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## Radiating Exposures

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**ABSTRACT:** The brief explorations of radiation exposures presented within this essay draw primarily from nuclear art and culture and contribute to the field of nuclear aesthetics, which has long been fixated on the problem of visibility and the representation of nuclear residues. The examples draw primarily from photographic technologies and other aesthetic registers that capture visual residues of radiation. The challenges of nuclear aesthetics are also political and social. This constellation of objects and inquiries is meant to explore the fraught political, environmental, and social relations between radiation, visibility, toxicity, through the concept of *exposure*. They offer feminist glimpses into other ways of thinking exposure, as it develops in relation to (often imperceptible) toxicity that is not inscribed into a logic that partitions the passive victim of suffering from some pure or unaffected subject. They are examples that are both forms of exposure specific to the nuclear while also, perhaps, helping to expose more nuanced and complex ways of understanding forms of exposure that extend beyond nuclearity.

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# Radiating Exposures

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On an overcast afternoon in Paris in 1896, Henri Becquerel opened a dark drawer and accidentally discovered spontaneous radioactivity. He had been studying the absorption of sunlight by phosphorescent uranium salts, hypothesizing that they might re-emit the sunlight as X-rays. But the weather in Paris in late February was not so agreeable to his experiments, and Becquerel, waiting for the next sunny day to test his theory, placed the wrapped photographic plates and uranium salts in his desk drawer. On 1 March, he opened the drawer and developed the plates to find that the image of the salt crystals on the plate was actually amazingly clear. He had discovered that uranium emitted radiation without any sunlight, a phenomenon that his student Marie Curie would later coin 'radioactivity'.

This well-rehearsed historical moment of the chance discovery of radioactivity is one marked by a process of exposure without light. Indeed, Becquerel would later learn that non-phosphorescent uranium compounds also had the same effect on the photographic plate, confirming that the radiation from non-luminescent uranium compounds had the identical effect of rendering an image visible without the presence of light. This moment of chance marks a profound shift in visibility. Thus, early nuclear physics paired with early photographic

technologies contributed to an unseating of (unassisted) vision as the epistemic centre of human experience. As John O'Brian writes in the introduction to *Camera Atomica*, 'Wherever nuclear events occur, photographers are present. They are not there only to record what happens, but also to assist in the production of what happens.'<sup>1</sup> The photographic image, with or without the use of light, is not (only, if at all) a representation or a reproduction of the nuclear event, but actively participates in the construction of the nuclear regime.

In 'La Nucléarisation de monde', Jaime Semprun writes that '[b]ecause nuclear fission acts on the very structure of inorganic matter [...], from now on there is no longer anything to see.'<sup>2</sup> Sven Lütticken likewise identifies the emergence of the nuclear regime as 'exacerb[at]ing] a certain modern crisis of the aesthetic', one that 'confirms that the aesthetic is a practice and theory of crisis.'<sup>3</sup> This early non-luminescent exposure, rendering visible an image of otherwise imperceptible radiation, remains a touchstone of nuclear aesthetics, as well as of the broader crisis of representation that the discovery of the nuclear sciences participated in ushering in. This crisis identified by both Lütticken and Semprun manifests itself in the sciences, as physicist and philosopher Karen Barad's account<sup>4</sup> of microscopic technologies that render the atom 'visible' has demonstrated,<sup>5</sup> as well as in art and culture more broadly as 'reality' recedes from the visual field. With scientific technologies, the crisis of representation is a crisis

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- 1 John O'Brian, 'Introduction: Through a Radioactive Lens', in *Camera Atomica*, ed. by John O'Brian, Art Gallery of Toronto (London: Black Dog Publishing, 2014), pp. 11–29 (p. 11).
  - 2 Jamie Semprun, *La Nucléarisation du monde* (France: IVREA Press, 1986). English translation accessed via *Libcom.org*: <<https://libcom.org/library/nuclearization-world-jaime-semprun>> [accessed 3 July 2020], p. 30.
  - 3 Sven Lütticken, 'Nuclear Aesthetics: Beyond Big Bangs', *kunstlicht: Journal for Visual Art, Visual Culture, and Architecture*, 39.3–4 (2018), pp. 13–19 (p. 14).
  - 4 Karen Barad, *Meeting the Universe Halfway: Quantum Physics and the Entanglement of Matter and Meaning* (Durham, NC: Duke University Press, 2007) <<https://doi.org/10.1215/9780822388128>>. She details, for example, the way in which scanning tunnelling microscopes (STM) are not operating as magnifying tools but rather as 'an encounter that engages the sense of touch rather than sight' (p. 52). In this way, realism, following Ian Hacking, is without representation, it is intervening rather than representing.
  - 5 Barad troubles the idea of sight through Ian Hacking, arguing that 'seeing' the microscopic is not the same as merely 'looking' — the latter being passive and the former active, an intervention (see previous footnote).

precisely because where one feels as though these technologies should render 'reality' more visible, when in fact they have the opposite effect.

Writing of the atomic radiation unleashed in the U.S. bombings of Hiroshima and Nagasaki at the end of World War II, Akira Mizuta Lippit describes a related crisis, one of the constitution of the human body.<sup>6</sup> Lippit claims a sudden 'excess of visibility' that 'threatened the material and conceptual dimensions of human interiority and exteriority'.<sup>7</sup> He also connects this crisis to technologies of interiority developed fifty years earlier, namely psychoanalysis, the X-ray, and cinema. Here the excess of the visible following penetrating radiation is the fragility of the body, its interiority made violently external. The X-ray, and later, the atomic bombs, caused a 'destructive visibility, a visibility born from annihilation'.<sup>8</sup> Of X-Ray technology he writes that it is a 'method of dissecting the human body into minute planes'.<sup>9</sup> He continues by likening the consequences of the X-ray for the visibility of the human to those of the atomic bomb: 'Like the X-ray, total visibility brought total destruction [...] the body reduced to sawdust. An atomic body, avisual.'<sup>10</sup> To return to the provocative claim by Semprun, rather than gaining further access to 'the real' or generating *excessive* visibility, the mediation of knowledge about subatomic particles through technological means actually demands that representation must move beyond the threshold of the visible, perhaps to point to its own destruction — 'there is no longer anything left to see'.

The brief explorations of nuclear exposures I offer in what follows draw primarily from nuclear art and culture or nuclear aesthetics, which have long been fixated on the problem of visibility and the representation of nuclear residues. As Lütticken has argued, the challenges of nuclear aesthetics are also political and social. Following

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6 Akira Mizuta Lippit, *Atomic Light (Shadow Optics)* (Minneapolis: University of Minnesota Press 2005), p. 4. Thanks to Arnd Wedemeyer for this reference, and to pushing me here on whether the crisis is excessive visibility or, conversely, the annihilation of the visual, which is not solved here but hopefully better points to a relation where they are not such easily distinguishable conditions from one another.

7 Ibid., p. 4.

8 Ibid., p. 48.

9 Ibid. Lippit here is drawing from Catherine Waldby's work on *The Visible Human Project* (2000), where she traces the VHP back to X-ray technology.

10 Ibid.

Joseph Masco,<sup>11</sup> Lütticken points to the ways in which the ‘poverty of human perception’, which according to him became evident in the late nineteenth century with the revelations of film and photographic technologies, has only ‘continued to widen in the post-war nuclear regime.’<sup>12</sup> These explorations do not mean to undermine the ongoing violence of the nuclear regime, the many lives that exposure to radiation through militarism and colonialism, extractivist projects, or the disposal of toxic waste has taken, and continues to put at risk around the world. Instead, they are meant to explore the fraught concept of *exposure* in ways specific to nuclearity and to radiation, while recognizing that: ‘Nuclearity is not the same everywhere [...]. Nuclearity is not the same for everyone [...]. Nuclearity is not the same at all moments in time.’<sup>13</sup> They offer glimpses into other ways of thinking exposure, as it develops in relation to a (in varying ways, imperceptible) toxicity that is not inscribed into logics that partition the passive victim of suffering from some pure or unaffected subject.<sup>14</sup> They are examples that are both forms of exposure specific to the nuclear while also, perhaps, helping to expose more nuanced and complex ways of understanding forms of exposure that extend beyond nuclearity.

The effects of long-term radiation are impossible to quantify or to know conclusively through scientific techniques, as countless scientific studies of irradiated ecologies and biological populations continue to demonstrate. There are no scientific tools that can separate natural from artificial radiation, no confirmed method of tracing cellular or genetic degradation with full certainty back to a specific nuclear event or catastrophe. While there are clear correlations between, for example, elevated thyroid cancer in children following Chernobyl, there is no ‘data’ that can clearly make the connection. This is why environmental justice scholar and advocate Michelle Murphy, following

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11 Joseph Masco, *The Nuclear Borderlands: The Manhattan Project in Post Cold-War New Mexico* (Princeton, NJ: Princeton University Press, 2006) <<https://doi.org/10.1515/9781400849680>>.

12 Lütticken, ‘Nuclear Aesthetics’, p. 13.

13 Gabrielle Hecht, *Being Nuclear: Africans and the Global Uranium Trade* (Cambridge, MA: MIT Press, 2012), p. 15. I encountered this passage in part of an epigraph that opens Kyveli Mavrokordopoulou and Ruby de Vos’ introduction to the issue ‘Nuclear Aesthetics’, *kunstlicht: Journal for Visual Art, Visual Culture, and Architecture*, 39.3–4 (2018), pp. 6–12 (p. 6).

14 Thanks to M. Ty for helping me to clarify this point.

Eve Tuck, calls for taking stock of environmental toxicity outside of what she calls a ‘data of damage.’<sup>15</sup> Murphy demonstrates the ways in which toxic chemicals are often treated as if they are discrete entities or molecules, and how, ‘[a]s a result, the infrastructure of chemical relations that surround and make us largely resides in the realm of the imperceptible.’ In other words, the ‘fullness of our chemical relations ends up being largely conjectural.’ She argues that ‘technoscientific research [...] tends to proceed by measuring the damage chemicals do to bodies’ which tends to ‘amplify the burdens of settler-colonial and racist violence.’<sup>16</sup> Instead, she argues that we must think against a data of damage, an approach especially relevant in the realm of radiotoxicity. Origin as contaminant is so dispersed, and so imperceptible, that it is impossible to trace a singular moment of object of contamination. Murphy and Tuck’s argument is important because radiation exposure presents particular problems to those affected by it and in need of care or reparations; its damage is neither quantifiable nor verifiable in scientific terms. Forms of radiation exposure, thus, draw attention to immeasurable consequences of vulnerability and forms of embodied knowing that are often rejected under regimes of knowledge that rely solely on scientific verification.

The condition of being exposed can mean one is or has been particularly vulnerable or in a state of heightened risk. But it’s not always true that the result of exposure is thought only in negative terms. One can be purposely exposed to a virus in the form of a vaccine in order to safeguard against infection; one can find oneself exposed to new ideas for the first time, to feel liberated or opened up in new ways. One might describe feeling exposed after a secret about them is revealed, turned inside-out, made vulnerable. The notion of exposure is often temporally, relationally, and sometimes spatially situated. It can require duration, pliability, resilience. Exposure, in colloquial uses, seems to imply a kind of porosity or laying bare but also captures an indeterminacy that helps to ask larger questions of weathering the nuclear. How might exposure to radiation resist being marked or measured, and in the spirit of this collection, how might these forms of exposure help us

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15 Michelle Murphy, ‘Alterlife and Decolonial Chemical Relations’, *Cultural Anthropology*, 32.4 (2017), pp. 494–503 <<https://doi.org/10.14506/ca32.4.02>>.

16 *Ibid.*, p. 496.

to think through unperceivable weathering that resists its registration by the human sensorium?

In *Exposed: Environmental Politics & Pleasures in Posthuman Times*, Stacy Alaimo describes exposure as a kind of political act by way of nuclear catastrophe:

Performing exposure as an ethical and political act means to reckon with — rather than disavow — such horrific events and to grapple with the particular entanglements of vulnerability and complicity that radiate from disasters and their terribly disjunctive connection to everyday life in the industrialized world. To occupy exposure as insurgent vulnerability is to perform material rather than abstract alliances, and to inhabit a fraught sense of political agency that emerges from the perceived loss of boundaries and sovereignty.<sup>17</sup>

For Alaimo, exposure is performed, reckoned with, occupied, and inhabited. The ‘horrific event’ Alaimo references here is the Chernobyl catastrophe of 1986 and the ‘total unprotectedness’ that suddenly came to define biopolitical subjectivity with regard to the claims and actions of the state, especially in Ukraine and Belarus.<sup>18</sup> What the Chernobyl explosion and the subsequent massive dispersal of radioactive particles into the atmosphere demonstrate is that the nuclear Anthropocene ushers in forms of exposure that rapidly and dramatically undermine the sovereignty of the embodied self. If the Anthropocene has revealed existence itself as already a state of exposure, thinking radiation exposure troubles the distinction between a supposedly passive state of absorption and the fraught occupation of vulnerability as forms of biopolitical agency.

2

Michael Marder and Anaïs Tondeur’s collaborative project *The Chernobyl Herbarium* is a 2016 rayogram-essay of 30 fragments,

17 Stacy Alaimo, *Exposed: Environmental Politics and Pleasures in Posthuman Times* (Minneapolis: University of Minnesota Press, 2016), p. 5 <<https://doi.org/10.5749/minnesota/9780816621958.001.0001>>.

18 Adriana Petryna, *Life Exposed: Biological Citizens After Chernobyl* (Princeton, NJ: Princeton University Press, 2013), p. 216 <<https://doi.org/10.1515/9781400845095>>.

one for each year since Chernobyl in 1986.<sup>19</sup> On alternating pages with short texts written by Marder are pages depicting Tondeur's herbarium specimens, grown in the radioactive soil of the Chernobyl exclusion zone and arranged on photosensitive paper. The result is a luminescence of the vegetal object surrounded by a darkness, awash only with spots of light and indiscernible, sweeping markings. These images are 'the visible record of an invisible calamity' as Tondeur 'liberates luminescent traces without violence, avoiding the repetition of the first, invisible event of Chernobyl and, at the same time, capturing something of it.'<sup>20</sup> Radioactive soil, out of which the plant is nourished and sustained, is registered in the plant and then on the paper as a brightness, an outline, a 'shimmer behind [a] shining'. Marder writes that the plants which 'assimilated the imperceptible and the inconceivable' are '[i]n the thick of infinite openness and exposure.'<sup>21</sup>

Structuring the text is a story that Marder relates from his boyhood. Travelling on a train to Anapa on 26 April 1986, neither Marder nor anyone on board one is yet aware of what has happened 1200 kilometres northwest. By May — Marder would be in Anapa all Summer that year — radiation readings would reach 60 mR/hr (milliRoentgens per hour), a value some 300 times higher than the 'normal' levels of 0.2 mR/hr.<sup>22</sup> Marder asks: 'How many layers or levels of exposure are there before us? Who is the exposing and who or what the exposed?'<sup>23</sup> The text is entirely occupied with the boundaries and mediations of the detectable, the rayograms serving as imprints of the assimilation of invisible radioactivity transferred as a form of light onto the page. Are these images of 'excess' as Marder describes them, or put differently, of a trace?

*The Chernobyl Herbarium* has one fragment titled 'Exposure', but the entire project might be understood as a meditation on the concept.

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19 Michael Marder and Anaïs Tondeur, *The Chernobyl Herbarium: Fragments of an Exploded Consciousness* (London: Open Humanities Press, 2016) <[https://doi.org/10.26530/OAPEN\\_606220](https://doi.org/10.26530/OAPEN_606220)>.

20 Ibid., p. 14.

21 Ibid., p. 20.

22 Ibid., p. 18.

23 Ibid., p. 22.



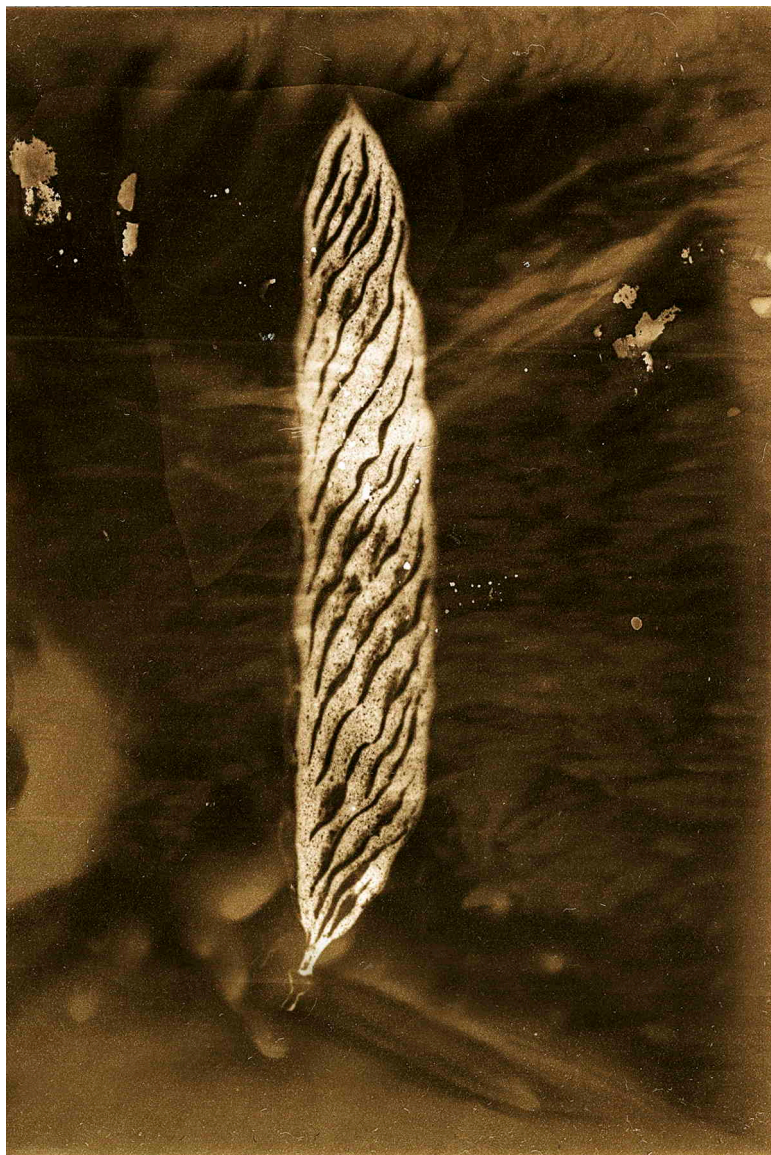


Figure 1. Anaïs Tondeur, *Phaseolea, Exclusion Zone, Chernobyl*.  
Radiation level: 1.7 Microsieverts/hr. Rayogram on Rag paper, 24x36  
cm, 2016, ongoing, courtesy of the artist.

Exposure is thus differentiated and theorized along various planes and scales of vulnerability, adaptability, and resilience:

This openness spelled out unfathomable vulnerability, the incapacity to defend oneself from a threat that was unknown and undetectable by the sensorium. One is ineluctably passive in the face of *radioactivity* [...]. [Plants] are more adaptable: soybeans experimentally grown in Chernobyl's radioactive environment have displayed drastic changes in their protein makeup, enabling them to improve their resistance to heavy metals and to modify their carbon metabolism [...]. Their exposure *to* the world is one of piece with learning *from* the world and giving plenty of things *back* to it. Only our, human, exposure betokens pure vulnerability, passivity, helplessness.<sup>24</sup>

If the exposed human is objectified, made passive ('Those of us who have been [in radiation's] eerie neighbourhood have resembled objects'), vegetal exposure is agential responsiveness that resists, that pushes *back*. Marder: 'Vegetal life is not merely exposed; it *is* exposure, exteriority, outwardness.'<sup>25</sup>

Tondeur's images do produce a sense of exteriority, a vibrancy particular to plant-life in the exclusion zone or other irradiated spaces. Marder seems to want to ontologically split vegetal and human life, to distinguish between forms of exposure that are 'pure vulnerability, passivity' for the human and, in a kind of metaphysical slide, deem vegetal life as *itself* exposure. In one sense, Marder's idea that 'the human' can only experience exposure as something that happens *to* oneself, that delimits agential capacity and renders the subject helpless, is one interpretation of exposure that I am attempting to question in this paper. Marder points to the *ex* in human *experience* in order to say that only in 'limit circumstances' can the human *experience* exposure 'on our skin', as a kind of *externality* embodied by the vegetal or as a life-form as *itself* exposure. *Ex*, from Latin for 'out', is drawn out in Marder's account in order to claim that plants are always outside of themselves, always moving outward, growing. But the skin is perhaps more of an *externality* in the vegetal sense than in the sense that it bounds or

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24 Ibid.

25 Ibid.



Figure 2. Anaïs Tondeur, *Linum usitatissimum*, *Exclusion Zone, Chernobyl*. Radiation level: 1.7 Microsieverts. Rayogram on Rag paper, 24x36 cm, 2016, ongoing, courtesy of the artist.

bars the human from performing exposures in a more vegetal mode. In feminist science studies, especially in the work of Murphy, Alaimo, and Nancy Tuana, they have reminded us of the porosity of the skin and indeed the ways in which the human body is itself always passing materials both into and outside of itself. Rather than a closed bounded subject, the human is in a constant relation with the world and with others that is perhaps much more exposed and external than Marder seems to grant here. The danger of such a distinct splitting of the vegetal and the human may reinstate the bounded human subject that posthumanism has worked to undo. And yet, at the end of the section, Marder points to the provocative notion that exposure might also unite the human and the vegetal: 'What did our [human?] exposure amount to? Did it prepare the grounds for a trans-human solidarity?'; suggesting that exposure may also provide an opening for a kind of trans-species alliance.

3

In August of 1945, Julian H. Webb, a physicist in the research department of Eastman Kodak in Rochester, New York, took it upon himself to investigate a sudden flurry of complaints from customers of Kodak X-ray film. The film was reported by consumers to be 'fogged' by black spots that Kodak then attributed to a contamination of the cardboard, which encased that batch of film. Webb was able to trace the paper from the packaging back to a mill in Vincennes, Indiana, situated on the Wabash River. Testing the run of paper produced on 6 August, Webb discovered a new artificially radioactive particle with strong beta-activity and a half-life of approximately thirty days, Cerium-141, and in doing so, also happened upon the discovery of a confidential nuclear weapons test detonation that had occurred on 16 July nearly 2000 miles away.<sup>26</sup>

Indeed, Kodak film in Indiana had registered the world's first nuclear explosion; the now infamous Trinity Test had taken place without public knowledge two weeks earlier in Alamogordo, New Mexico.

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26 Julian H. Webb, 'The Fogging of Photographic Film by Radioactive Contaminants in Cardboard Packaging Materials', *Physical Review*, 76.3 (1949), pp. 375–80 <<https://doi.org/10.1103/PhysRev.76.375>>.



Radioactive fallout had blown thousands of miles, and found its way into the paper mill through the river water, causing the disturbance in any film that was packaged with the paper produced on 6 August. It would take Webb four years to publish his highly sensitive findings. He finally did in 1949, writing with a certain clarity: 'The most likely explanation of the source of this radioactive contaminant appears to be that it consisted of wind-borne radioactive fission products derived from the atom-bomb detonation in New Mexico on July 16, 1945.' It would seem that what was exposed on film in turn exposed an entirely new and covert industry that could neither hide nor control the planetary effects of nuclear weapons tests that have since come to define the start of the 'nuclear Anthropocene.'<sup>27</sup>

In 1951, having been through something like this six years prior, Kodak again registered high levels of radiation in snowfall, this time along the shores of Lake Ontario. They registered a complaint with the National Association of Photographic Manufacturers, who then telegraphed the Atomic Energy Commission. The AEC replied that a major test, what would later be revealed as test 'Able', had in fact taken place, but that the situation was not of any threat to public health. But Kodak's general manager threatened to sue the government should the company or its film stock suffer serious damage as a result of testing, and the AEC responded with an offer. Presumably in an effort to avoid a major lawsuit, the AEC would provide Kodak with maps of all weapons tests prior to their occurrence that would detail areas of potentially heavy fallout and adjust their operations and manu-

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27 It is outside of the scope of this short paper to detail the discussion about when the Anthropocene begins and the Holocene ends. As the previous footnote shows, scientists have in recent years have claimed that the Anthropocene is set in motion at the beginning of the atomic era. But in the humanities, scholarship on the Anthropocene tends to mark it with a much deeper history, one inherently tied to the transatlantic slave trade or to early agriculture practices. But in the sciences, see as examples of studies that mark the Anthropocene as beginning in the Nuclear Age: Colin N. Waters and others, 'Can Nuclear Weapons Fallout Mark the Beginning of the Anthropocene Epoch?', *Bulletin of the Atomic Scientists*, 71.3 (2015), pp. 46–57 <<https://doi.org/10.1177/0096340215581357>>, Jan Zalasiewicz and others, 'When Did the Anthropocene Begin? A Mid-Twentieth Century Boundary Level Is Stratigraphically Optimal', *Quaternary International* 383 (2015), pp. 196–203, and Gary J. Hancock, Stephen G. Tims, L. Keith Fifield, and Ian T. Webster, 'The Release and Persistence of Radioactive Anthropogenic Nuclides', *Geological Society, London, Special Publications*, 395.1 (2014), pp. 265–81 <<https://doi.org/10.1144/SP395.15>>.

facturing accordingly, solidifying a decade-long relationship between the largest photographic film manufacturer and the U.S. industry of nuclear militarism, a double exposure (at least).

4

An elaborate, golden, three-tiered chain necklace with deep-blue jewels sits in a glass case. *Inheritance*, as this work is titled, is part of the exhibition ‘Invisible Forces’ at ArtLaboratory Berlin featuring works by artists Erich Berger, Mari Keto, and Martin Howse.<sup>28</sup> The necklace is displayed in a row of deconstructed parts of a concrete box that has housed it in order to keep handlers from being exposed to its radio-activity. Next to the parts read the following instructions, engraved on a copper plate:

This jewelry box contains your inheritance: a necklace and earrings crafted from gold, silver, thorite, thorianite, and uraninite; an electroscope with spare leaves for detecting the jewelry’s radiation, a glass rod with a piece of fur to electrostatically charge the electroscope; a timer for recording the time and these instructions for the ritual of measurement. A generation ago when the box was last opened, the jewelry proved unready for wear and was locked away. Today you will perform the ritual of measurement with your elder to find out if you can wear the jewelry, or if you need to lock it away again for another generation.

The display instructions continue with detailed instructions about how to proceed with the ritual of testing the jewellery every hundred years for its eventual wear-ability. Thus, the inheritance is the legacy of atomic science (including, among other things, nuclear weapons testing and deployment, mining projects, nuclear energy, nuclear waste disposal) transposed onto a family heirloom, passed down for innumerable generations.

The artists, Berger and Keto, write in the exhibition text that the piece ‘attempts to address the long time component of nuclear waste

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28 ‘Invisible Forces’ ran from 19 October to 8 December 2019 at ArtLaboratory Berlin, Prinzenallee 34, 13359 Berlin, curated by Regine Rapp and Christian de Lutz. The necklace is part of the artists’ ongoing work, ‘The Inheritance Project’ <<http://inheritance-project.net/index.php/page-2/>> [accessed 3 July 2020].



Figure 3. Erich Berger and Mari Keto, *INHERITANCE*, 2016, jewellery close-up, gold, silver, uraninite, thorite, thorianite, courtesy of the artists.

by transferring it into the intimate and caring concept of a family without compromising the deep time aspect'. The work invites contemplation about the nature of inheritance by way of multiple vectors, including the ways in which nuclear waste is an inheritance that operates on a vastly different timescale than that of the human lifespan — the jewelry can only be tested every hundred years. By imbuing the family heirloom with the deep toxic time of nuclear waste, perhaps it is easier to conceive of just how long this waste lives on past the finite temporality of human life. But the piece also suggests something desirable about radioactivity, jewels behind a casing that cannot be touched for entire lifetimes.

Naturally, there are other temporalities at play here, too, that of a certain class and economic status, of aesthetics and materials of a certain historical moment or place; its very status as an heirloom suggests a moment of importance in the act of passing down, and of transmission. But the piece is challenging in that it is difficult to think of nuclear inheritance as a tender or intimate act, or as existing within normative family structures within which acts of inheritance such as this would be located. In a way similar to that of *Inheritance*, atomic

artwork installations often exhibit items that emit radioactivity, or that claim to — gallery goers threatened (though perhaps largely fabricated or imagined) with exposure to low-levels of radiation. Suggesting the risk of exposure, however fabricated or exaggerated it might be, can indeed expose fears of that which one cannot simply perceive. But it can also expose a kind of privilege that does not contemplate or alleviate the violence of the nuclear regime, but rather contributes to its dangerous seduction.

5

‘Dark tourism,’ a term introduced by John Lennon and Malcolm Foley in 1996, describes recreational travel to places marked by death and suffering. While scholars of ‘dark’ or ‘disaster’ tourism have come up with a number of reasons for why people flock to these kinds of sites, most will agree that it’s often too difficult to parse. Some have recently argued, for example, that visitors to dark sites gain satisfaction from observing the sites of violence and conflict (Debbie Lisle), or that they seek commemoration of a tragedy (Lennon and Foley).<sup>29</sup> Dark tourism, a fairly recent field of research,<sup>30</sup> remains therefore a controversial ethical enterprise.

As a site often considered, alongside the Nazi Death Camps, to define the enterprise of disaster tourism, the Chernobyl 2600 square km exclusion zone in Ukraine attracts an estimated 10,000 tourists every day.<sup>31</sup> On the *Chernobyl Welcome Tour* website, one of the more popularly booked tours of the zone, they promise that radiation exposure during the excursion will not exceed 3-4 microsieverts, ‘which

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29 For a brief summary of tourism studies and dark tourism that I turn to in this section, see these citations and others in Ganna Yankovska and Kevin Hannam, ‘Dark and Toxic Tourism in the Chernobyl Exclusion Zone’, *Current Issues in Tourism*, 17.10 (2014), pp. 929–39 <<https://doi.org/10.1080/13683500.2013.820260>>.

30 See Philip Stone, ‘Dark Tourism — an Old Concept in a New World’, *The Tourism Society Journal*, 125 (2005), p. 20 <<http://clok.uclan.ac.uk/29705/>>.

31 See Nicholas Hryhorczuk, ‘Radioactive Heritage: The Universal Value of Chernobyl as a Dark Heritage Site’, *Qualitative Inquiry*, 25.9–10 (2019), pp. 1047–55 <<https://doi.org/10.1177/1077800418787553>>.



is the equivalent to around 4 hours on an intercontinental flight.<sup>32</sup> For one hundred and nineteen euros, visitors are bussed from Kiev to Chernobyl and escorted around parts of the zone, including walking right up to the protective sarcophagus of the blown reactor. Each person also receives a portable dosimeter — a small Geiger counter — to measure radiation levels throughout the tour. The tours paradoxically promise both risk and safety; they are extreme and dangerous but supply tourists with the necessary technologies to measure their risk along the way.

In their study of tourism in Chernobyl, Ganna Yankovska and Kevin Hannam suggest thinking about the phenomenon not only as dark tourism but as ‘toxic tourism’, a term developed by Phaedra C. Pezzullo to describe tours to sites of environmental degradation in the United States.<sup>33</sup> Interested in the ways in which toxic tourism might open up possibilities for building solidarity by focusing on the relationship between environmental and social degradation, Yankovska and Hannam also point to the strangeness that inheres in people’s desire to visit (still) toxic sites. As one of the tour guides they interviewed describes critically, ‘People [that visit Chernobyl] [ ... ] are not interested in real history and valid information anymore. What is more, they want to risk their lives and find adrenalin instead of appreciation and memorialization of the past.’<sup>34</sup> Exposure, in this context, is sought out in a way that some of the tour guides reported as an unethical response to historical tragedy. Although an individual dosimeter can pick up levels of atmospheric radiation, the ways in which low-level radiation affects biological life over generations remains, of course, largely speculative. Countless studies of life in the zone have been done and though many have found significant changes to specific species under study as well as to the larger ecological relations within the zone, nearly all studies conclude that there is still too little known about the effects of radiation poisoning that will last at least 20,000 years more into the future.

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32 See ‘Chernobyl 1 Day Tour’, Chernobylwel.com (Bratislava: radioPROactive, 2018) <<https://www.chernobylwel.com/tour/7/chernobyl-1-day-tour>> [accessed 29 July 2020].

33 Phaedra C. Pezzullo, *Toxic Tourism: Rhetorics of Pollution, Travel, and Environmental Justice* (Tuscaloosa: University of Alabama Press, 2007).

34 Quoted in Yankovska and Hannam, ‘Dark and Toxic Tourism’, p. 936.

There are scholars of dark tourism that claim that the draw to post-disaster or toxic sites is the fixation on death or suffering, or the desire to contemplate one's own mortality. Focused primarily on tourist responses to the fatalities of historical catastrophes, rarely do these studies think deeply about the specificity of tourism in irradiated zones, where tourists decidedly put themselves at some level of radiation risk, however slight or downplayed by local authorities. What marginal, perverse, conscious, or unconscious desires draw people to these kinds of sites of exposure? Somehow the dual but conflicting assurance of both high risk and personal safety that provides tour-goers to assure themselves of either one at any given time, an experience that plays out as a kind of seeking of exposure while also requiring the promise of protection.

### 5.5

Bionerd23, a Youtube-er with 157,000 followers, has published/posted over seventy self-made videos from within the Chernobyl exclusion zone since 2013. The videos show bionerd23 walking freely around Chernobyl, filming a nearby rabid fox, getting bitten by ants, and picking up radioactive glass shards with her bare hands. Wearing an army-patterned jacket and a closely shorn buzz-cut, she takes samples and tests them in the videos in order to dispel supposed myths about the levels of toxicity that are said to exist in the zone. In one of her most-watched videos, she picks an apple near the iconic Ferris wheel inside the zone and eats it on camera.<sup>35</sup>

### 6

*Aldona*, a quiet, twelve minute film by Lithuanian artist Emilija Škarnulytė, follows Aldona, the artist's grandmother, around her

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35 See 'Chernobyl Wild Zone: Radioactive Rabies, Autumn Fruit and Foxes', online video recording, YouTube, 30 September 2014 <[https://www.youtube.com/watch?v=u\\_ZvHMGXdbE](https://www.youtube.com/watch?v=u_ZvHMGXdbE)> [accessed 24 February 2020], and Dan Nosowitz, 'The Woman Who Ate Chernobyl's Apples', online video recording, Atlas Obscura, 15 April 2015 <<https://www.atlasobscura.com/articles/the-woman-who-ate-chernobyl-s-apples>> [accessed 4 March 2020].



Figure 4. Film Still from *Aldona*, dir. by Emilija Škarnulytė, 2013, courtesy of the artist.

property and through Grūtas Park in southeastern Lithuania.<sup>36</sup> The park, an open-air museum, was opened in April 2001 by businessman Viliumas Malinauskas on his private property, without taxpayer money. The park is an odd tourist destination with a complicated relationship with Lithuania's Soviet heritage; it displays recuperated Soviet-era sculptures and large-scale stone monuments of Marx, Lenin, and Stalin.<sup>37</sup> Aside from the ways in which the park has caused debate amongst Lithuanians for its unclear relation to the past, the museum site itself is located nearby to the Grūtas Forest, where Lithuanian partisans lost a bloody war against the Communist Red Army.<sup>38</sup>

36 *Aldona* was part of the exhibition 'Presence in the Absence', 18 January – 21 February 2020, which I visited at the Alexander Levy Gallery Berlin, Germany.

37 For a discussion of Grūtas Park and dark or what the authors call 'thanatourism,' see Rami K. Isaac & Laurencija Budryte-Ausiejene, 'Interpreting the Emotions of Visitors: A Study of Visitor Comment Books at the Grūtas Park Museum, Lithuania,' *Scandinavian Journal of Hospitality and Tourism*, 15.4 (2015), pp. 400–24 <<https://doi.org/10.1080/15022250.2015.1024818>>.

38 *Ibid.*, p. 406.



Figure 5. Emilija Škarnulytė, photograph from the shooting of *Aldona*, 2013, courtesy of the artist.

In the film, Aldona makes her way through the park without the use of sight; the exhibition catalogue tells us that she has been blind since Spring of 1986, a likely result of the Chernobyl explosion in April of that year. Walking through the park, we watch as she runs her hands along the gigantic stone bodies of (once-memorialized, then discarded, now somewhat revived) Soviet figures now confined in what has been called a kind of enactment of imprisonment: a network of wire fences and canals surround the park, and several watch towers circle the park's territory. In other scenes, we watch Aldona's solitary domestic activities: she peels apples, listens to the radio, rinses the dishes. The only sounds are those of birds and the wind blowing through the trees.

The film is part of a larger body of work that has established Škarnulytė as a significant artist within nuclear art and culture. Here, she invokes the nuclear past of Lithuanians in the Soviet-era, chan-

nelled through the familial.<sup>39</sup> Aldona's blindness may be the result of exposure to radiation. But neither Aldona nor the framing of the film seem to mourn her blindness, but instead the piece imagines Aldona's relation to the past as it is structured by a non-visual sensorium. In addition to challenging the perceptual registers on which radiation can be catalogued, the film also focuses in on the temporalities of radiation that are often infinitely expanded outwards by refocusing viewers' attention on the intimate, the domestic. Fallout of decades past is not a violence in this film, at least not only violence, but attached to a tenderness that Aldona has learned and which the quietness of the film allows viewers to see and hear — the flies buzzing on delicately peeled fruits, the old radio, the lapping of water in Aldona's coffee mug. The temporality of living with radiation, or more precisely not really ever being *sure* if and how one is living with radiation, is diffused through (nuclear) history, as well through a domestication of radiation that is rendered not (only, or merely) traumatic, but tender and soft.

7

Since around 2015, a wave of very particular journalistic stories have been revisit aging, still-radioactive exclusion zones.<sup>40</sup> The phenomenon emerged perhaps in response to commemorations of the fifth anniversary of the disaster at the Fukushima Daiichi Nuclear Power Plant in Japan, 2011. Focused largely on Fukushima and Chernobyl but including Three Mile Island, Bikini Atoll, areas around the Nevada Test Site, and the Semipalatinsk site, what I

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39 Soviets sent an estimated 7,000 Lithuanians to labour camps and into other services providing cleanup efforts for Chernobyl, performing work like dousing flames or building dams to filter radiation from nearby rivers. Lithuanian borders are about 450 kilometres from Chernobyl. See Andrius Sytas, 'New Tours, Painful Reminders in Lithuania After Hit Chernobyl Show', *Reuters*, 31 July 2019 <<https://www.reuters.com/article/us-lithuania-chernobyl/new-tours-painful-reminders-in-lithuania-after-hit-chernobyl-show-idUSKCN1UQJWF>> [accessed 19 July 2020].

40 As part of my project as a Fellow at ICI Berlin, I have been working on questions of radioactive wildernesses and irradiated natures. I've collected over fifty articles from popular media sources such as *Grist*, *The Guardian*, *The Atlantic*, *The Independent*, *Huffington Post*, *The New York Times* and others of varying levels of credibility. The headlines declare that the flora and fauna are flourishing and proliferating wildly since (and in fact because of) nuclear catastrophe and radiation exposure.

identify as a surge in ‘popular’ interest in irradiated zones seems to have become quite suddenly fixated on the question of how these exposed areas have fared over time. Implicit in this fascination is the understanding that (low-level) radiation exposures are not singular in their temporality or moment, but rather are forms of exposure that develop more so over impossibly long periods of time and about which there is still very little conclusive data. Evacuated of the human, zones of alienation are the new test sites of the nuclear age. As dozens of articles pronounce almost unanimously — Nature has reclaimed its space, overgrown and rampant, feral and unyielding — it may be toxic, but it flourishes nonetheless in the absence of human polluters, hunters, and settlers. As *National Geographic* proclaims in a Youtube video to their 14.5 million subscribers: ‘30 Years After Chernobyl: Nature Is Thriving.’<sup>41</sup>

I conclude with these ‘reports from the zone’ in order to return to the questions with which I opened this incomplete archive of things. What is exposure when taken from the frame of victimhood, passivity, and vulnerability. How can exclusion zones, like those I’ve referenced above, be both toxic and a site of flourishing at once; to go even further, what is exposure when it is celebrated, sought out, empowering — something one can be resilient in the face of, or feel queerly intimate towards?<sup>42</sup> This paper hopes to raise these questions through exposures that resist weathering as either an absorption/projection of experience, or as a form of resilience. I have also pointed to the ways in which exposure is often understood as a process made legible primarily through the register of visibility, whereas radiation forces a different set of questions around what it is to weather imperceptibly, even unknowingly. Indeed, to think radiation, to radiate exposures outward (as well as countless forms of imperceptible toxicities in the Anthropocene, in different ways), not only grapples with the unknowable, it necessitates

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41 National Geographic, ‘30 Years After Chernobyl: Nature Is Thriving’, online video recording, YouTube, 20 April 2016 <<https://www.youtube.com/watch?v=E-h15wX14p0>> [accessed 4 July 2020].

42 Disability studies and crip theory have done a lot of important work on the question of toxic intimacies, which lie outside of the scope of this short paper, but which I have explored elsewhere. For an excellent example of this scholarship which has deeply informed my thinking here, see Mel Y. Chen, *Animacies: Biopolitics, Racial Mattering, and Queer Affect* (Durham, NC: Duke University Press, 2012).

forms of not-knowing. To weather exposures of these sorts is, thus, crucially a speculative practice, a challenge to ways of tending to a profoundly contaminated world, and a confrontation with impossibly deep, nonhuman temporalities.<sup>43</sup>

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43 I am indebted to the editors, Arnd Wedemeyer and Christoph Holzhey for their attentive and thorough comments on an earlier draft, which I could only partially attend to here. I also extend gratitude to the fellows at ICI Berlin who workshopped the idea of weathering together for months and who helped my thinking along for this paper. A special thanks to Anja Sunhyun Michaelsen and M. Ty for their invaluable comments on the first draft.

Alison Sperling, 'Radiating Exposures', in *Weathering: Ecologies of Exposure*, ed. by Christoph F. E. Holzhey and Arnd Wedemeyer, Cultural Inquiry, 17 (Berlin: ICI Berlin Press, 2020), pp. 41–62 <[https://doi.org/10.37050/ci-17\\_03](https://doi.org/10.37050/ci-17_03)>

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## REFERENCES

### BIBLIOGRAPHY

- Alaimo, Stacy, *Exposed: Environmental Politics and Pleasures in Posthuman Times* (Minneapolis: University of Minnesota Press, 2016) <<https://doi.org/10.5749/minnesota/9780816621958.001.0001>>
- Barad, Karen, *Meeting the Universe Halfway: Quantum Physics and the Entanglement of Matter and Meaning* (Durham, NC: Duke University Press, 2007) <<https://doi.org/10.1215/9780822388128>>
- 'Chernobyl Wild Zone: Radioactive Rabies, Autumn Fruit and Foxes', online video recording, YouTube <[https://www.youtube.com/watch?v=u\\_ZvHMGXdbE](https://www.youtube.com/watch?v=u_ZvHMGXdbE)> [accessed 24 February 2020]
- de Lutz, Christian, and Regine Rapp, 'Invisible Forces' exhibition text, ArtLaboratory Berlin (2019)
- Hancock, Gary J., Stephen G. Tims, L. Keith Fifield, and Ian T. Webster, 'The Release and Persistence of Radioactive Anthropogenic Nuclides', *Geological Society, London, Special Publications*, 395.1 (2014), pp. 265–81 <<https://doi.org/10.1144/SP395.15>>
- Hecht, Gabrielle, *Being Nuclear: Africans and the Global Uranium Trade* (Cambridge, MA: MIT Press, 2012)
- Hryhorczuk, Nicholas, 'Radioactive Heritage: The Universal Value of Chernobyl as a Dark Heritage Site', *Qualitative Inquiry*, 25.9–10 (2019), pp. 1047–55 <<https://doi.org/10.1177/1077800418787553>>
- Isaac, Rami K., and Laurencija Budryte-Ausiejene, 'Interpreting the Emotions of Visitors: A Study of Visitor Comment Books at the Grūtas Park Museum, Lithuania', *Scandinavian Journal of Hospitality and Tourism*, 15.4 (2015), pp. 400–24 <<https://doi.org/10.1080/15022250.2015.1024818>>
- Lippit, Akira Mizuto, *Atomic Light (Shadow Optics)* (Minneapolis: University of Minnesota Press 2005)
- Lütticken, Sven, 'Nuclear Aesthetics: Beyond Big Bangs', *kunstlicht: Journal for Visual Art, Visual Culture, and Architecture*, 39.3–4 (2018) pp. 13–19
- Marder, Michael, and Anaïs Tondeur, *The Chernobyl Herbarium: Fragments of an Exploded Consciousness* (Open Humanities Press, 2016) <[https://doi.org/10.26530/OAPEN\\_606220](https://doi.org/10.26530/OAPEN_606220)>



- Masco, Joseph, *The Nuclear Borderlands: The Manhattan Project in Post Cold-War New Mexico* (Princeton, NJ: Princeton University Press, 2006) <<https://doi.org/10.1515/9781400849680>>
- Mavrokordopoulou, Kyveli, and Ruby de Vos, eds, *Nuclear Aesthetics (=kunstlicht: Journal for Visual Art, Visual Culture, and Architecture, 39.3–4* (2018))
- Murphy, Michelle, 'Alterlife and Decolonial Chemical Relations', *Cultural Anthropology*, 32.4 (2017), pp. 494–503 <<https://doi.org/10.14506/ca32.4.02>>
- Nosowitz, Dan, 'The Woman Who Ate Chernobyl's Apples', online video recording, Atlas Obscura, <<https://www.atlasobscura.com/articles/the-woman-who-ate-chernobyl-s-apples>> [accessed 4 March 2020]
- O'Brian, John, ed., *Camera Atomica*. Art Gallery of Toronto (London: Black Dog Publishing, 2014)
- Petryna, Adriana, *Life Exposed: Biological Citizens After Chernobyl* (Princeton: Princeton University Press, 2013) <<https://doi.org/10.1515/9781400845095>>
- Pezzullo, Phaedra C., *Toxic Tourism: Rhetorics of Pollution, Travel, and Environmental Justice* (Tuscaloosa: University of Alabama Press, 2007)
- Semprun, Jamie, *La Nucléarisation du monde* (France: IVREA Press, 1986)
- Stone, Philip, 'Dark Tourism — an Old Concept in a New World', *The Tourism Society Journal*, 125.20 (2005) <<http://clok.uclan.ac.uk/29705/>>
- Sytas, Andrius, 'New Tours, Painful Reminders in Lithuania After Hit Chernobyl Show', *Reuters*, 31 July 2019, <<https://www.reuters.com/article/us-lithuania-chernobyl/new-tours-painful-reminders-in-lithuania-after-hit-chernobyl-show-idUSKCN1UQJWF>> [accessed 19 July 2020]
- Waters, Colin N., and others, 'Can Nuclear Weapons Fallout Mark the Beginning of the Anthropocene Epoch?', *Bulletin of the Atomic Scientists*, 71.3 (2015) <<https://doi.org/10.1177/0096340215581357>>
- Webb, J. H., 'The Fogging of Photographic Film by Radioactive Contaminants in Cardboard Packaging Materials', *Physical Review*, 76.3 (1949), pp. 375–80 <<https://doi.org/10.1103/PhysRev.76.375>>
- Yankovska, Ganna, and Kevin Hannam, 'Dark and Toxic Tourism in the Chernobyl Exclusion Zone', *Current Issues in Tourism*, 17.10 (2014), pp. 929–39 <<https://doi.org/10.1080/13683500.2013.820260>>
- Zalasiewicz, Jan, and others, 'When Did the Anthropocene Begin? A Mid-Twentieth Century Boundary Level Is Stratigraphically Optimal', *Quaternary International* 383 (2015), pp. 196–203 <<https://doi.org/10.1016/j.quaint.2014.11.045>>

## FILMOGRAPHY

*Aldona*, dir. by Emilija Škarnulytė (2013)