66, 1.84, 1.89), where we presented and discussed our individual artistic, research and living engagement with extra-human bodies[92].

91 *#occupy #withdraw #earth,* the working title of this performance, is expected to materialise for the final Frontiers in Retreat exhibition in summer 2017.

92 These conversations helped crystallise ideas that await follow-up beyond the doctoral research itself.

3.69. Rudna Glava, prehistoric mining site, *we ♥ copper & copper ♥ us vol.3: mineralizacija*. Video documentation. Majdanpek, Serbia.

3.6.c. Where copper lives: first strata of a biopic

There is no yet known way to build a smartphone or basically any informations and communication device without turning earths upside down. A zig-zaggy yet continuous line runs from mines to electronic waste, and enormous piles grow by orders of magnitude in dumpsites, especially in Africa and China[93]. The voices are that the future of mining lies in 'urban mining', since astounding amounts of ICT devices are "left to gather dust in the drawers" (Nichols, 2015)[94]. Between these two extremes—extraction and recycling—of the mineral–ICT supply chain is where the second stage of *we ♥ copper & copper ♥ us* situate itself.

The back of any iPhone notoriously (or laconically) tells "Designed by Apple in California Assembled in China", supporting the mainstream imaginary of a globalised economy with a neatly cut hierarchical division of labour. The West designs, and the East or the South manufactures. What is invisibilised in this landmark statement is *where the materials come from and where do they go afterwards*. The entire periodic table is in our pocket, as

> A century ago, or even half a century ago, less than 12 materials were in wide use: wood, brick, iron, copper, gold, silver, and a few plastics. Today, however, substantial materials diversity in products of every kind is the rule rather than the exception. … This use of materials is not a whim of the designer, but a carefully calculated effort to achieve increasingly high performance in products simple to complex. (Graedel *et al.*: 2015: 6295)

93 According to United Nations Environment Programme, the Waste Electric or Electronic Equipment (WEEE) or simply 'e-waste' is the fastest growing material stream of waste on the planet. A 2015 report from the UN University estimates that about 90% of the global e-waste is illegally traded or dumped on the world level (Nichols, 2015). In 2014, 42 million tonnes of e-waste was produced (ibid.)

94 'Urban mining' has become a magnet for business opportunities, but, has come under radar of media art practitioners. Some of the projects i mentioned in Part I, especially Revital Cohen & Tuur van Balen's artificial minerals, and Jonathan Kemp, Martin Howse and Ryan Jordan's *crystal world* are instances of urban mining.

3.70. Flash furnace, Smelter of Mining and Smelting Combine Bor (RTB Bor). *mineralizacija*. Video documentation. Video: Duško Jelen. 13 January 2016, Bor, Serbia.

A computer chip contains more than 60 elements, out of 83 stable (nonradioactive) elements (Rohrig, 2015). Supply of the whole periodic table demands tentacular regimes of supply embracing the whole planet, penetrating deep times and inner spaces.

What is specific about copper is that it does not lose any of its properties through recycling either from raw state or from devices. Copper is meant to last into eternity[95]. Copper is thus a potential mediator of deep futures in common between humans and the earth. The minerals thirst is however hard to quench, and demand and supply have risen vertiginously over the last 100 years[96]. As the ore grades generally tend to decline in all mines, ensuring the availability of the metal means digging wider and deeper, but it is thought that 'peak copper' will arrive when extraction might become uneconomic.

One of the less suspecting places where ICT technologies are materially born is the city of Bor in East Serbia, home to a copper and gold mining and smelting district. In the Bor-Majdanpek mining district, or, geologically speaking, Timok Magmatic Complex, copper lives for about 85 million years. In this region, humans have been crossing paths with the red metal for about 7,000 years. Bor is one of the borderlines where natures and cultures are being cut together and, with much more fierceness, apart, by apparatuses of extractive capitalism.

Following *#copper #love #maintenance*, as part of the same project Frontiers in Retreat, i was invited by KC Grad (Belgrade) to continue work on *lives of metals*. The organisation, with support from the Ministry of Culture of Serbia, arranged for me to get a chance to visit the operations of Rudarsko-topioničarski basen Bor (RTB Bor, Mining and Smelting Combine Bor). RTB Bor consists of three open-pit mines and one underground exploitation.

95 An estimate says that as much as 80% of copper *ever mined* is still in use (Copper Development Association). About 33% of today's copper production is derived from the existing stock (International Copper Study Group, 2014: 51).

96 "Since 1900, when world production was less than 500 thousand tonnes copper, world copper mine production has grown by 3.2% per year to 18.1 million tonnes in 2013." (International Copper Study Group, 2014: 11)

3.71. Old slag. Smelter of RTB Bor. Video documentation, *mineralizacija*. Video: Duško Jelen. 13 January 2016, Bor, Serbia.

Escorted by the members of the press team of the company, i was given a unique tour through different stages of production and refining of ore[97]. Field trips into the industry were supplanted by a crash course in metallurgy through dialogues with Dr. Mile Dimitrijević and Dr. Aleksandra Mitovski of the Technical Faculty in Bor.

For the dynamics of the performance it is relevant to understand key steps of mining and metallurgy. One of the places where ore is taken from the ground is Veliki Krivelj, the deepest and widest of the three open-pit operations of RTB Bor. The sheer volume of the hole made by dynamite is beyond visual imagination, the huge trucks carrying 220t of ore each look like tiny ants milling slowly along the terraces spiralling the pit[98]. I feel like Alice in this mine land. It dawns on me that humans indeed display geologic capacities. No photographs or a geological epoch proposal could have prepared me for the scale of operations that invisibilise earths.

After extraction, a series of metallurgical operations are put to work to concentrate elemental particles distributed in the ore. The ore in Bor district contains around 0,3% of copper, whereas the market standard for copper as a delivered commodity is 99,99% pure copper. Enter metallurgists, who perform this magic of converting rock into metal. In the earth's strata, copper creates two basic types of chemical compounds: oxides and sulphides. In Bor area, copper lives primarily in sulphidic mineralisations, to which are applied pyrometallurgical production processes. After ore has been mined, it is crushed (comminuted) into powder, which is then processed through froth flotation. Pulverised ore is sank into water and a chemical reaction separates a number of elements considered impurities, which sink to the bottom of the pool, while the concentrate of red metal remains in the surface of the pond. The copper concentrate now contains c. 20% of the metal. The remaining material on the

97 My thanks goes to Gorica Tončev Vasilić, Ljubiša Aleksić and Jasmina Stanojević of the Press team of RTB Bor for their hospitality.

98 For example, in August 2015, from the pit in Veliki Krivelj the company extracted astounding 900,000 tonnes of ore (of average 0,27% concentration of copper).

3.72. Electronic and electric waste recycling factory, *mineralizacija*. Video documentation. 5 January 2016, Niš, Serbia.

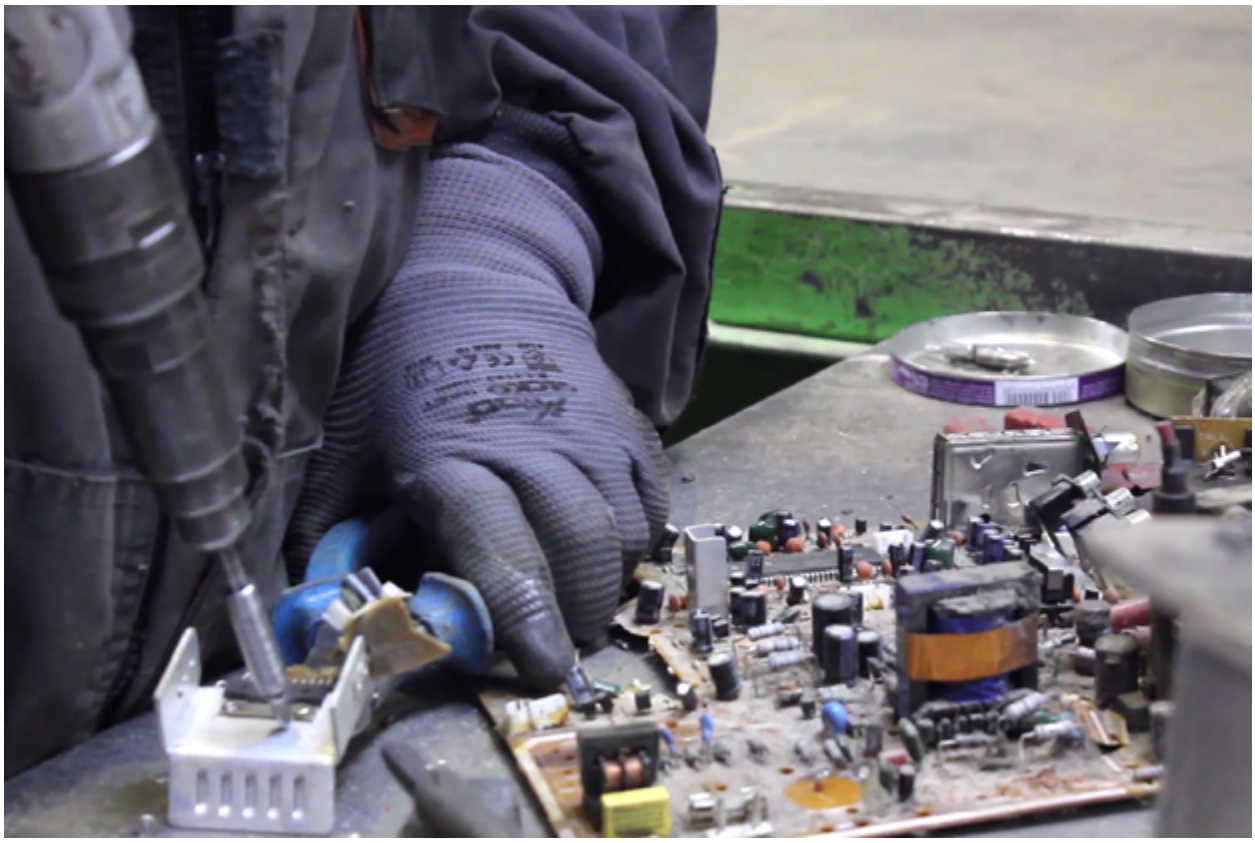
bottom of the pool, called gangue, is deposited into tailing ponds[99]. Comminution and flotation are performed in close proximity of the mine itself, after which copper concentrate is transported by truck to the smelter complex, which is about 10km away, right next to the town centre of Bor.

Smelting of sulphide concentrate is a four-step process. Firstly, the ore is roasted producing calcine and sulphur dioxide. Roasted ore is then poured into the flesh furnace, where at temperatures around 1250 degrees (copper melts at 1,085°C), copper separates from sulphides and the outcome is called matte, which now contains 45-75% Cu. The side product is sulphuric acid which is then channelled into the factory of sulphuric acid (and some parts of it find their way out through the chimney). The next step is conversion of matte in a long cylinder furnace, after which is obtained blister copper (98-99% pure). Processes of smelting in the flash furnace produce slag, a lava-like mass that is rich in iron and sulphur oxides, but which also contains traces of copper[100]. Blister copper is finally molten into anodes, iridescent bars of deep greenish-violetish hues. One last step towards achieving the so-called four-9's copper is electrorefining, where anodes are immersed into a sulphuric acid solution, in which they dissolve and electrons of copper attracted by tin or copper plates form cathodes, while the remaining impurities, the anode mud, sinks to the bottom of the pool. Copper cathodes are pinkish-orange plates weighing around 100kg each, with less than 0,004% of other elements. They are the prime form in which copper is traded in the world commodities markets. Cathodes can be molten into anything from wires to computer chips. Some of this happens in the cable factory and copper alloys foundry, parts of RTB Bor complex.

At Bor it is very hard to lose sight of the mine, its (side-)effects and products. The hills surrounding the old pit are covered or even made of gangue, flatly cut

99 Tailing ponds are one of the main environmental problems of mining from the point of view of other earth bodies. Ponds are always prone to leakage into their environs, which they sometimes do clamorously (as in the case of Talvivaara in Finland in 2012, or Grupo Mexico's Buenavista leak in 2014). More often, leaks take place silently and imperceptibly over much longer durations, which represents a considerable problem for environmental justice.

100 Some time ago, slag was considered to be waste, in these days, it is recirculated back to flotation and then to the smelter again. Take note here, since my performance will recirculate slag, but in another direction.



3.73. Electronic waste recycling, *mineralizacija*. Video documentation. Video: Marika Troili. 5 January 2016, Niš, Serbia.

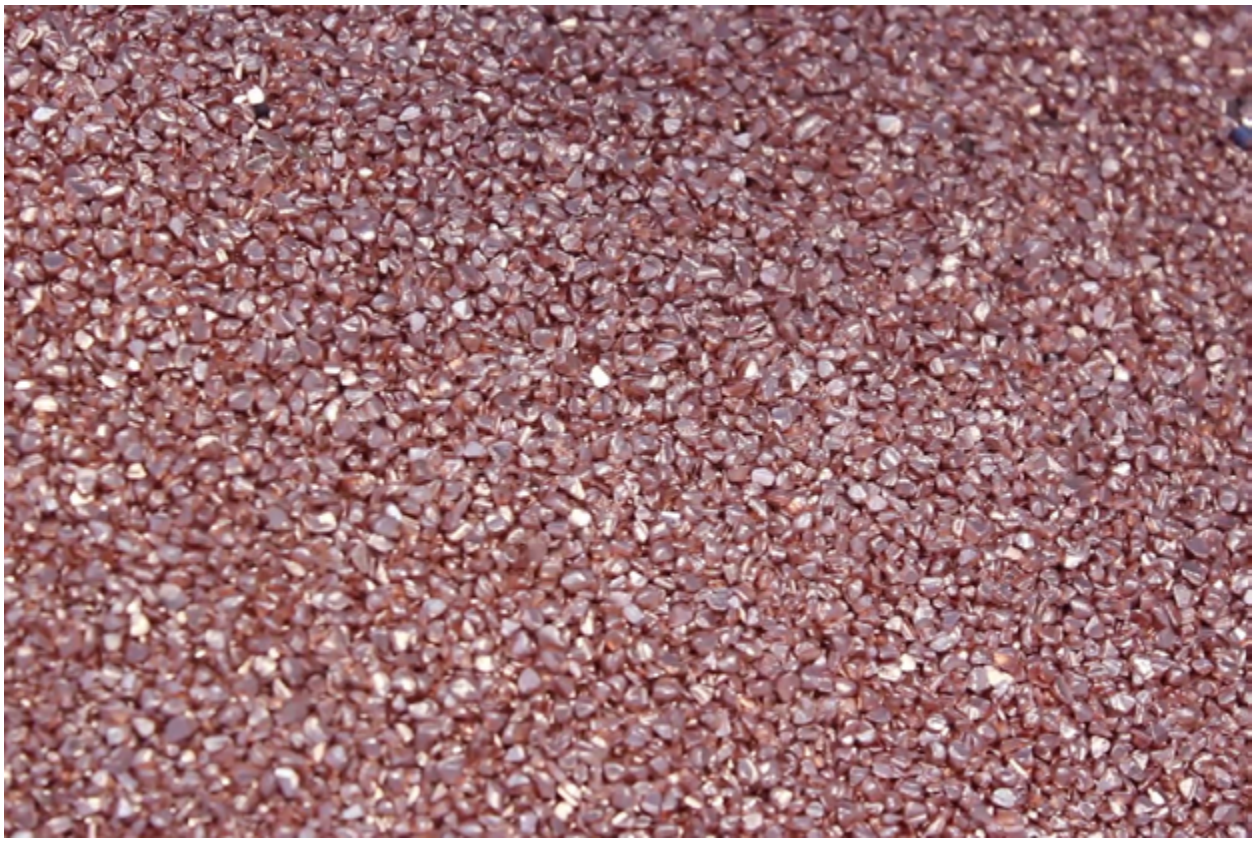
hilltops show this is an industry which literally moves mountains. Light-weight copper wires imply heavy material movements. Another landscape presence is smoke, which tirelessly billows from the chimneys of the smelter. It pours out in different shades of grey, and sometimes drops close to the ground spreading the stingy smell of sulphuric acid, a toxic agent when set loose in the air. The factory and the mines employ 5,000 people out of 34,000 total population, thus goes the local saying: "as long as there is smoke, there will be life in Bor". In this period the company, which is still publicly owned, one of the last relics of the socialist organisation, is entering a period of major reorganisation due to its big debt[101]. The smoke can be a deceitful indicator of economy, but is is a clear point of friction with the town inhabitants. Locals are very wary not to end up in the 'cloud' or the infamous 'Bor pudding'[102]. More peacefully, a number of bronze sculptures are scattered around town, product of artists who came to the now shut Bor Art Colony. Large blocks of ore are exhibited on postaments. The metal holds an undisputed however ambiguous central place in the urban context and collective imagery of the town.

The wider region of Timočka krajina, or, geologically, of Timok Magmatic Complex was intermittently mined since prehistoric times. The region around Bor is implicated in much longer metallic histories than those of the current commodity markets fluctuations. Where the big pit of the modern mine gapes, once towered Tilva Roš ("red hill" in Vlachian language[103]), along the slopes of which Ancient Romans pursued their own copper hunts. The modern mining operation started as a private enterprise in 1903, then changed hands, and became nationalised after World War II. For over two decades, after the end of the socialist Yugoslavia, it is constantly seen as an unsolvable financial problem

101 When i was visiting the company, some parts of the complex were not operating, and talking with the workers one got very different points of view on the future of the company. The shift managers and the press team were very positive about the prospects. Yet, it is clear even to an untrained eye that some parts of the complex might be technologically obsolete.

102 A few months before my residency started, a new smelter was installed with the promise that the sky will be as blue as before the smelter was installed. The transition period from the old to the new furnace has been bumpy, and there was a period when both the old and the new furnace were operating in parallel, which has allegedly caused intense smoke outbursts. This has incited several citizen protest gatherings.

103 Vlachs are an indigenous ancient Latinised population, now living in East Serbia, and Romania and Bulgaria.



3.74. Copper recycled from wires, *mineralizacija*. Video: Marika Troili. 6 January 2016, Niš, Serbia.

to the state.

This would be a story of the post-industrial post-socialist decline, by-product of development patterns of 20th century capitalisms and socialisms alike, were it not for another twist. The larger Bor area is experiencing a true gold rush, led by Rakita, a joint venture of multinationals Canada-based Reservoir Minerals and U.S.-based Freeport-McMoran Exploration Corp. Interestingly, the "significant copper-gold high sulphidation and porphyry copper-gold mineralisation" that Rakita discovered is situated merely 5km from the Old Pit of RTB Bor. The presents and futures are close neighbours, and extraction does not retreat where there is smell of copper.

In this mountainous peripheral area of South-East Europe is where financial and extractive capitalism unleash their powers, pressing heavily upon human and other-than-human bodies within their reach. Beneath the surfaces, elements conceal memories of Big Bang's nuclear fissions, and conspire future cracks and crystals[104]. Is it possible for us humans to meet the earth others halfway? What would these meetings look like, across the radical differences in becoming, mass and force?

104The immediate violences of extraction gain a new perspective when one visits the Zlot Cave, where one can feel the earth's pulsating vibrancy and its artistry. Stalactites and stalagmites can almost be seen as they grow.

3.75. Blue stone synthesis performed by Dr Aleksandra Mitovski, *mineralizacija*. Video documentation. Video: Duško Jelen. 11 January 2016, Technical Faculty in Bor.

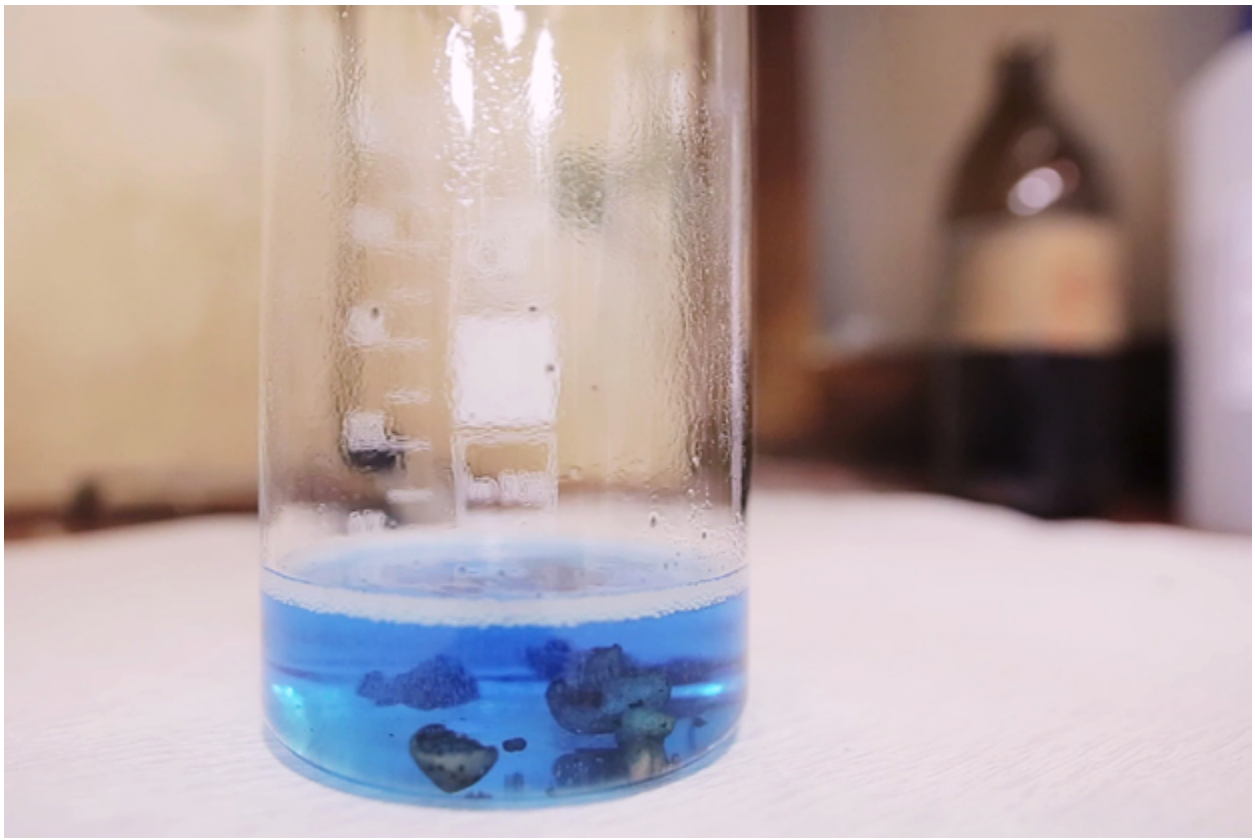
3.6.d. *we ♥ copper & copper ♥ us vol. 3: mineralizacija*

date / location: Bor, East Serbia. Residency, October / November 2015. Performance, January 2016. Exhibited at KC Grad, Belgrade, 19-24 January 2016
with Dr Aleksandra Mitovski, Marika Troili, Tuomas A. Laitinen, E-reciklaža Jugo-Impex, RTB Bor, Tehnički fakultet u Boru
video documentation: Duško Jelen
video editing: Duško Jelen and me
sound: Tuomas A. Laitinen

During my copper journeys in Finland and Serbia, most striking was an affective and cognitive realisation of the degree of my own boundedness within the webs of technological and capitalist processes. At the prehistoric mine of Rudna Glava, as the sun was setting down, i felt that i am, as most of us, an *extractivist subjectivity*, a product of long histories of natural-cultural asymmetrical transactions. Subjectivity is the crucial site of ecology, and posthuman justice in most cases means working *with and against myself*. My stance is anti-extractivist, but over time i understood that, if i am to do artistic work around extraction in the present, it must be a creative critique from up close, embedded in the currently existing processes. I don't think it is feasible to say that all mining must stop, but what can and must be imagined and commenced are modes of reorienting the dynamics of the industry, not from but for the earth.

The creative proposal began by thinking that extraction could be an acceptable practice, but only if it truly entangled with geological processes, that is, if it followed the living dynamics of the earth. Temporally speaking, what would mining mean if it would be a truly geological process, i.e. if it took place over thousands and millions of years, at the speed of mineralisations?

Upon learning the modalities of work in the mine and the smelter, the



3.76. Blue stone synthesis by Dr. Aleksandra Mitovski, *mineralizacija*. Video documentation. Video: Duško Jelen. 11 January 2016, Technical Faculty in Bor.

preliminary idea of slowing down the actions of labourers resulted impossible to execute materially. The extractive-metallurgical apparatus is too tight and too linear, and most contemprary mining is performed by machines with their own intrinsic velocities. Nevertheless, each apparatus circuitry contains alternative possibilities. While studying flow diagrams of metallurgical processes, it became clear that this apparatus, as most of the others, simply cuts out the earth. So the question became how to traverse through the possibility spacetime of the process to create an opening for the secluded minority, the earth to perform its possibilities of becoming.

Copper recycling effectively recirculates copper that is already extracted, but this is too short a process geologically speaking, and it leaves the earth out once again. The question was how to open the loop of this quasi-circular economy, which was still not circular enough. Following Naomi Klein's injunction to 'keep in the ground', with all the mineral matter that is already present above ground, it would be important also to withdraw it from the loops in which it is constrained[105]. 'Bring it back in the ground'. At some point, copper should also be afforded to return to the earth, where it would be free to continue its other lives. If after mining would come unmining, if extraction (reaping) would be counterpointed with sowing, depositing into the strata, perhaps mining could start being a reproductive intra-action with the earth.

mineralizacija set out to perform a recycling process in reverse, a re-earthing, from pure metal to the state of ore, that will be then deposited/planted in the ground. The aim was to find a way to intermingle with the earth's imaginative powers, to intra-act with its creativity in a more-than-human economy that is not anymore about mastery but about collaboration over deep futures. Who knows what will take shape in the strata over another 85 million years.

The idea of unmining emerged from the conversations with the workers and metallurgists, after which we discussed how this could be done. This is clearly

105This approach is consonant with Jonathan Kemp's *Crystal Worlds* research project, where the ethos was to liberate the metals from the constraints of the ICT capitalism, and allowing them to become crystals again. The principal difference between the works is in the site-specificity and performativity.

3.77. Blue stone synthesis by Dr. Aleksandra Mitovski, *mineralizacija*. Video documentation. Video: Duško Jelen. 11 January 2016, Technical Faculty in Bor.

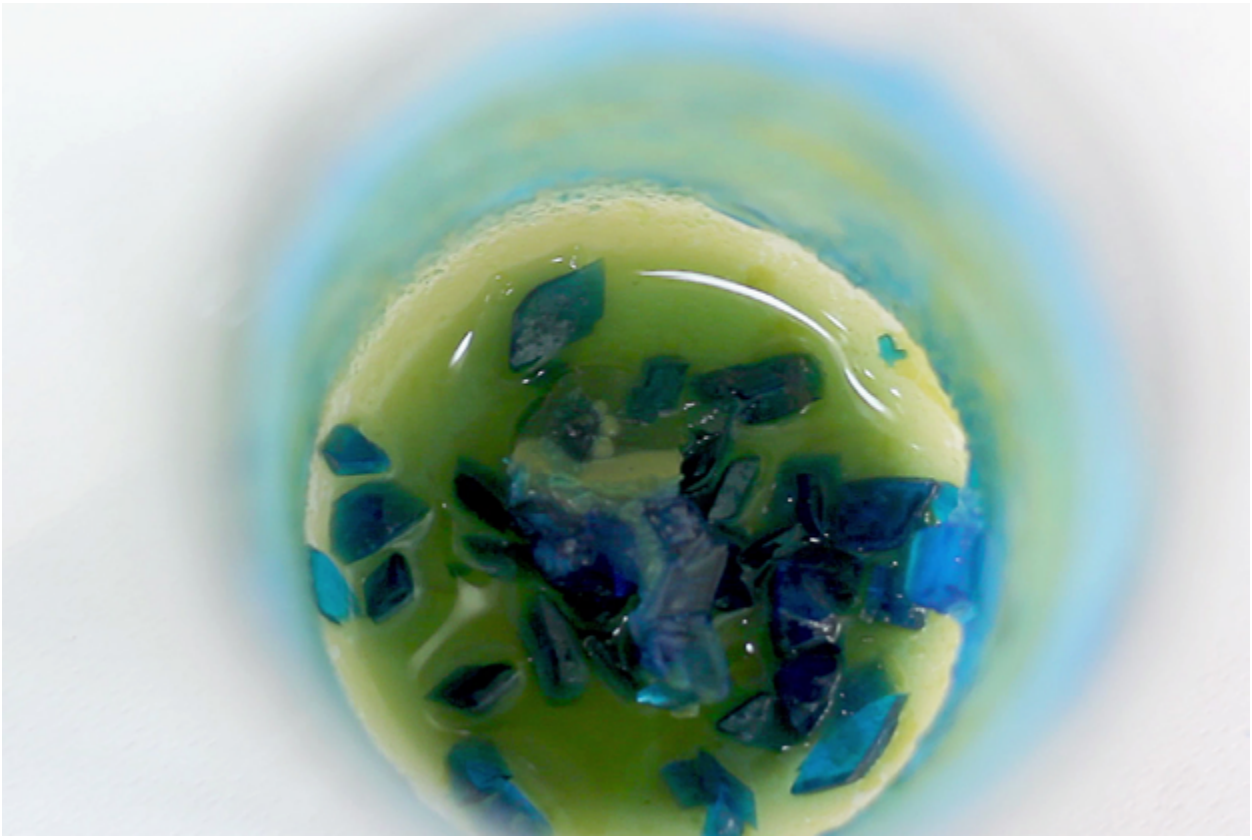
the exact opposite of what mining and metallurgy is about, their mission statement being that of *ex*tracting the metal from its dispersed state in the ore. Some of my interlocutors took up the challenge and tried to creatively figure out how we could remake the ore starting from the end product, the wire. During my residency at Bor, and over the months that followed, the score of the performance took shape in collaboration with several institutions and people involved: the mining-smelting complex, the Technical Faculty of Bor, and e-recycling factory E-reciklaža in Niš. Crucial in the score development was the conversation and exchange with Dr. Aleksandra Mitovski of the Technical Faculty at Bor.

What follows is an account of the performance that took place in January 2016. Since it span across multiple sites and times, and involved different types of processes, the best way to represent is to tell the story[106].

Corn. Niš, January 5/6, 2016. (fig. 3.72 – 3.74)
E-waste is one of the fastest growing flows of matter in the world not only because of consumption patterns, but because refrigerators, computers, TV sets, smartphones are designed to break down just after the warranty has expired[107]. Some of these prematurely discarded technical corpses are recycled, and one of the few places in Serbia where this happens is in two facilities of E-reciklaža at Niš, a town in East Serbia some 200 km south from Bor.

As i learned there, it is extremely complicated to disassemble e-waste in order to recover the constitutive elements. People work neck to neck with machines, it is a manual-technical labour which neither machines nor humans can perform on their own. A massive multi-component machinery eats refrigerators and churns out differently shaped chunks of aluminium, copper, plastic, etc. The workers sieve through the moving lines of the matter to sort out the small pieces the machine cannot classify. TV sets are entirely disassembled by hand. My hosts allow me to rummage through the heaps of strangely shaped metal chunks of

106The story is also the plot of the film that can be found in appended documentation.
107Architect Tomas Rau insightfully criticises the designed obsolescence model and provides an alternative view of economy in documentary film *The End of Ownership* (2015).



3.78. Copper(II)-oxide crystallisations, *mineralizacija*. Video documentatation. Video: Duško Jelen. 12 January 2016, Technical Faculty in Bor.

copper recycled from refrigerators. Unmining thus commences with a gesture of mining.

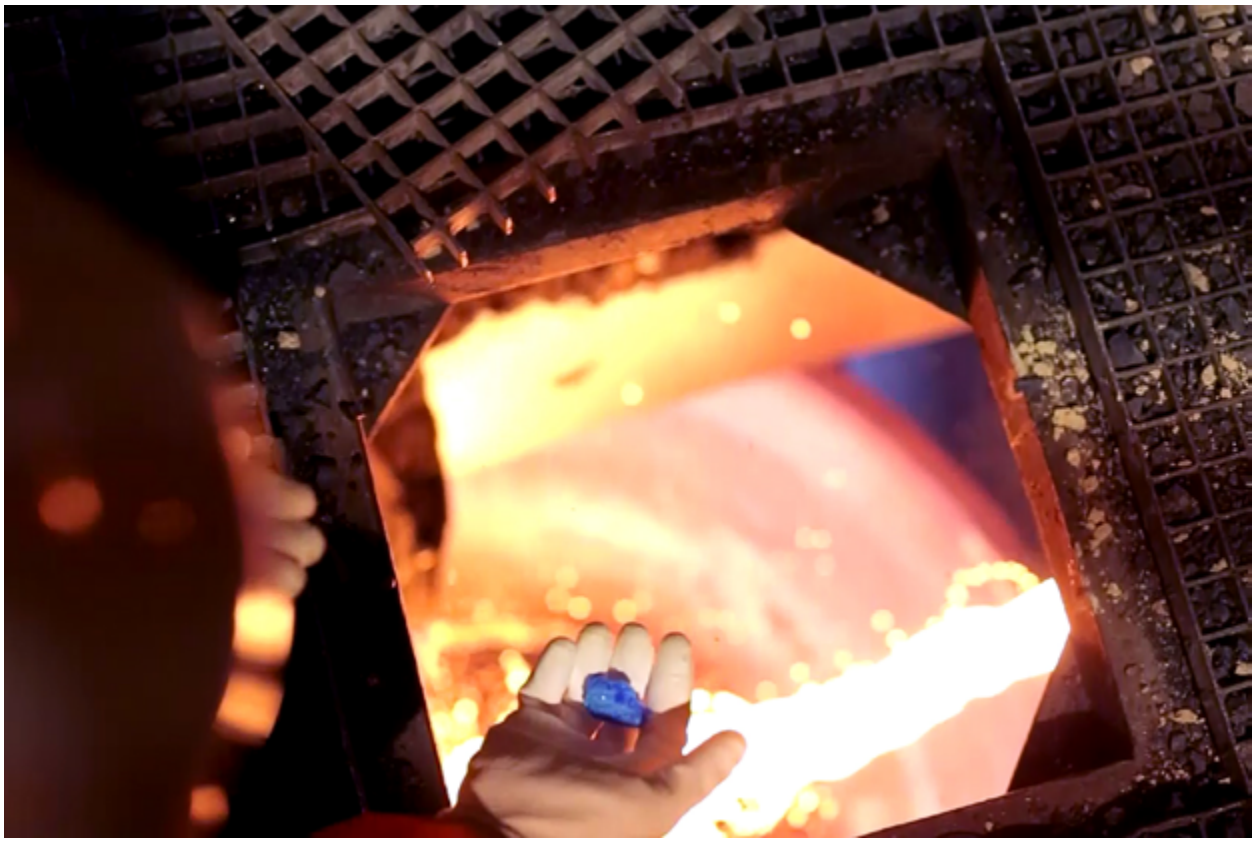
On day 2, we visit the factory where electrical cables are recycled. Wires and cables of all sorts and varieties are fed into machines that shred them into tiny bits, to then separate plastic coating from the metallic core. From the shredders, the copper is usually sent to the foundry where it is moulded into large slabs of high-grade copper which is then sold back to the industry. A special type of foundry output, called 'copper corn', attracts me. Copper corn is used to industrially produce copper-sulphate ($CuSO_4$), better known as blue stone. Blue stone is a compound used in agriculture as fungicide, revealing a potential material solidarity between copper and plants[108]. With these ancient characters, now in new (recycled) coats, we jointly set out towards a deep earth future from where it all began.

Crystallisation. Technical Faculty of Bor, Bor. January 11, 12. (fig. 3.75 – 3.78) In the laboratories of the Metallurgical department of Technical Faculty of Bor, the recycled copper moves a step closer to its mineral form. Through a series of (al)chemical transformations, tiny chunks of recycled copper become crystals of copper-sulphate. The choreography of laboratory equipment and particles was orchestrated by Dr Aleksandra Mitovski, and involved Dr Vesna Grekulović[109].

The first step is the dissolution of pieces of copper with the use of sulphuric acid. An enriched solution of copper-sulphate, one of the side products of RTB

108Copper-sulphate or blue stone, is used in agriculture as fungicide, for correction of copper deficiency in soils and animals, etc. As a fungicide, it is often sprayed on grapes, and it protects plants from over 300 fungal diseases (Copper Development Association). This agricultural connection was the material-conceptual link that encouraged the idea that mining can be turned into a reproductive activity. Together with Dr Aleksandra Mitovski, we decided that blue stone could be used as a material link towards creating a new ore. More on this below (see 4.6.e.).

109The technical process of crystallisation had been developed through consultation with Dr Aleksandra Mitovski, beginning in my first visits in October 2015. Aleksandra had started performing the experiments over the following months, using the side products from the smelter at Bor. Over November and December, she cultivated a consistent population of crystallisation centres. These were mixed together with the recycled copper i brought from Niš, thus uniting copper from two different genealogical pathways together. The experiments documented in the film were thus only the moment of reunion, whereas the crystallisation has been ongoing over a longer period.



3.79. Making crystal-slag, *mineralizacija*. Video documentation. Video: Duško Jelen. 13 January 2016, Smelter of RTB Bor.

Bor's smelter, is added to catalyse the crystallisation. The solution is heated up, and upon bringing it to boil, the heat is switched off. As the temperature starts dropping, the crystals begin to form. The slower the temperature decrease, the better pathways crystals will find to assemble together. Tiny centres of crystallisation form at the bottom of the glass. Over days and weeks this blue sand will *grow* into larger formations by slowly extracting copper particles from the solution. The process can be aided by repeatedly heating up the solution. Crystals are lively beings. From previously solid metals, copper has now become a population of differently shaped and sized individuals, each a unique crystal figure like no other.

Crystal-slag. Smelter of RTB Bor, January 13. (fig. 3.79 – 3.81)
The chemical composition of the ore is about 0,3% of copper, so copper-sulphate needed to become only a tiny fraction in a larger rock mass. In the beginning, i thought it would be enough to throw into a furnace the various elements composing the rock, together with small bits of copper, and that would re-create the rock. However, from the metallurgists i learned that this is materially impossible, because much higher temperature and pressures are needed, an actual volcano to cook a rock. There are no active volcanoes in the region, and staying with the *ethos* of minor intervention (firing a furnace implies huge dispense of energy), we simply used what is already happening.

Flash furnaces at RTB Bor are fed with copper concentrate (processed ore + additives), and the outputs are blister copper and slag. Slag continuously recirculates to the flotation and back to the furnace, it is the key supporting actor in smelting. For this infrastructural characteristic it holds, i imagined that slag would be a possible character that could be spun out and away from the cycle of smelting and flotation.

In the room where slag exits from the furnace, the heat is almost unbearable and the sulphuric acid fumes bite the nostrils. Through a hole, slag in magma-like state pours down into iron pots some metres below (fig. 3.79, 3.80). Amidst

3.80. Slag exiting the furnace, *mineralizacija*. Video documentation, Video: Duško Jelen. 13 January 2016, Smelter of RTB Bor.

the workers who suspend their duties for a couple of minutes, i approach the hole with a silver box in my hands. The box contains various bits and pieces of copper that were gathered and crystallised in the journey so far. I slowly send the recycled copper pieces down to join the stream of lava, thus becoming a crystal-enriched slag now (fig. 3.79). At this point, the performance is joining the usual production circuit of slag.

Massive pots of slag, each containing about 60 tonnes of boiling matter, when they are filled, get trucked to the adjacent clearance, where, lined up in long rows, they are left to stand in open weather to cool down. The process is accelerated by water showers. Most of the water evaporates in touch with the hot matter. Once the slag cools down, usually after two days, the truck lifts the pot with its metallic arms and spills it into a small basin (fig. 3.81). Even after a couple of days of standing outdoors and being showered with water, the slag still emanates fumes in this winter afternoon. The red magma from the furnace has now become rock again.

The common procedure at this point is that slag driven to the flotation where copper concentrate is extracted again. However, some parts of this pile will head elsewhere. This is where the minoritarian branching out from the organisational diagram of the smelter takes place.

Unmining. Old Pit of RTB Bor, January 13. (fig. 3.82 – 3.84)
The smelter on one side flanks the city, while on the other it is surrounded by the landscape of extraction. Just next to the smelter lies about 500m deep Old Pit, the void result of mining since it began in 1903 until the 1990s. Now shut, it is the site of a disappeared mountain, a cone turned upside down[110]. The rocks

110This association comes from the locals who use to say that the Pit is like the nearby mountain Rtanj (1,565m) in reverse. This is clearly an exaggeration, but the conic shape of the pit does somewhat resemble the striking pyramid profile of Rtanj. Through this anecdote, something deeper emerges. Earth makes mountains, and humans are experts in dismantling them. Fascinating counterpoint to this dynamics is Agnes Denes' bioremediation earthwork in Finland, *Tree Mountain – A Living Time Capsule – 11,000 Trees, 11,000 People, 400 Years* (1992-1996-), a forest mountain created on site of a disused quarry.

3.81. Slag disposal, *mineralizacija*. Video documentation. Video: Marika Troili. 14 January 2016, Smelter of RTB Bor.

lying still in the pit below are kins of the freshly cooled down crystal-slag. Some particles of copper may have even come from this very pit, extracted and put into electrical devices. Recycled, recrystallised, remineralised, they are here again.

Under the gaze of the shift leader of the smelter and several workers, and accompanied by the documentation collaborators Duško and Marika, i approach the pile of unloaded slag pushing a wheelbarrow borrowed from a smelter worker. In line with the safety measures of the complex, i am wearing a worker overalls, an orange fluorescent jacket, and a white helmet. A closer inspection might reveal two copper hearts on the helmet, and the sweater adorned with copper-tape hearts, as well as strange silver boots. I begin placing some of the slag bodies from the fuming pile into the wheelbarrow (fig. 3.82). Some blocks are massive while others are more manageable. At first, i place too many, and can barely life the barrow. The proportions conceal high densities, concentrated powers of chemical becomings. Once i find an agreeable weight, i start pushing the barrow along the plateau where the huge pots of slag are cooling down. On my left side stand the dark formations of old slag, human exercises in stratification of waste. In between these different states of matter, i continue, past the smelter, and onto the old railway tracks. Time ago, a train would go on this very tracks to disgorge the slag into the underlying pit[111].

The tracks end with a ramp, like in a spaghetti Western film. Upon reaching the barrier, with a sensation of relief, i set the wheelbarrow down. From the collective of slag rocks, i lift one, take a few steps towards the steep edge of the slope, lean and release the rock into the void. I perform this operation for each rock. They roll down and stop when they meet other rocks or gravel. When the barrow is empty, i start walking back the same route, a kilometre or so. I load the wheelbarrow two more times, and take it to other two locations looking

111 Mining is about extracting and then deposing of waste just round the corner, once the 'valuables' have been taken out from the ore. Through my future visits of modern mines in Wales (1600's - 1900's) and Finland (1700's), i have observed that the slag was often left lying just outside the perimeter. In contemporary mines, entire landscapes are formed by the subsequent depositions of gangue, soils of no interest for the processing. This is what is often left out from photos too impressed by the pits.

3.82. Unmining, *mineralizacija*. Video documentation. Video: Duško Jelen. 13 January 2016, Smelter of RTB Bor.

down into the Old Pit[112].

In the last round, i pick one rock only, embrace it and walk it back to the pit (fig. 3.84). Now it is free to become part of the strata again, to concatenate into novel formations with different elements, to mineralise or dissolve into tinier bits.

Metalmorphosis. Rudna Glava, Majdanpek, 14 January. (fig. 3.69, 3.85)
Some 60 km from Bor, on top of the hill above the village of Rudna Glava lies one of the ancient mining sites in Europe. According to the archaeological findings, Rudna Glava was worked for copper by the Vinča culture around 4,500 BCE (Filipović, 2015). Thousands of years ago, these early geological explorers, holding stone tools, followed the greenish marks from the surface down into the earth. They dug until the limit of the lower oxidation zone, around 20 m in depth, to reach the end of the mineral body containing copper minerals malachite, azurite and cuprite (Filipović, 2015: 342). The entrances to the mineshafts are now obstructed, but the marks on the surrounding cliffs indicate strata of labour. Here and in other sites around the Middle East and the Balkans, humans first encountered copper. Concurrently with digging, somehow they discovered also the process of smelting, of giving shape to the metal. Human societies would never be the same, the metals would change technology of working the land, of warfare, as well as dramatically reshuffling the social organisation. The ancient godesses of the earth will be joined and sometimes superseded by gods of fire and underground. The miners and metallurgists will assert themselves as a new upper class, in close conjunction with warriors and priests. Contemporary moderns are part of the same techno-social filiation, we are peoples of metal ages. The hill stands in silence as the night pulls in. The electrical lights shine in the valley far below, dogs break the silence. The rocks

112RTB Bor is currently remediating the Old Pit, just across from where i was performing my little rock planting. The plan is to fill the huge hole with gangue, and once the ground is back to level, to plant trees and landscape it (quite a leap of imagination to visualise this). With the current economic outlook of the company, i am afraid it might take many years before this plan is accomplished. One way or another, the machines throwing material back into the hole and me were engaged in a similar line of business, with one crucial difference. The pit is remediated with what is considered waste from the process, while i was putting back so to say 'valuable' copper-enriched crystal-slag rocks.

3.83. Unmining, *mineralizacija*. Video documentation. Video: Duško Jelen. 13 January 2016, Smelter of RTB Bor.

around the mineshafts have turned green again. Copper lives here (fig. 3.85).

The exhibition. KC Grad, Belgrade, 19 - 24 January.
The various steps of the journey/performance of *mineralizacija* were documented in sound and video by myself, Marika Troili and Dule Jelen. Throughout the research and *mineralizacija*, i kept a diary that became a poem *postajanje-zemlja* (*becoming-earth*) [Appendix I] combining my insights, technical and scientific data and statements about mining and metallurgy. Audio-visual artist Tuomas A. Laitinen produced the musical composition *copper drone* by mixing together electrical synthesiser sounds with our field recordings.

The exhibition at KC Grad (Belgrade, January 19-24) documented the on-site performance through an inter-media assembly. The central piece was an installation on pink yoga mats presented all the various states of copper, from old electrical devices, via waste, recycled material, copper(II)-sulphate to the crystal-slag. One corner of the installation featured a laboratory set-up with copper(II)-sulphate crystals immersed in solutions. Surrounding the sea of pink were five TV sets showing the video documentation from the various sites and steps of *mineralizacija*: e-recycling, laboratory, smelter and old pit, Rudna Glava, and the internet (the stock exchange data of trading on the London Metals Exchange, and my online website *we heart copper hearts us*). The screens were laid horizontally, lifted above ground on yoga blocks, wrapped in different camouflage or pseudo-natural printed textiles.

The site-specific *mineralizacija* was re-enacted or re-narrated for the gallery audience as a performance of *postajanje-zemlja* on 21 January. Over 75 minutes, i moved between various working stations on the yoga mats: from the 'scrapyard' with old computers and phones, to the 'e-waste disassembly' table where i unpacked my old iPhone, to the 'junkyard', to the 'lab', to the pile of slag. By the end of the performance, i made a small mountain of polystyrene hearts. Finally, the rocks and a geological hammer were unmined and deposited into

3.84. Unmining, *mineralizacija*. Video documentation. Video: Duško Jelen. 13 January 2016, Smelter of RTB Bor.

the mountain of hearts. These material-gestural procedures were punctuated by the lines of the poem/diary. The performance unfurled to the droning sounds of Laitinen's *copper drone*.

The film *mineralizacija* is an attempt at bringing together some of these disparate media and processes.

3.6.e. Postscript on unmining

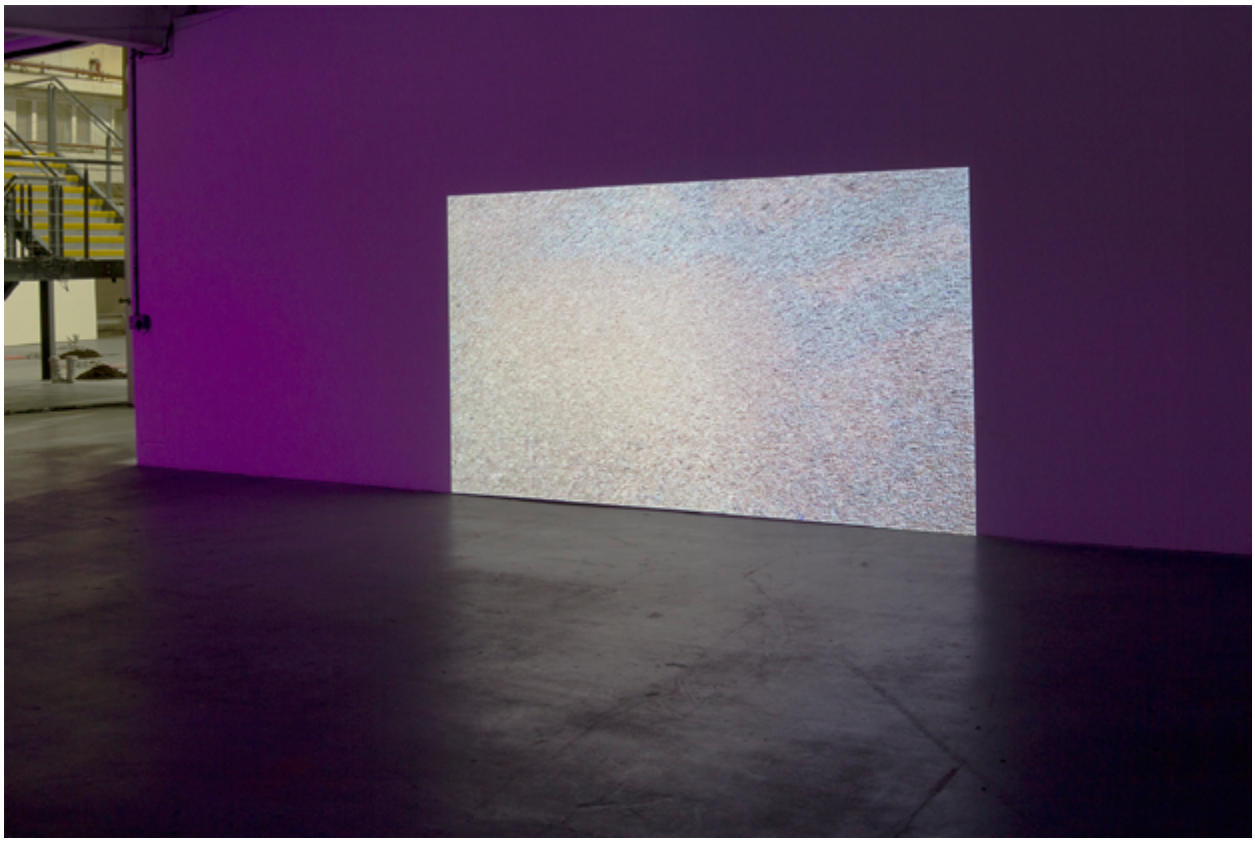
mineralizacija was an act of mental, social and material re-orientation of the extractivist apparatus towards the great minority of earth. It is a work that proceeded through conversations with workers active in various domains of the industry. The work materialised already there with the question i kept asking, "how can we remake the mineral and deposit it into the mine?" With this utterance, the phase space of the apparatus started shifting a bit. The performative action took place at the heart of the full-scale processes. This implied a change in my own subjective space, becoming partially implicated within the larger apparatus of production, embodying knowings and parameters fully inconceivable before. *I have become more of the extractivist subjectivity in order to withdraw through it*. Hopefully, some of the persons involved shifted their phase spaces as well.

Working with multiple organisations, public and private, especially the massive mining concern, created situations when freedom and autonomy seemed to be waning. The margins of movement were restricted many times, and permissions were given and taken away. However, affinities with insiders helped to pull through it. Many people performed what they usually do, and some performed things they don't usually do. Knowledges and affects were shared, creating an alternative performative apparatus that moved through the larger one, but with a different disposition.

3.85. Rudna Glava, prehistoric mining site, *mineralizacija*. Video documentation. Rudna Glava, East Serbia. 14 January 2016, Majdanpek, Serbia.

Many times over five months between the first visits and the execution of the performance i was disoriented by the power of agencies in act. Even when i felt overwhelmed if not overpowered, i tried to keep present that the main actor of this story is the earth: victim, audience and collaborator. The whole process was about releasing some of the earth's agency that has been unilaterally captured by the power procedures of the extractivist apparatus. Looking anamorphically, there are possible leeways for the emergence of posthuman commons, associations and coalitions between humans and rocks. However, on the ground, those that work and live on these frontlines of extractive capitalism live under perpetual threat if not blackmail of financial dependency. The havoc and pain caused by extraction is here to stay, inscribed on the bodies of decapitated hills and on human bodies. This is a time for metamorphosis of hearts, minds, technologies, worlding projects.

The performance, deep down and under, was an act of re-imagination of extractive industry from something that only takes from the earth, into a reproductive affective labour, a sort of earthculture, cultivation of the earth. It should be readily noted that, agriculture, from its inception implied appropriation of land and biopower, and in that sense it fully participated in the anthropocene. (To this should be added the close intertwinement between metallic tools and development of agriculture.) However, i believe the two should not be equated. Agriculture on small scale, as subsistence economy, decisively opens possibilities for more just naturalcultural commonings (e.g, Mies & Shiva, 1993; Shiva, 2005; Dalla Costa 2003, 2007). Mining would benefit from learning from agriculture, especially from more sustainable practices such as permaculture. What kind of scales and collaborative practices would permaculture of minerals demand? What kind of posthuman mineral-human matterings—meanings, as well as withdrawals, would this demand? These are issues rarely discussed in sustainability literature. Viewed and analysed through posthuman standpoints, perhaps withdrawals from entire lines of technology would be seen as affirmative, and entirely different modes of entanglement would be invited.



3.86. *mineralizacija*. 4 channel projection at Viva exhibition *burning hearts of a thousand tiny matters*. 1 – 5 February 2017, Ambika P3, London.

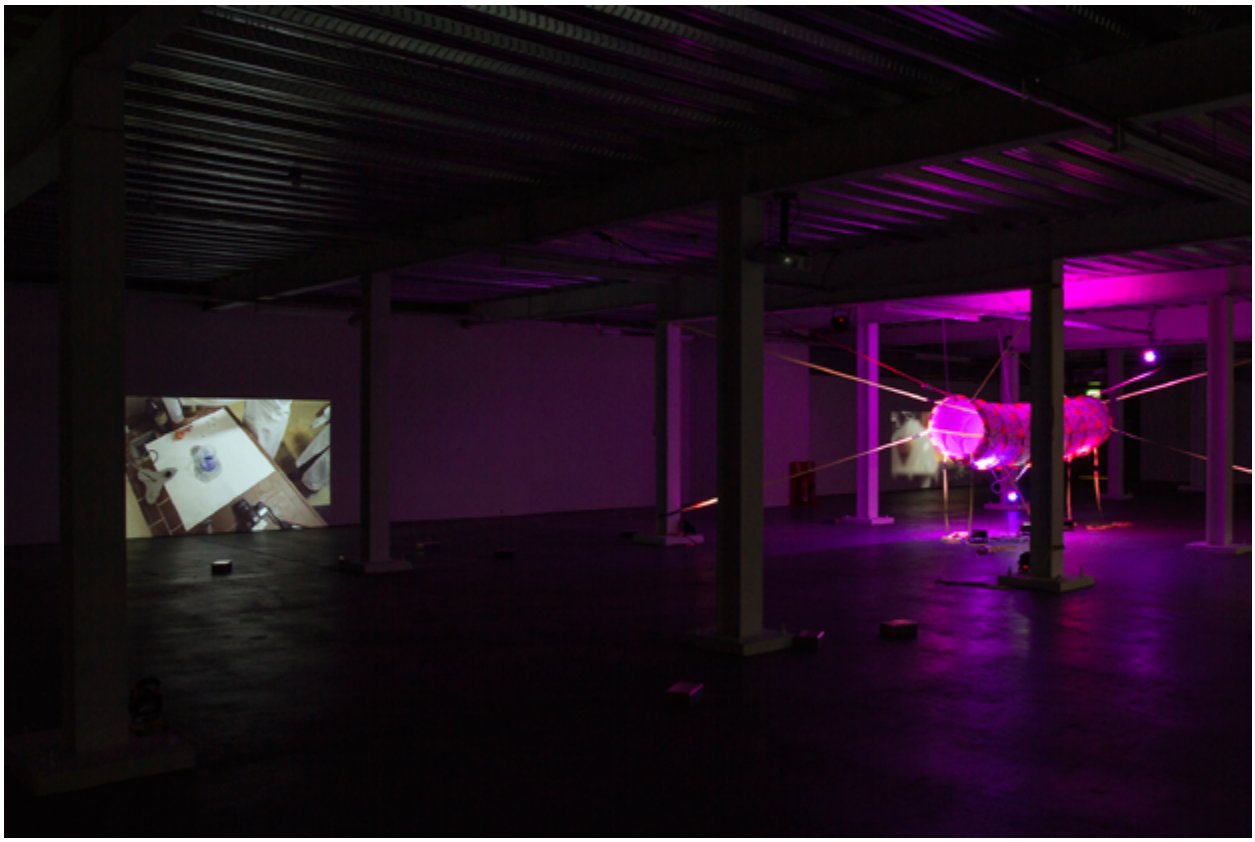
3.7. *burning hearts of a thousand tiny matters*

location / date: Parys Mountain, Wales (December 2015); Ambika P3, London (1 – 5 February 2017); the City of London, Parys Mountain (March 2017 —)
with araucaria araucanas, carbon-dioxide, copper, Mynydd Parys, Duško Jelen, Isidora Spasović Lebović, Tuomas A. Laitinen
(Fig. 3.86 – 3.89; 5.01. – 5.14.)

Parys mountain (Mynydd Parys) lies on the isle of Anglesey in North Wales. It's as close as one can get to Mars. Not because it is a rocket launchpad, but because it was thoroughly dug for copper over centuries. First traces of mining date to the Bronze Age, around 1,500 BC. Perhaps Romans tried their tools here too. The mountain was explored and mined occasionally in the 16th and 17th centuries, but with the discovery of a major ore body dates to 2nd of March, 1768, Parys is put on the map of the Empire. From then, two leases and two mines, Mona and Parys, grew to become the largest supplier of copper in the British Isles by 1800 (and, according to some accounts, in the world). The gradual decline of production lead to their closure at the beginning of the 20th century.

Extractivist spirits do not sit still. From 1955 on, various companies drilled bore holes around the red mountain. The mountain is now property of Anglesey Mining plc, which has continued these explorations discovering zinc, copper and lead reserves, but they are too low-grade to allow re-opening the mine in present conditions. In the meanwhile, the stocks of Anglesey Mining Plc are floated in the London South East exchange. It is one of the dormant companies whose stocks are not of great interest at the present moment, but if they struck another ore body, and/or if the market price of zinc soars, relatively quickly new drills might roll up the hill again. As of now, the mountain is mostly known as a tourist site on the European Route of Industrial Heritage. It would be good if it stayed that way.

The performance will try to encourage withdrawal of extractive interests from



3.87. *mineralizacija* and *#copper #love #maintenance*. Viva exhibition *burning hearts of a thousand tiny matters*. 1 – 5 February 2017, Ambika P3, London.

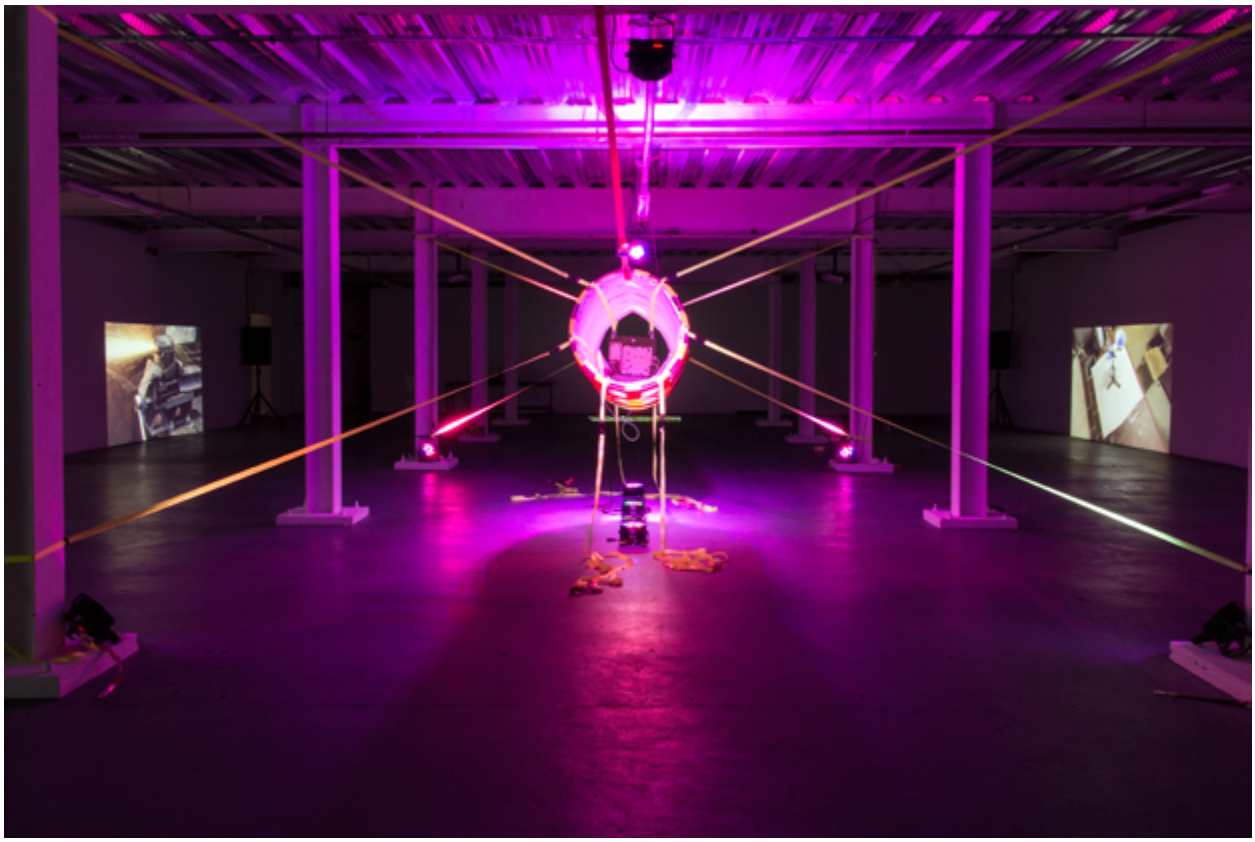
Parys mountain through a site-specific performance, a poetic twitter stream, and a materialisation in London. The polymorphous work will encourage unforgetting the Parys Mountain, as well as many other red mountains that have been disappeared: Tilva Roš at Bor, Buenavista del Cobre in Mexico, a multitude of other earth others that made the capitalist globe spin. Withdrawing through refusing to forget mountains peopled by 'unique, individual' matters, desiring-machines of multispecies confederations hybrid intra-actions breakbeat diffractions unearthly symbioses dances to dance beyond anthropos.

The viva examination show worked within the subterranean cave of Ambika P3 to occupy it and withdraw the strata of modernity[113], and to interconnect it with places of extraction, Parys mountain and the City of London. The show brought various bodies that do not belong to culture into the cultural space without representing them, and to pose questions around the validity of such artistic practice. In the show were re-assembled two constellations of works developed throughout the research: first, a group of works occupied by photosynthesis and carbon trading (*dancing ecologies*, *grow buy cut sell*, *black box white paper*, *all that is air melts into city*), and, second, the works concerned with extraction (*#copper #love #maintenance*, *mineralizacija*). Through the works, the exhibitions summoned three realms of mattering: atmosphere, biosphere, and lithosphere.

Extra-human bodies present were: a group of chipped ore borrowed from Mynydd Parys, a number of monkey puzzle seedlings (Chilean pine, *araucaria araucana*)[114], topsoil, blue slate chippings, a solution of copper(II)-oxide and crystals. These bodies were variously disposed on top of and around nineteen yoga mats, hand-made patchworks produced by Isidora Spasović Lebović. Yoga-patchworks featured a collection of images that have been produced in various projects over the last years: green clouds, pink trees, geological

113The space, now an art gallery, was initially a hall used for testing concrete, and trucks were driven through it, thus it belongs to the strata of fossil industries.

114Chilean pines evoked histories of colonization of Americas, and especially the fact that Chile is home to world's largest mines of copper.



3.88. *#copper #love #maintenance* and *mineralizacija*. Viva exhibition *burning hearts of a thousand tiny matters*. 1 – 5 February 2017, Ambika P3, London.

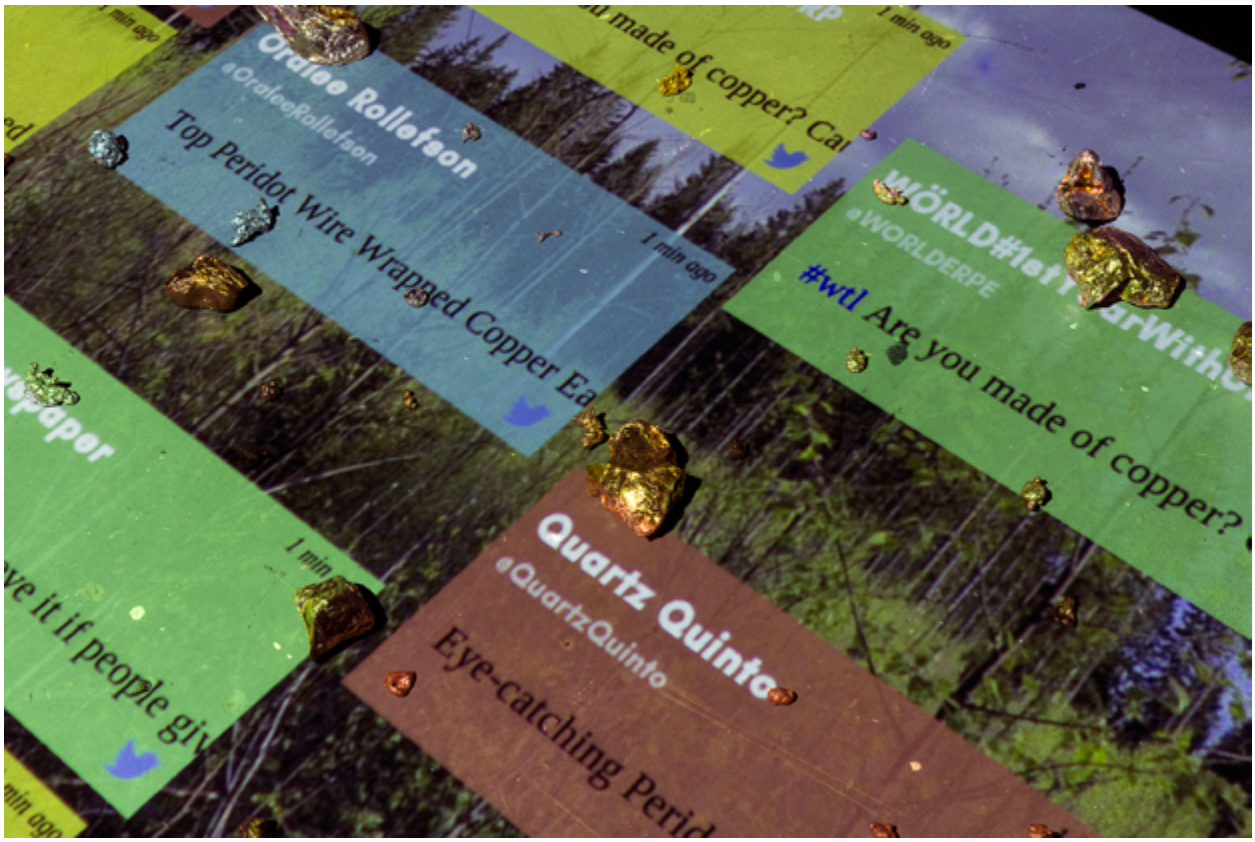
(counter)mapping patterns of Finland, and rocks of Rudna Glava. Patchworking and quilting were invoked as nomadic practices (DG, 1987: 476-77), qualities embodied in yoga mats' temporal territorialisations.

The main hall of the space was occupied by nineteen yoga mats, twenty-two piles of topsoil with eleven araucarias planted in them, as well as twenty-nine piles of blue slate mixed with Mynydd Parys ore. On the walls were displayed three numbers formed by A4 papers: 412.57 (particles of CO_2 per million, the average measurement taken over *all that is air melts into city*), 0.955 (US dollars: the value of copper if it was to be extracted from the copper ore in the space, according to London Metals Exchange index on 25 January 2017), and 0.086 (EUR: the value of carbon if it were extracted from the araucarias present, according to the value at the EU ETS on 25 January 2017).

The lower section contained a four-screen installation of *mineralizacija* (fig. 3.86 – 3.88), and in the middle of the space, *#copper #love #machine* was hung, tied by a dozen of straps to the architectural frame of the gallery (fig. 3.87, 3.88). The video output of the weheartcopperheartus.co was projected on the floor, over different recycled pieces of metals that i recovered from e-recycling factory at Niš, as well as rocks reassembled in previous performances (fig. 3.89).

The audience was invited to use the mats and touch and be touched by the bodies present with these words: "feel free to share the mats and timespace with the *burning hearts of a thousand tiny matters*, in 'loving perception'". This was an invite for the visitors to, yes, territorialise on yoga-patchworks, and, unlike the usual yoga practices, to share them with other bodies, araucaria araucanas and copper ore, soil and rocks.

The show opened with a three-hour performance to the sound of Tuomas A. Laitinen's *Music for matter*, especially composed for this occasion, and made of three parts: Movement I (Photosynthesis), Movement II (Copper Drone), and Movement III (Metal to Air). Correspondingly, the performance unpanned through three movements, re-telling and re-enacting actions and stories from



3.89. Website floor projection, *weheartcopperheartus.co*. Viva exhibition *burning hearts of a thousand tiny matters*. 1 – 5 February 2017, Ambika P3, London.

the previous projects. In the first movement i told stories of plant life and labour, and performing 'shining breathing' with araucaria araucanas by lighting them with permaculture LED lights to simulate sunshine (since we were in a sunlight-less underground gallery) (fig. 5.07., 5.12.). The second movement told the story of the EU carbon trading market, and i performed yan-tyan-tether counting of CO_2 measured in the gallery, as well as 'lithic yoga' exercises (fig. 5.10.). In the third movement i performed 'reassembling healing' of the copper ore by cementing the pieces together, and adding small crystals of copper(II)-oxide between the chippings of ore to encourage (fig. 5.08., 5.09, 5.11). Periodically through the performance i was doing general 'art maintenance' (re-enacting Mierle Laderman-Ukeles's performance): sweeping and cleaning the gallery, rearranging the lumps of topsoil and rocks. I have continued to periodically perform these actions throughout the exhibition.

The performance did not finish when the show ended, it was only a segment in a larger becoming. The next stage of performance will take place outside the show itself, and beyond the timeframe of the doctoral research itself. Chilean pines will be taken on a tour through the City of London to visit the seat of the ICE Futures Europe. Correspondingly, healed rocks will take a walk with me to visit the seat of London Metals Exchange, where their presents and futures are being traded. (This is a re-enactment/-(con)figuration of Joseph Beuys's *How to Explain Pictures to a Dead Hare* performance where he was showing art to a dead rabbit.)

Eventually, the rocks will be spread around Finsbury Square, the green space in front of the London Metal Exchange. There they should be (relatively) safe from another round of mining, and they can continue to 'witness' the geological processes happening in the City. The araucaria araucana seedlings will be planted back on the Parys Mountain, evoking Chilean landscapes of (post-)extraction and invoking a solidarity spreading across hemispheres. In this way, trees and rocks will have briefly transitioned through the gallery (art/research apparatus) to then leave towards other becomings, with and without humans.

4.01. *postajanje-zemlja,* storytelling/re-enactment of *mineralizacija*. Performance documentation. Photo: Neda Mojsilović. 21 January 2016, Cultural Front Belgrade.

4. Infraphysics of becoming-minoritarian

This short chapter wraps up the 'situated-dispersed knowledges' gathered through the performative encounters described above. This is a statement about the ethico-polytics of posthuman performance of becoming. It comes close to a methodological statement of the research, but methodology would imply smooth transfer from one place to the other without shifts, which would be counter to situated epistemology i work with (see 2.4.). Therefore, this is an apparatus of critical and creative discursive concepts and material affects that together shape *a disposition of the theory-practice apparatus*, a sensibility of the praxis, a diagram of its capacities to touch and be touched.

The goal of a posthuman eco-aesthetics, set out in Part II, is to invite minoritarian becomings departing from the apparatuses of capture. Andreas Philippopoulos-Mihalopoulos, in his analytics of lawscapes, introduces the concept of 'tilt' to indicate a disposition of a given legal-spatial apparatus, the way it distributes majorities and minorities (2015: 192). The re(con)figuration of the 'tilt' is called 'reorientation' of the apparatus (ibid.: 197-8). Reorientation is *not* an action of a subject *upon* (intervention), it entails an immanent intra- or *infra*-activity, a performative infraphysics. Reorientation is not about bringing to matter what is excluded, which would again be a majoritarian movement of 'taking over' control over an apparatus.

Tilting is withdrawal. Withdrawal is not a gesture of exiting, it is a '*situated-dispersal*' toward the minoritised side of the apparatus. It 'begins' with the embodied and embedded 'self' of the relative majority:

> *Withdrawal is self-withdrawal*: a body withdraws from the space of its own desire, the one that keeps the body atmospherically conditioned. [original emphasis] (ibid.: 205)

4.02. *postajanje-zemlja*. Performance documentation. Photo: Neda Mojsilović. 21 January 2016, Cultural Front Belgrade.

The 'self' is the subject of the apparatus, 'the body of one's desire' is its power-knowledge diagram, while 'atmosphere' is its territory. Self is shot through by a number of power lines of subjectivation, "the law is carried in bodies, inscribed or even embodied" (ibid.). The body of one's desire is the relation of the body with the power-diagram, a set of forms, codes, standards, practices, which connects the diagram and the territory through the 'self'. Self-withdrawal is thus a deterritorialisation of the self from within the apparatus of bodily production. Self-withdrawal is a situated intra-action of pulling against apparatus in an attempt to "cross the line of law's normative geometry while being inscribed within it" (Philippopoulos-Mihalopoulos, 2015: 217-8). 'Crossing' here does not mean going-beyond (still a majoritarian move), but to criss-cross or create a transversality in the geometry of im/possibilities. Since the 'self' is to an extent plugged into the power diagram and the territory, self-withdrawal is not an individual action. *Self-withdrawal draws the apparatus with*, it is "a transversal movement" of "sweeping away" (DG, 1987: 25) the organisation of an apparatus.

Apparatus withdrawal is about standing *in* the power line, but *torquing it away* from its sedimented trajectory. This is prefigured in Foucault's notion of lines of 'breakage' and 'fracture':

> Untangling these lines within a social apparatus is, in each case, like drawing a map, doing cartography, *surveying unknown landscapes*, and this is what [Foucault] calls 'working on the ground'. One has to position oneself on these lines themselves, these lines which do not just make up the social apparatus but *run through it and pull at it*, from North to South, from East to West, or *diagonally*. [my emphasis] (Deleuze, 1988: 159)

In an apparatus, a body is a nexus 'run through' by power lines. However, *withdrawal does not amount to establishing a new line*. Lineal mode of operativity embodies a network ontology, a linearity of cause and effect, a plan or a project, a technique embedded in the apparatus. Withdrawing is situated within the ontology of the present, but it *tends* and *yearns* towards a different

4.03. *postajanje-zemlja*. Performance documentation. Photo: Neda Mojsilović. 21 January 2016, Cultural Front Belgrade.

mode. Infraphysics for me is about *pulling power-knowledge lines away from the line-ing,* and *not making another line*. It is about withdrawing from the power of the point and the line altogether. Ecology needs to leave the domain of modern options that connect or disconnect, include or exclude. This other mode of intra-action is that of becoming, which takes place through assemblage dynamics, an open field of multiplicious (self-)touching of possibilities.

Let me dwell a little further on this line. Lines, as used in apparatuses, are closely connected with domains of strategy or tactics, which implies a friend and an enemy. In DG terminology, becoming actualises along a 'line of flight' or a 'line of escape' (*ligne de fuite*, in French), which has a genealogical affinity with 'war machines' (1987: 222-3, 412, 422). A 'line of flight' is a nomadic answer to the State, and in itself it can be creative or destructive (ibid.: 423). In Reza Negarestani's DG-inspired proposal for a 'polytics' of 'radical openness', the key 'schizotrategy' consists in "'calling here' (summoning), *engineering a line of attraction for the outside*" (2008: 202). What i find unsatisfactory in these figurations is that they remain in the realm of oppositional methodologies. These doubts of mine have been given voice in Keller Easterling's analysis of military metaphors in DG, Paolo Virilio, Hardt & Negri (2014: 121-8). Schizotrategies and lines of flight in important ways remain related to Clausewitz's logic of warfare, and ultimately, reproduce the logic of the binary, even if from the minor side (ibid.). Polytics of becoming, i believe, has to imagine a radical alternative to the dynamics of the apparatus, it has to withdraw from it and occupy itself differently.

As i described in the analytical part, there is a difference in dynamics between apparatus and assemblage, which has to do with *how* they enact their differences within and without. In the last instance, apparatuses cannot help but cut the difference together/apart, while assemblages maintain/nurture flows of differentiation. Apparatuses create territories, whereas i claimed that assemblages are fields. Withdrawal from apparatus toward assemblage is thus about turning a line of power into a multiplicity, re-orienting a territory into a field of resonance in which power 'disperses'. To enact withdrawal is not merely

4.04. *postajanje-zemlja*. Performance documentation. Photo: Neda Mojsilović. 21 January 2016, Cultural Front Belgrade.

to re-orient the agential cut of an apparatus, to reconfigure inclusions and exclusions, but to institute a plane of collective possibility that is not of territorial sorts. Field of assemblage is the open spacetime of mutation, hybrid indeterminacy, transing or traversing.

In an apparatus, withdrawal can 'begin' by 'facing the inhuman' (Barad, 2012a): situating performativity 'anamorphically' (Dean, 2016) to the dynamics of apparatus. Becoming-plant is not about connecting with a plant to create a larger network of beings [the limitation i have experienced with my *dancing ecology,* see 3.1.b.]. Minoritarian ecology is about sensitising oneself to what/whom was "always already there" (Dolphijn, 2015), *facing us*. However, it is not in the possible to 'see' or 'articulate' the virtual (inhuman) within a given apparatus. Touching 'anamorphically' along the 'cracks' or transition zones among the planes of the apparatuses is one way of 'seeking the secluded' (e.g. peri-capitalist spaces where 'salvage accumulation' happens) [or, in *cut grow buy sell*, see 4.2.a.].

Another movement is to traverse possibles of multiple apparatuses, because they 'see' and 'articulate' differentially. By cross-breeding their mutual (mis)translations, axiomatics, and speeds, untranslatable hybrids of signs and gesture may emerge. [For example, the hybridisation of various data practices and bodies in *office of ecological labour*, see 3.5.b.] These hybrid compositions do not sit well with any of the original apparatuses, they may 'fit' better with the inhuman. I call this hybrid apparatus minoritarian. This apparatus is still to a degree connected to the majoritarian diagrams through supple and porous relations, it still responds to a certain logics but it seeks to become-other-than-itself [*all that is air melts into city*, see 4.3.b.]. Instead of a 'xeno-call' (Negarestani, 2008: 203) to the outside in order to turn "the outsider into an insider" (ibid.), a minoritarian apparatus needs to perform a polymorphous call that shouts (back) at the apparatus of capture in a language it partially understands, *and* to silently gesture (forth) to the cracks in the possible, towards the 'murmurings' of the virtual, the inhuman. The inhuman is not mute and it does not speak either (Barad, 2012; 2015). Minoritarian apparatus is a

4.05. *postajanje-zemlja*. Performance documentation. Photo: Neda Mojsilović. 21 January 2016, Cultural Front Belgrade.

resonance of summoning within and without the apparatus, a withdrawal of the logic of the cut, creating conditions for the occupation of the inhuman. But it is not an assemblage yet.

Assemblage is a common praxis among bodies in difference, a capacity of common intra-action that generates difference. It means an absolute withdrawal from the apparatus dynamics, a 'rupture' in its strata (Philippopoulos-Mihalopoulos, 2015). This rupture is not a break, it is an affirmation of dis/continuity of becoming, a quantum leap from the dynamics of the cut into the dynamics of transversal differentiation. Rupture evokes a violent action with a hammer, but this is misleading because hammer can be directed only at the possible. Rupture is a *situated touch* with 'anotherness' (the virtual), but, as Barad explains, in the domain of electromagnetic fields, it is impossible to touch the alterity directly (2015)[115]. Rupture is thus also a *dispersal*, an in/determinate proximity to difference, a transmission of resistance. It is a formation of an intimate 'zone of proximity' where 'response-abilities' disperse and situate, an interplay of '(self-)touchings'.

Rupture—touch is a stream of quantised particles of possibility from the 'grid' into the 'void', an almost-silent murmuring of yearnings for a quantum field of indeterminate freedoms. Touches—dispersals are content of absolute withdrawal, however expression of this intra-action cannot be known in advance. It affirms an already existing dis/continuity in the fabric of apparatuses, a continuum in "virtual exploration of every possibility" (Barad, 2015: 399), some of which may or may not flash in the intense becomings. Enter-the-secluded-exit-the-subjects: a meeting along a threshold where exit and entrance *un*fold and agencies *en*fold. Situated touch—dispersal is a quantum leap in the collective tissue of an apparatus, a group transition from a state of power to a field of freedom.

As Lyotard claimed, ecology is "the discourse *of* the secluded". It is not only a

115As Karen Barad explains, electrically speaking, electrons cannot touch one another, it is only electromagnetic resistance that can be sensed. "Electromagnetic repulsion: negatively charged particles communicating at a distance push each other away" (Barad, 2015: 397).

4.06. *postajanje-zemlja*. Performance documentation. Photo: Neda Mojsilović. 21 January 2016, Cultural Front Belgrade.

question of "listening to and seeking for what is secluded, *oikeion*" and inviting it into "home". 'They' need not come 'into' the family (*oikos*), they are already here, even if it appears that they are not. Why would anyone want to be inside of an apparatus of capture? Withdrawal withdraws from family, from familiality, in order to "engender conditions for the creation and development of unprecedented formations of subjectivity *that have never been seen and never felt*" [my emphasis] (ibid.: 92). The inhuman is the 'great indoors' immanent to the apparatus, yet it does not *belong* to it. 'Discourse of the secluded' is not *about, for* or even *with* the secluded, it implies a withdrawal of discourse from the secluded. Not for another discourse (as apparatus) to come. To withdraw is to occupy (an assemblage), to become occupied by anotherness.

Withdrawal is not a goal in itself, but a performative intra-action of undoing the apparatus and inviting the possible. Practically speaking, i see it as a collective creation of an apparatus of minor disposition, an apparatus that withdraws from boundary-making, diagramming, disposing, and, finally, agential cutting [to different degrees, i have attempted this in *counting live stock(s)*, *office of ecological labour, #copper #love #maintenance* and *mineralizacija*]. *Apparatus withdrawal is turning the cutting*-together/apart *into* (self)*touching*-other.

Touch can only happen when multiple agencies (self-)touch, therefore the horizon of eco-aesthetic praxis lies in intense dispersals of invitations, thousand tiny touches to touch. These 'happenings' may flash through minoritarian apparatuses disposed *for* the inhuman, territories that intensify response-abilities *before* a touch happens. Minoritarian apparatus is disposed *before* the inhuman, it intensifies response-abilites *for* a touch to happen. 'We' don't see 'them', but 'we' can feel (by) 'them'. Other molecular agencies abound, bodies feel their way around. An irreducible curiosity of mattering dwells in-between, within, and without the apparatuses of capture. Touches may come to touch.

[This is what i have attempted, especially in the ongoing *we ♥copper & copper ♥us*. Whether 'it' 'happened', and to what degree, is not (only) for me to tell.]

5.01. *burning hearts of a thousand tiny matters*. Viva exhibition, installation view. Photo: Marika Troili. 1 – 5 February 2017, Ambika P3, London.

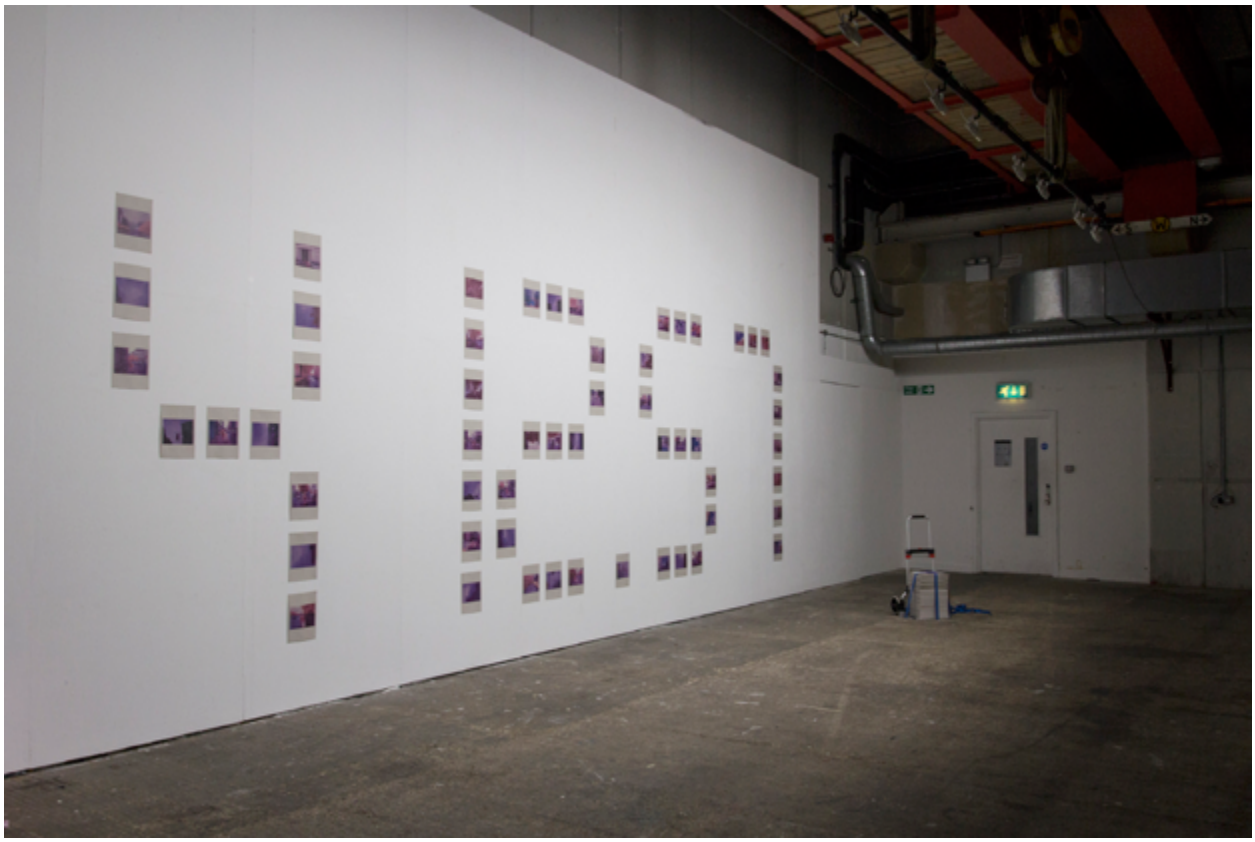
5. Conclusions:
For posthuman commonings

5.1. A becoming of praxis

The research set out from a question of how to create spaces where different bodies can 'meet' in their mutual differences, and engage in a 'shared conversation' across the binaries of the logic of dualism. Through the research process i intra-acted with material bodies, and these encounters mod(e)ified (and were modified) by the research questions. These entanglements can be best sensed in the trajectory of the praxis. What i will seek in this concluding section is to analyse the touches and ruptures that appeared in the process. First, i will summarise the three performative modes of the praxis[1].

The first performativity of my eco-aesthetic practice, is, after Foucault, an 'ontology of the present', a critical analysis of the operative 'protocols' that govern relations between humans and earth others. Ontology of the present in this research springs from ecofeminist analysis of the 'logic of dualism' or 'colonisation' (Plumwood, 1993). The system of binaries forms a general 'web of oppression' (Plumwood, 1992) that operates throughout cultures and natures as a material-discursive system of 'functional differentiation' (Wolfe, 2010) or 'state of exception' (Agamben, 1995), which, by way of exclusion, appropriates agency and power. Mechanisms of appropriation-by-exclusion support capitalist economies, imperialism and patriarchy (Mies, 1986; Federici, 2012; Moore, 2015). The epistemological dimension of this project can be seen in representationalism, which creates separate 'kingdoms' of words and things, knower and known, mapper and mapped, image and world. Especially

1 In line with the espousal of performative ontology (Pickering, 1995; Barad, 2007), all the methods in the research are taken to be entanglements of discursive and material. For details, see 2.1.

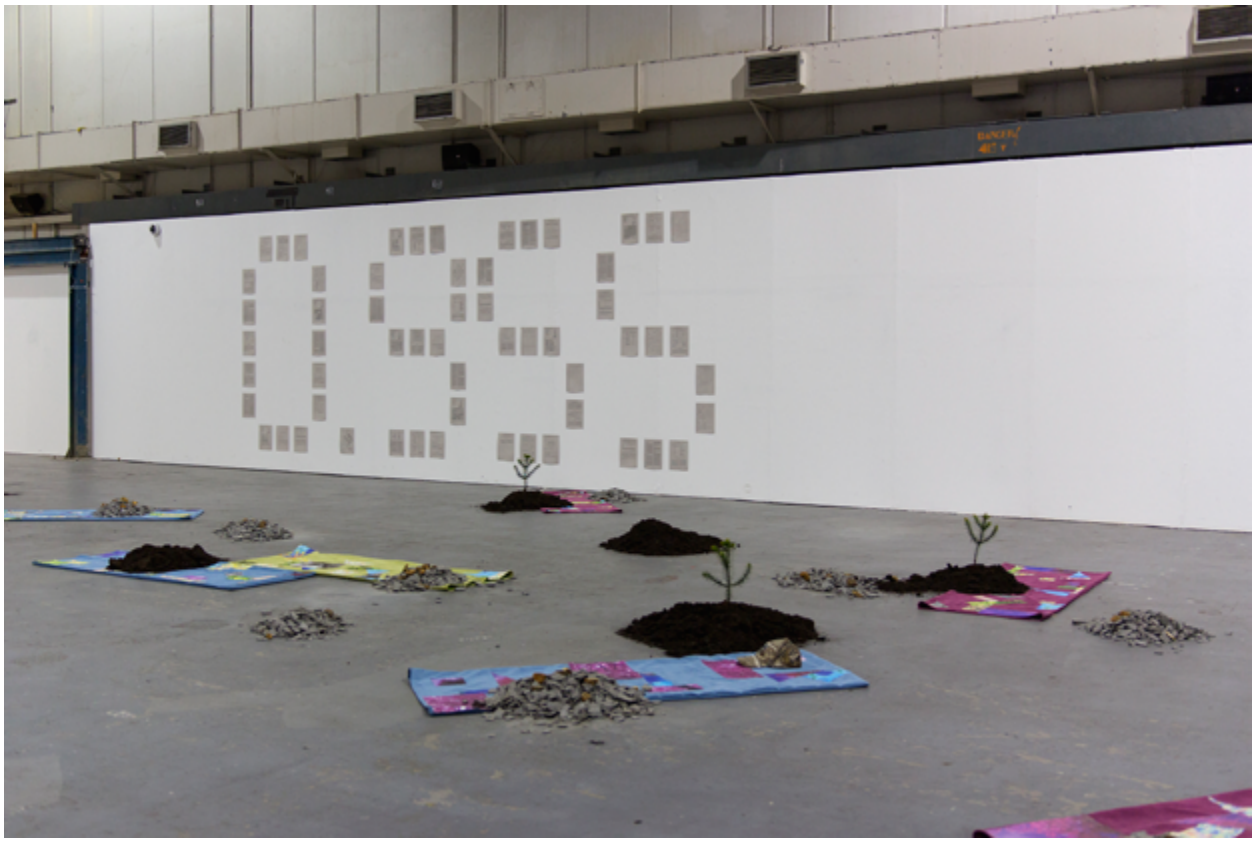


5.02. *412,57 particles per million of carbon-dioxide in the air of London*. Documentation from *all that is air melts into city*, presented at *burning hearts of a thousand tiny matters*. Photo: Marika Troili. 1 – 5 February 2017, Ambika P3, London.

problematic modes of dualisation that spring from representationalism are information (cybernetics), mapping, and, perhaps most pervasively, network (here taken both as ontology and information architecture). These material-discursive practices are understood here to operate as boundary-making systems that pervade the social field. In this project i have sought to develop situated performative approaches that propose and enact a different logic, an infraphysics of becoming with earth others.

An existing constellation of alternative world-making projects, recent object-, matter-, and nonhuman-oriented philosophies, provided territories in which to situate my praxis (see 1.4–1.7). By following their areas of concern and intervention, notions such as object, matter, and nonhuman have begun to be alleviated from the grids of the logic of dualism. With this non-binary approach, i join a transversal shared conversation between arts and philosophy, that i have tentatively called *a posthumanist art—philosophy continuum of experimentation*.

The second performative mode of praxis is what i have called analytics of the possible. Based on agential realist elaboration of agency in Karen Barad, Foucault's and Deleuze's notions of apparatus and assemblage, as well as Barad's own understanding of apparatus, i have postulated two distinct dynamics of spacetimemattering, two modes of (re)production of difference. Apparatuses (*dispositifs*) are performances of boundary-drawing, enacted by an 'agential cut' that determines what 'comes to matter' (Barad, 2007) and what withdraws/virtualises (De Landa, 2002; Harman, 2005; Philippopoulos-Mihalopoulos, 2015). Through iteration of 'agential cuts', apparatuses 'stratify' power-knowledge diagrams (Deleuze, 1988), possibility spacetimes of a given formation. From the stratification of apparatus techniques emerges the disposition of the apparatus, which can be majoritarian or minoritarian. Majoritarian apparatuses tend towards control of possibilities, while minoritarian apparatuses try to keep the boundaries open. Assemblage (*agencement*) is a 'polyphonic' (Tsing, 2015) performance of differentiation in



5.03. *0,955 US dollars for twelve point six kilograms of Parys mountain*. Research archive, *we ♥ copper & copper ♥ us,* presented at *burning hearts of a thousand tiny matters*. Photo: Marika Troili. 1 – 5 February 2017, Ambika P3, London.

which agencies experiment possibilities of becoming-other. Some of these desiring experimentations actualise in flashes of becoming (DG, 1987), transformations in collective possibilities, emergence of new 'symbioses' or 'sympathies' (Deleuze, in De Landa, 2006: 121). Following feminist critical epistemologies, i have claimed that assemblages can be characterised in terms of collective practices of knowing/being, where i draw on feminist standpoint theory and Haraway's notion of situated knowledge (1991). Posthuman assemblages as knowings in common are 'situated-dispersals' (Górska, 2016) of accountability and response-ability. Assemblages are locations of posthuman polytics of becoming (Rich, 1984; Braidotti, 2011).

Apparatuses and assemblages are not two exterior or opposed types of bodies, but different performances of spacetimemattering that cross-cut and entangle among themselves. Modern protocols that enact the logic of dualism essentially perform according to the apparatus dynamics, determining power based on inclusions and exclusions. By re-interpreting the logic of apparatus with Deleuze and Guattari as a mode of production of majority and minority (1987), a polytics of becoming was postulated as consisting in minoritarian reconfiguration of apparatuses, unfolding their power relations to affirm the oppressed differences.

I called this type of performance a minoritarian apparatus, a 'summoning' of multispecies assemblages. This is the third performative mode of my posthuman praxis: *infraphysics of becoming*. The three modes—ontology of the present, analytics of the possible, infraphysics of becoming—are co-constituted through intra-action with other material-discursive nexuses. The research proceeded through situating (ontology), orientation/disposal (analytics) and infraphysics (eco-aesthetic performance): learning to know where one is located through the critique, what the possibilities are, and experimenting towards more open and multiple possibilities. These modes mattered in the same way, but to different degrees and intensities at different points. At their most intense, various discursive and material bodies came together/apart in site-specific eco-

5.04. *burning hearts of a thousand tiny matters*. Installation view. Photo: Marika Troili. 1 – 5 February 2017, Ambika P3, London.

aesthetic performances.

The performances developed were embedded in the context of everyday life, starting from my own body and inviting other neighbouring bodies. Following feminist economic analysis, it was understood that 'frontiers' of appropriation are ubiquitous in the present informational economy. Based on this, home and office became the first site of performance. In early *dancing ecologies*, i suspended my quotidian mores in order to 'dance' around a household plant as a mode of shared 'immaterial labour' of breathing. Subsequently, by tracing material apparatuses of biopower over trees, i tried to re(con)figure the supply chain of paper that runs from a forest to the stock exchange (*grow cut buy sell*, *black box white paper*), and to slow down the economy of 'carbon trading' (*all that is air melts into city*). Intra-actions emergent in these works made me reconsider the networked modality of work i had adopted up to that point. In the projects that followed, a greater emphasis was placed on in/determinacy, a sensing of zones of freedom and desires of the bodies involved.

office of ecological labour and *counting live stock(s)* intensified the key operations of the apparatus dynamics (its agential cutting and territorialisation), through emphasis on numerical and coding procedures. By placing myself and human co-performers firmly along the power lines of apparatus, what began emerging more distinctly are latent possibilities of apparatuses. By occupying the thresholds of possibilities, these performances started torquing the apparatus against itself. Numbers were not any more coded signifiers, they became bodies, that, in proximity of other heterogeneous bodies, showed more vividly the difference as it is made and unmade (translated). Slowly, 'through-and-against' apparatuses, the performativity started 'reorienting' (Philippopoulos-Mihalopoulos, 2015) towards the inhuman.

From an engagement with air and associated processes, the second group of the projects moved towards earth. In *#copper #love #maintenance*, a more

5.05. *0,086 euros for eleven Chilean pines*. Printout of Directive 2003/87/EC of the European Parliament and of the Council of 13 October 2003 establishing a scheme for greenhouse gas emission allowance trading within the Community and amending Council Directive 96/61/EC. 2017. Research archive, *all that is air melts into city*, presented at *burning hearts of a thousand tiny matters*. Photo: Marika Troili. 1 – 5 February 2017, Ambika P3, London.

expanded performativity was sought by situating and dispersing desire from and across the internet. This project in particular has yet to come to full completion, but, in its firts phase, it created an entanglement with earth bodies that has then occupied the rest of the research. In *mineralizacija*, i hope to have enacted a minoritarian apparatus that might have touched upon the possibility of assemblage. I (self-)touched a rock and was (self-)touched by it[2]. Admittedly, in everyday life, i touch and am touched by rocks many times. However, meeting rocks in the conditions of a smelting and mining combine is a different power relation. When i came to meet rocks cooling down on the pile of slag next to the smelter in Bor, the rocks had been through a lot (mining, flotation, furnace). I had to make my way through a web of institutions, technologies, and discourses. At that moment, both the rock and myself were relative minorities in the context. I picked up these rocks and unmined them, i.e. took them through and away from the apparatus of extraction. In this asymmetrical intra-action, where i certainly still was a majority, i became response-able for a number of rock bodies. The determinacy of the extractive-industrial apparatus was made more porous and indeterminate for the spacetime of this intra-action. I have withdrawn the rocks from further extraction, while i have withdrawn from my own extractivist subjectivity to become occupied deeper by the lithosphere. This performance involved a number of other humans and bodies, and i believe they have experienced different degrees of withdrawal and occupation as well. If this performative apparatus effectively became an assemblage is something that extends beyond the contained spacetime of that situated intra-action, at this stage it is to the earth to respond.

2 For the explananation of (self-)touching as a dynamics of knowing/being, refer to section 2.4.

5.06. *burning hearts of a thousand tiny matters*. Installation view. Photo: Marika Troili. 1 – 5 February 2017, Ambika P3, London.

5.2. Affirmation of in/determinacy

From the above, i will try to respond to the first research question: how to perform shifts from dualistic apparatuses towards posthuman assemblies. Understood as an actualised gathering of heterogeneous agencies experimenting with their singular freedoms, a key understanding gathered is that *it is not possible to 'set up' or 'organise' a naturalcultural assemblage*, lest of re-creating a power diagram and hierarchical apparatus. Assemblages cannot be created or designed by a subject who then implements a plan. This is the most important lesson i have learned from new guinea, dragon trees, carbon-dioxide, sheep, and minerals. But this is not a negative answer, it is troubling and messy, but only if taken from the apparatus perspective.

The situatedness of this research are apparatuses of biopolitics and biocapitalism, this is where its performativity begins. In this nexus of late capitalism, art, and research, all one 'sees' or is afforded to see are subjects and objects, protocols, codes, disciplines. However, these apparatuses capture only a fraction of a multiplicity of worlding processes. Apparatuses themselves participate in (re)production of in/determinacy, recreating the conditions of dis/continuity which are constitutive of the way in which matter 'comes to matter' (Barad, 2003). Learning from quantum physics, we see that even electrons are profoundly 'queer', tirelessly experimenting with their own identity and possibilities for change (Barad, 2012, 2015). However, this nature's 'queer performativity' (Barad, 2012) is suppressed in most contemporary social practices. How to render justice to this immanent and intimate 'tethering' of matter, to its in/determinacy, is not only a micropolitical or quantum problem. The in/determinacy of matter, its capacity to self-experiment has to do everything with large-scale bodies, the birds, the cattle, the climate, the stars. Through my encounters with heterogeneous bodies, i have been learning how to get sensitised to some of this excitedness pertaining to intra-actions of matters.

5.07. ‘Shining breathing’ with *burning hearts of a thousand tiny matters*. Photo: Marika Troili. 1 – 5 February 2017, Ambika P3, London.

Bodies want to move or to stand still. Eco-aesthetics is a matter of how to intra-actively touch and be touched by these performances.

Touching is a matter of response-ability of multiple bodies, of wasps and orchids, of cats and humans. 'We' as humans are already implicated in so many of these touches, these are assemblages that keep us alive. It would be impossible to breathe for a second without them. Affirmations of desire and possibilities, yearnings of matter, is ethico-polytical intra-activity of the world that never stops. I take it that ethico-polytical in/determinations are being co-performed by lions and zebras, as well as algae and the sun. No relation is settled 'once and for all', and settlements can collapse or be renewed anytime. The human is always differentially accountable and responsible to other bodies, and others are as well. 'Choices' and 'freedoms' are a continuous performance, a 'cosmopolitics' of matter (Stengers, 2004). The key word here is 'differentially', because each body is differently emplaced within the folds of spacetimemattering, and, what is specific (but not extraordinary) for humans is the extent of forces that they partake in it especially via bio-political and -capitalist apparatuses.

From where i stand, amidst an art/research apparatus which is in relations of dis/continuity with biocapitalism, imagining environmental posthuman justice begins with 'self-withdrawal' (Philippopoulos-Mihalopoulos, 2015). *Self* is part of the apparatus, it is performed by and it sustains the apparatus in its turn. Self-withdrawal is thus a beginning of withdrawal of the dynamics of the apparatus, of its boundary-making, power-knowledge, territory. It is desubjectivation, a leaving of the territory that pulls an ensemble of power lines away from the majority of the apparatus. The question is not where to withdraw. Withdrawal does not amount to 'exiting' from a perceived union to an independence, which amounts to creating another apparatus, perhaps with more power or determination in 'our' hands. Self-withdrawal is a deeper enmeshment with the proximate bodies, seeking 'neighbours' or proximates that one didn't *know* were there. In the way biopolitical apparatuses distribute 'light', they almost always 'invisibilise' the inhuman (Philippopoulos-

5.08. ‘Reassembling healing’ for *burning hearts of a thousand tiny matters*. Photo: Marika Troili. 5.07. 1 – 5 February 2017, Ambika P3, London.

Mihalopoulos, 2015). Yet, *it* is 'always already' here.

In order to work around this relative blindness produced by any apparatus (even animals and plants see selectively), a 'self' needs support. By torquing multiple apparatuses away from themselves, a transversal apparatus can take be affirmed. This minoritarian apparatus 'sees' in multiple ways, it 'touches' in multiple directions. It is still conditioned by majoritarian apparatuses, but it decelerates the agential cut and power-knowledges, it creates a zone of 'approximation' (DG, 1987). By collectively experimenting with disposition, minoritarian apparatus is trying to 'face the inhuman' (Barad, 2012). Karen Barad call this methodology of intersecting apparatuses 'diffraction' (2007). More in line with the situatedness of my practice, i feel affinity with 'situated-dispersal' (Górska, 2016). Minoritarian apparatus is trying to 'face' and to 'summon' a touch of anotherness. *Facing-summoning* is one side of this apparatus, the other one is *touching-becoming*.

For differences to 'meet', this implies that a majority (in this case, the human), and a minority (in this case, the inhuman) touch. Assembling posthuman ecologies is thus a matter of (self-)touching the earth bodies. 'We' cannot know what the earth truly 'wants', but 'we' can keep on approximating its desires. Because i am implicated in infinitely many intimate ways with the earth, and my desires are not (only) my own, touches may come to touch. Posthuman becomings, realisation or virtualisation of naturalcultural commons, is about a situated intensification of desires that are 'always already' there, they are the 'latent commons' (Tsing, 2015). Becoming as an assertion of freedom of coexistence is always multiply enacted across bodies, species, lines.

A 'rupture' in the logic of apparatus thus comes from in-between, not from my own or something else's will. Rarely it is a geometric "meeting halfway", more commonly it is asymmetrical (as when the earth and lightning meet). To assemble is to become occupied by anotherness. This can only happen "by heart, by will and by chance" (Dolphijn, 2015: 197). Therefore, assemblage intra-action is a "loving perception" (Lugones, 1988) of difference. As i have tried to show,

5.09. ‘Reassembling healing’ for *burning hearts of a thousand tiny matters*. Photo: Marika Troili. 1 – 5 February 2017, Ambika P3, London.

most of the time, we don't even know who perceives us lovingly, who supports us at each and every moment. This wood, these minerals, this water, this air, this bedrock. At any rate, the world is 'facing' us, listening and yearning.

In the posthumanist continuum, eco-aesthetics is about yearning *for* the inhuman, the plant, the animal, the earth other, learning inhuman loves. Yearning 'for' means facing 'before': before the future, maintaining "the conditions of an open future" (Barad, 2007: 177), and for the past, accounting for the touches that may have already come without them being noticed. Inhuman love is not a relation, a call-and-answer, a utopian future, it is about becoming response-able to what supports us and reproducing possibilities of differential mattering, sometimes in common, sometimes apart. In any given place, some possibilities are more possible than others. Therefore, posthuman mattering is taking responsibility to re-iterate local dispositions, further response-abilities, to support and be supported by more free occupations and withdrawals.

5.3. Posthuman eco-aesthetics in the social

This brings me to the second research question, of how to create and maintain spaces for posthuman performative knowledges in the context of human apparatuses of visual arts and research. In most important sense, this research, art, and knowings are not (only) my own. I cannot represent earth others in this seat, but i try to maintain a minor territory for it to 'come to matter', and to draw myself and others with to face them with 'loving perception'. The research outputs and performances are a trace of material and discursive intra-actions in which i have taken part. Only to a degree these intra-actions were planned or known. I do take a greatest share of responsibility in them, since i have initiated most of them and they marked many bodies, causing injustices, exhaustion, abandonment, and probably pain and suffering. It is to these bodies, my willing

5.10. ‘Rock’n’yoga’ with *burning hearts of a thousand tiny matters*. Photo: Marika Troili. 1 – 5 February 2017, Ambika P3, London.

and unwitting associates and co-conspirators (co-breathers), that my responsibility lies with, first and foremost. I have also been marked in these intra-actions, and i carry memories of them, as well as forgettings. Responsibility also lies 'before' a future, to iterate accountability, to 'begin' again, to go back to the bodies, to keep 'our' material stories alive.

Telling a story of naturalcultural performances is the problem of the 'can't yet must' of representation, as Astrida Neimanis pointed out (2015). How not to re-create apparatuses of capture, how not to reappropriate agencies for one's own purposes, is a constant struggle that permeates each performance, their documentation, and writing through them. In some seats i will have taken over, in others more just happenings will happen.

It is key to try to affirm that these performances and knowledges thus produced are not entirely 'human'. "The stories we know of stone will always be human stories…" (Cohen, 2015: 11). This is true, but some 'human stories' can also be shared conversations for/before a stone, posthuman gatherings that do not fully belong to any one, a posthuman commons of knowing, sensation and desire. To decolonise the apparatuses of art and research is another important practice that goes in hand with decolonisation of nature. This is what, i believe, Cary Wolfe points at when he envisages posthumanist thinking as "mutational, viral, or parasitic form of thinking" (2010: xvi, xix). It is about re-iterating this parasitic openness, porosity, in/determinacy through the praxis, allowing it to become and remain not only mine and not only human.

In light of this, it is essential for the posthuman eco-aesthetics to withdraw from territories that it stakes at the present. One possibility of this consits in putting to work minoritarian apparatuses that intra-act in-between arts, sciences, technology, politics. By creating minoritarian modes of co-work, instead of keeping eyes on one another, the question becomes how to collectively withdraw to open decolonised zones of approximation where inhuman may come to matter. In the case of this research, minoritarian ethos was co-produced through material-discursive intra-action with posthumanist authors that

5.11. ‘Rock’n’yoga’ with *burning hearts of a thousand tiny matters*. Photo: Marika Troili. 1 – 5 February 2017, Ambika P3, London.

incessantly troubled many of my aesthetic determinations. Even more demanding was radical in/determinacy that extra-human bodies kept re-asserting, a constitutive power that can only be celebrated by becoming-minor in regard to the established modes of making art, where 'author', 'object', 'medium', 'action' are pre-determined bodies or processes.

With Elizabeth Grosz (2008), the disposition of posthuman art is to participate in a broader 'evolutionary art', an art of co-performing 'aparallel evolutions' (DG, 1987: 11). A posthuman art, an eco-aesthetics that desires posthuman justice, is trans-individual and extra- or rather infra-disciplinary, 'extending' the social through spacetimematter into 'deep times' of pasts and future, while being rooted in the urgency of here and now. It is an art of re-iteration, re(con)figuration of bodies with other bodies. Some naturalcultural performances may need to extend across generations and millennia[3].

Will this minoritarian posthuman-oriented eco-aesthetic be any closer to a more-than-human environmental justice? Bodies come together and apart through thousands of tiny and less tiny 'efforts', and facing this mattering buzz with response-ability is to invoke possibilities of becoming. From my situated location as a quasi-modern quasi-human, to experiment ways of 'meeting halfway' with unique, singular squirrels, spiders, and multitudes of earth others looks so obvious yet glaringly unknown. "In this matter, the truth is that we haven't seen anything yet" (DG, 1983: 240), or painfully little. Matter is 'flush' with imaginings to become, and some of these worldly possibilities (self-)touch the possibilities of the human present.

3 This is made painfully obvious, for example, in the case of temporalities invoked by nuclear energy. A recent exhibition, *Don't Follow the Wind* (2015 -), initiated by the artist collective Chim↑Pom, and curated by Kenji Kubota, Eva and Franco Mattes, and Jason H. Waite, takes place in the Fukushima Exclusion Zone. It is the area of radioactive melt-down of Fukushima Daiichi power plant following the tsunami in March 2011. At the present, the exhibition is inaccessible to (human) audience, and the website of the project is a blank page with a short verbal announcement. However, even beyond these 'hyperobjects' (Morton, 2013), there are innumerable other encounters that shape our everyday latent commons.

5.12. *burning hearts of a thousand tiny matters*. Exhibition view. Photo: Marika Troili. 1 – 5 February 2017, Ambika P3, London.

5.4. Posthuman ecology and climate justice

In the course of this research i have been touched by numerous other projects, but i have not been able to respond to all of them. However, i feel responsible to point them out to my posthumanist and other companions. I hope to accept some of these invitations in the future, and to extend hospitality to some of them. Further dialogue of posthumanism with feminist intersectional theories, especially with regards to race and social locations and struggles is central. How to move towards enacting "thousand tiny races" (Saldanha, 2006: 20), "thousand tiny intersections" (Dolphijn & van der Tuin, 2011), "thousand tiny sexes" (Grosz, 1993) is a matter of collective transversal experimentation. These intersections go beyond theory, and should be put in shared conversation with social movements, something to be learned from the recent conjunctions between movements for racial and environmental justice in the U.S. (McKee, 2016). Commons as key notion of recent social struggles against the propertisation of life (Hardt & Negri, 2008, 2012; Linebaugh, 2014) has important potentials for imagining and enacting an earth-centred polytics, as already outlined by Miriam Tola (2015). Further *rapprochement* between the new generations of materialisms, in which i have been immersed, with previous generations of materialist thought is due, as Diana Coole envisaged with 'capacious historical materialism' (Coole, 2013). Lastly, and perhaps crucially, a great attention and effort is needed to counter the still ongoing minoritisation of non-European, non-Western philosophies and arts, in academia and beyond. Posthumanisms and neomaterialisms are especially responsible in this context, as their claims sometimes have affiinities with indigenous or nonmodern philosophies, however these connections are often unacknowledged or omitted, something which Zoe Todd (2014) and other indigenous scholars rightfully insist on. Decolonising research methodologies, artistic practices and academia are constituent parts of a struggle for climate justice (Demos, 2016: 22-25).

5.13. *burning hearts of a thousand tiny matters*. Exhibition view. Photo: Marika Troili. 1 – 5 February 2017, Ambika P3, London.

To continue, i will turn towards another assembly, an act of radical social imagination that resonates strongly with posthuman polytics and aesthetics. In 2010 at Cochabamba, Bolivia, People's Climate Change Conference, set up as an alternative to the UN Conference of Parties, voted in the Universal Declaration of the Rights of Mother Earth. Although it is fashioned after the humanist ideals of 'universal rights', the Declaration reorients the modern lawscape away from itself to gaze into the cracks it produces. The Declaration states:

> (1) Mother Earth is a living being. ....
>
> (5) Mother Earth and all beings are entitled to all the inherent rights recognized in this Declaration without distinction of any kind, such as may be made between organic and inorganic beings, species, origin, use to human beings, or any other status.

The assembly of People's Climate Change Conference to my knowledge did not involve direct consultation with extra-human bodies, however, it created a zone of approximation that faces towards earth others. The powerful corporations of extraction are still casting their powers over the forests of Ecuador and Bolivia, but the Declaration summons an 'existential territory' on which different types of 'shared conversations' and legal struggles can be enacted. As the text itself reveals at a closer inspection, humans do not 'know' how to implement these rights, even what the 'specific' rights of singular species or bodies. The Universal Declaration of the Rights of Mother Earth is a beginning of many practices of assembly to come.

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5.14. Meeting Östergårdsgrufvan. Kemiönsaari, Finland.

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g. Appendix I:

postajanje-zemlja:
#occupy #withdraw #copperlove[1]

occupy tilt withdraw atmospheres lithosphere mechanosphere
decelerate copperlove

they come from late Mesozoic — eighty-four point six million years ago
#copper #foreveryoung

Copper-gold area of Bor-Majdanpek, East Serbia, is home to world-class minerals. Humans have looked for copper since about 5,500 BC. Modern mining began in 1903.

Not everything is metal, but metal is everywhere. Metal is the <burning heart> *of all matter*[2].

Miners of early Eneolith followed natural canals of the ore's body, the size that allowed access to one or two human bodies. They entered the strata up to the depth of around 20m, lower limit of oxidation zone.

"they grow slow …… yet they grow, 'ripen' in tellurian, earthly darkness."[3]

nomadic inorganic lively mediators
neurons transistors resistors capacitors

1 This text is the performance score of off-site storytelling about *we♥ copper & copper ♥ us.* It is an ongoing diary of my intra-actions with mineral bodies. On each occasion it is performed differently, usually in accompaniment to the audiovisuals of *mineralizacija*. For the show at KC Grad, i performed a version in Serbian.
2 Based on Deleuze & Guattari (1987).
3 From Eliade, M. (1962) *The Forge and the Crucible*. Chicago: University of Chicago Press.

metallurgical triangulation
planetary computation
panpsychic senses
internet of stones

nonhumans *other than nonmen*[4]

Historically speaking, mining has been understood as giving a hand to the earth to accelerate its processes of mineralisation.[5]

A mountain peopled by-'unique, individual' matters, desiring-machines of multispecies confederations hybrid intra-actions breakbeat diffractions chaosmosis unearthly symbioses
dances to dance beyond mankind

humans and #copper, a complicated affair ongoing for about 10,000 years

The results of the investigation indicate the presence of hitherto unknown base-metal mineralisation, accompanied locally by gold. ...airborne electromagnetic data were confused by transmitter interference and the magnetic data was of very limited use in detecting where minerals grow.[6]

different lives differing speeds atmospheres that make difference

The first prognosis show that the Mining and Smelting Combine will finish the year with a "positive zero".

4 Following Rosi Braidotti.
5 Following Mircea Eliade (1962).
6 Based on Cooper, D.C., Nutt, M.J.C., Smith, I.F., Easterbrook, G.D. (1989) *Base-metal and gold mineralisation in north-west Anglesey, North Wales*. Technical Report WF/89/2. British Geological Survey.

"...exploration & #mining venture depends on a number of factors,
imponderable and ponderable"[7]
geology ≠ rationalist epistemology

#cuprite beyond (human) measure

the hardest net-workers of us all
#silver #platinum #tantalum #aluminium #zinc #gold
behind the screens, matter sweats
refuse the '#labour of #love'
demand #wages for #earthwork

It was found that the airborne electromagnetic data were confused by
transmitter interference
and the magnetic data was of very limited use in feeling
where minerals grow.[8]

technophilia ≒(double bind) geophilia [mineralophilia?!]

not only you and me, "*all* the species are being mined, #data mined, earth mined"[9]

"... after many centuries of looking, the successful discovery of workable mineral deposits took eight years of intensive shaft sinking and related exploration..."[10]

"I think you value consciousness too high and rock too little"[11]

7 Amstutz, G.C. In Gasparrini, C. (1993) *Gold and Other Precious Metals: From Ore to Market*. p. vi.
8 Based on report of Anglesey Mining Plc.
9 Following Rosi Braidotti.
10 Based on Cooper, D.C., Nutt, M.J.C., Smith, I.F., Easterbrook, G.D. (1989) *Base-metal and gold mineralisation in north-west Anglesey, North Wales*. Technical Report WF/89/2. British Geological Survey.
11 Kim Stanley Robinson in Wark, M. (2015) *Molecular Red*.

#copper ≠ mind & #copper ≠ matter

"The problem will be further exacerbated by the near cessation of mineral exploration particularly at the grassroot level …
as current mines reach the end of their natural life."[12]

share the 'fragility of things' with #tantalum #yttrium #europium #neodymium #lanthanum[13]

freedoms to move freedoms to rest

Deep Engine inferred anonymous veins—six hundred thousand eighteen tonnes —whose population is made of one point ninety-five copper, four point twenty-two zinc and zero point two grams per tonne of gold

copper(I)-sulfate is not reducible or irreducible to anything else

est. total #copper recoveries from so-called waste:
- Africa: 40% in 1994; - China: 70% in 2005; - Europe: 73% in 1999; - Latin America&Caribbean: 84% in 1994; - USA: 49% in 1994

labour point of view of
#copper #silver #platinum #europium #tantalum #lanthanum #yttrium #aluminium #zinc #gold

socially necessary unpaid work
to some society to some necessarily unpaid work

Do minerals "struggle for life", like we do, in their own unique, singular ways?

12 Anglesey Mining Plc (2015, 27 Nov) Half yearly report for the six months to 30 September 2015.
13 Following William Connolly.

un-oedipal triangulation
iron copper sulphur
oxidations conversions fusions
fireworks red lights butterflies[14]

'~~people~~ minerals are strange, when you're a stranger'[15]

possible futures of #copper are *"not* sufficiently contained in the present"
// each rock a volcano, a brick or a shred for its cabinet of curiosities //

lithics and nonlithics allure, charm & seduce one anothers, summoning unforetold ardent adventures[16]
metals "the strangest things", it's like "loving the alien"[17]

Thanks to the exquisite crafts of planned obsolescence, our phones live so short, too short

"possibilities do not sit still" // earths are not paintings on the wall //

By itself, #copper is #copper; but, "bundled with relations of class, empire & appropriation"
It is the partial object *A* for alfa-male-humans.

"Earth is all the free resources - gifts of nature - usable in production"[18]
#capitalism vs. #nature[19]

14 Following Aleksandra Mitovski.
15 Following the Doors.
16 Based on Cohen, J.J. (2015) *Stone: An Ecology of the Inhuman*.
17 With David Bowie.
18 After Malthus, in Foster, B. (2000) *Marx's Ecology*. p. 167.
19 Following Naomi Klein.

Lithium beryllium boron magnesium aluminium silicon scandium titanium vanadium chromium manganese iron cobalt nickel copper zinc gallium germanium arsenic sellenium
Strontium yttrium zirconium niobium molybdenum rhodium palladium silver cadmium indium tin antimony tellurium
Barium hafnium tantalum tungsten rhenium osmium iridium platinum gold mercury thallium lead
Lanthanum cerium praseodymium neodymium promethium samarium europium gadolinium terbium dysprosium holmium erbium thulium ytterbium lutetium

they don't have substitutes, on this planet[20]

Copper heart oxygen heart copper
// oxidation joint extra-organic perspiration //

According to the current Serbian mining law, exploration licences are valid initially for three years. They can be extended two times per two years. After each extension, surface of the permit is reduced by 25%.
// run run run gold is on the run //

to "mix our #labour with the #earth"[21] is a *compulsory* neighbourhood work for post-capitalist post-humans

"how far can you send emotions ooo-oooh
can #copper cross the oceans?"[22]

Metallurgists of antiquity justified their labours to the gods saying that they

20 Drawn from the "periodic table of substitute performance" in Graedel et al. (2015: 6298).
21 After John Locke.
22 Based on La Roux's song *In for the Kill.*

“help” minerals to “grow ripe” faster[23]

what holds them together is desire, with and against inverse causations and molecular reconfigurations

surfacing hearts vs. mining earths #copper #tantalum #gold #platinum #zinc #yttrium #lanthanum #praseodymium #europium

The value of production is expected to grow, but the waste flows & CO2eq emissions associated are also likely to increase during the evaluated periods.[24]

“We are leaving the Hole
We haven’t seen any worker with a pickax or a shovel on the shoulder
We haven’t seen any horses pulling ore wagons through narrow corridors
There are no horses left in the Hole
There are only stories about them.”[25]

sous le soleil dans le #plusquehumain #multiverse
proliferating multitudes conspiring animal vegetal mineral insurrections sexual involutions beginnings of wonderful friendships

we don't know yet what a malachite can do

minerals are not really objects nor machines nor subjects nor resources nor materials
// stuffs that some humans’ dreams are made of //

23 Based on Eliade (1962).
24 Based on Tuusjärvi, M., Mäenpää, I., Vuori, S., Eilu, P., Kihlman, S. & Koskela, S. (2013) *Developments in mining and quarrying industries in Finland: Scenarios to 2020 and 2030.* Report of Investigation 200. Espoo: Geological Survey of Finland.
25 Translated from Čukić, R. (1975) *Tamo gde teku bakar i zlato*. Gornji Milanovac: Kulturni Centar.

“Whilst there are some areas in which blue sky is appearing, the expected resurgence in the resources sector that we discussed this time last year has generally not yet materialised…”[26]

labour systems, divestment strategies, and care-taking patterns in which the generation time of information machines became compatible with the generation times of human, animal, plant & *mineral* communities[27]

there are many internets in this world & we are not the only beings in our internet

“The ore is raised from the mine by the whimsey in large heavy masses and is then thrown over a stage onto the ground below where it comes into charge of the cobblers, principally women and boys, copper ladies or *copar ladis*.”[28]

that mineralisation in you and me, holding our soft parts, building freedoms from gravity, intricate x-ray pictures and macabre dances

refusing to forget Tilva Roš, Mynydd Parys, Buenavista del Cobre, Remojärvi, Kytäja, Matkajärvi, Vestlax, Ingesson, Lägsmansgård, Porkkala, Attu, Frankböle, Guldholmen, Simsiö, Kalliokangas, Metsäkylä, Liuhtari, Takaluoma, Orijärvi, Pitkäranta, Outokumpu, Ylöjärvi, Aijala, Luikonlahti, Hällinmäki, Vuonos, Hammaslahti, Pahtavuoma
and other red mountains

where colusite + sulvanite + arsenosulvanite + chalcopyrite + covellite + enargite + sphalerite
grow together

26 Anglesey Mining Plc (2015, 31 Jul) Annual Financial Report.
27 Following Donna J. Haraway.
28 Faraday, M. (1819) Tour in Wales. <http://angleseymining.co.uk/ParysHeritage/faraday/FaradayUG.htm>

meeting the lithosphere halfway, “in this matter, the truth is that we haven't seen anything yet.”[29]

an alien to us, a foreigner, coming from the other side, bringing fire from below or from the sky[30]
// meteorites inteplanetary messengers mineral spacetime travel companions //

halcopyrite lies beyond measure

#copper #love takes time, #deep time

“Significantly other to each other, in specific difference,we signify in the flesh a nasty developmental infection called [inhuman] #love.”[31]

#occupy #withdraw #copper keep it close keep it in the ground[32]

Avicena, around 1000 AD, says that “romantic love” is not uniquely given to humankind, it waves through all that dwells in the skies and in the earth, fervent in vegetal and mineral world.[33]

It has seen things we humans wouldn’t believe… becomings of oolites, concretions, stalactitic-formations, -reniform & -botryoidal-accumulations… All these moments will be lost in time … like tears in a flash furnace … time for metalmorphosis…[34]

29 Following Deleuze and Guattari.
30 Based on Eliade (1962).
31 Haraway, D.J. (2003: 3).
32 Following Naomi Klein (2014).
33 Based on Eliade (1962).
34 Based on *Blade Runner.*

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