The Practice of Microtopia:
Microfiche Archives of Troubled Places

D A GRIFFITHS

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Microfiche Archives of Troubled Places

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Abstract

This PhD by publication (route 1) concerns narratives of contemporary troubled places that involve the memory and repair of events of hazard, trauma and conflict arising from contested matter. The three artworks published in 2013-16, together with a written exegesis, explore the intersection of troubled places with the miniature medium of microfiche, a cultural practice of transmitting knowledge through time as tiny celluloid, photo-chemical artefacts.

A genealogy of microfiche's twentieth-century function in library, military and state epistemes, in real and speculative applications, reveals its entanglement with human desire for a compact, resilient remembrance that will survive crisis. Artistic deployment of obscure microfiche apparatus comments on wider society's incomplete, unclear, forgotten or concealed remembrance, in both physical and virtual media.

The research considers the material and memorial challenges of three troubled places, including a gamma-ray burst in the early Universe, a site of genocide legacy, and infrastructure for toxic nuclear waste containment. Through the interface of troubled places and microfiche the research arrives at 'microtopia', a new creative method for the remembrance, archiving, and recall of memories, things, and places.

Microtopia is a knowledge practice involving the witnessing of complex sites of remembrance through its production of multiple narratives. Microtopia method gathers evidence of contentious material and technologies, as observed and recorded in conversations, numerical data and photographs. Factual accounts are interwoven with situated micropolitical memories, producing traces of speculative-fabulation. In microtopia artworks, these different narrative modes are expanded and combined through studio editorial collage, poetry and comics illustration, to differently imagine the unclear past, burdened contemporary, and inconceivable futures in troubled places.

The resulting publications/artworks offer methods for the management and remembrance of the material remains of an event, and affective encounters of those acting in the sites.

The research is situated within the field of contemporary archival-art research, which samples and counter-witnesses official bodies of evidence to insert antagonistic or fictional strata into production of place. The use of microfiche contributes to this research by signalling the continuing need for archives to occupy plural forms of remembrance to counter inevitable medial ruination. Microtopia joins monuments, artefacts, and digital records in support of future re-telling of troubled places.

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Chapter One

Introduction: Microtopia and How to Make Them

1.1 Timeline of this Research Route

This PhD is by Publication (Route 1) which permits outputs already in the public domain, published up to 36 months prior to enrolment, to constitute 60% of work for examination.[1] Two existing publications from 2013 and 2015 were accredited during PhD registration; these are joined by a new artwork and written commentary that were produced under the guidance of my supervisory team during 2016-20, and which resolve this submitted portfolio and thesis.

The existing publications examine two sites, accessed through short residencies and commissions with scientific communities and arts institutions,[2] where I tested the early stages of inquiry into use of microfiche as an artistic archive. The hunch guiding both these projects was that to use microfiche to mix factual and speculative modes of storytelling, in going beyond the medium's typical archival orderliness, might render it capable of a new kind of storytelling that is emplaced, ongoing, always incomplete, transmitting into the future.. The two sites underpinning these publications are more than scientific; they are marked by trauma or hazard, whose material emergency and potential resolution is being researched by academic specialists. In this thesis I characterise these specialists as *observers* – those using instruments and performing

[1] *Guidelines for PhD by Publication*, Graduate School handbook (Manchester Metropolitan University, 2017) 8. Accessed at https://www2.mmu.ac.uk/media/mmuacuk/content/documents/graduate-school/regs-handbook-and-key-documents/pgr-publication.pdf.

[2] During 2013 I completed a residency with the NASA-led SWIFT satellite team at Department of Physics and Astronomy, University of Leicester (UK), in association with Phoenix Square (Leicester, UK). In 2014 I was commissioned by School of Art and Creative Technologies, and Centre of Archaeology at University of Staffordshire (Stoke-on-Trent, UK), to respond to *Finding Treblinka*, a 2013 forensic survey conducted at Treblinka extermination and labour camps (Treblinka, Poland).

experiments to collect data as evidence for telling factual stories about the materiality of place. *Extinction Event [GRB130313A]* depicts data from a cataclysmic gamma-ray burst in the early Universe, observed in 2013 by a community of astronomers using a satellite-borne telescope. In 2015, *Deep Field [Looking Squarely Ahead]* responds to new evidence of Nazi execution infrastructure observed by forensic archaeologists at Treblinka Camp II in Poland. I was drawn to making art in response to the difficult and multi-layered stories of such sites, whereby I could test the use of microfiche as a medium for archiving complex narratives.

During first-year PhD study, from January 2016, I produced a third publication, *Deep Field [Unclear Zine],*[3] in which I sought to build on insights from the earlier outputs by developing further fieldwork and studio methods. I was keen to extend the singular voice of the two earlier works, by collaborating with a zine illustrator and a poet, which would add to the narrative breadth. The study aimed to deepen my understanding of the relationship between archives and troubled places, and to realise how I might take more risks to deploy my medium more discursively. This third project responds to proposed radioactive-waste ("radwaste") burial infrastructure in Belgium, and the epistemic problems of communicating such hazardous matter to, and safeguarding it from, future planetary beings. During 2017-20 I analysed all three artworks to establish my methods and further clarify and realise the hypothesis, of microtopia as a new form of archival artistic practice for remembrance of troubled places.

1.2 Research Inquiry: The Practice of Microtopia

My experiments as an artistic researcher using microfiche since 2009 have journeyed from rudimentary use of the medium as a repository for photographs and data, to this research project's realisation as a practice of microtopia (fig.1.1); an archive of stories that document and speculate on troubled places. This section explains my research question, terminology and context for the practice of microtopia; the observers, technologies and materials of troubled places, and their archiving in the compressed medium of microfiche.

[3] In 2016 I was commissioned by Arts Catalyst (London, UK) to respond to HADES laboratory operated by SCK-CEN (Mol, Belgium) and the cAt project, in association with Z33 House for Contemporary Art (Hasselt, Belgium), ONDRAF/NIRAS, the Belgian National Agency for Radioactive Waste and Enriched Fissile Material (Brussels, Belgium) and STORA, Radioactive Waste Study and Consultation Group (Dessel, Belgium).

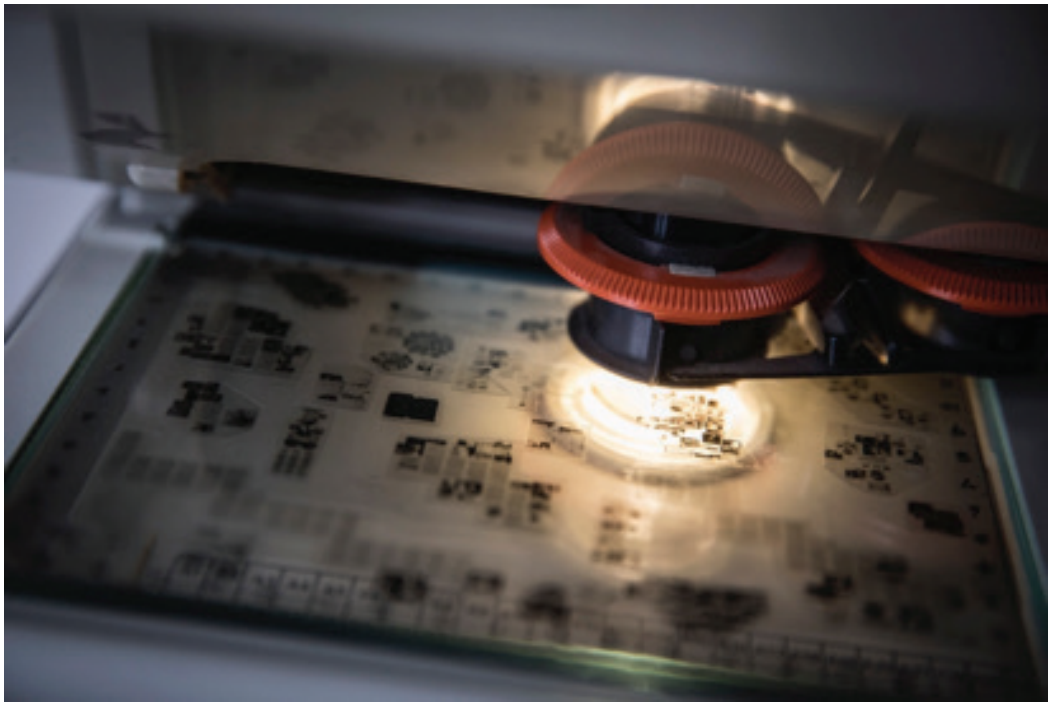

Figure 1.1 *Deep Field [Unclear Zine]* 2016. Microfiche 10.5 x 14.8cm, detail. Installation at Z33 House for Contemporary Art, Hasselt, Belgium.

The artworks resulting from this research were concerned with stories and documents of troubled places – complex sites marked by geopolitical, scientific and community entanglement in crisis. Feminist philosopher Donna Haraway notes that 'trouble' derives from a French verb meaning 'to stir up', 'to make cloudy', 'to disturb'; she advocates that "staying with the trouble" means to vigorously entwine-with and attend to situated, present-day difficulties – it is our duty to take the trouble to co-produce our multi-species survival on Earth:[4]

> We – all of us on Terra – live in disturbing times, mixed-up times, troubling and turbid times. The task is to become capable, with each other in all of our bumptious kinds, of response. […] The task is to make kin in lines of inventive connection as a practice of learning to live and die well with each other in a thick present. Our task is to make trouble, to stir up potent response to devastating events, as well as to settle troubled waters and rebuild quiet places.[5]

[4] Donna Haraway, *Staying With the Trouble: Making Kin in the Chthulucene* (Durham and London: Duke University Press, 2016) 1.

[5] Haraway, *Staying With the Trouble*, 1.

I read Haraway's trouble as twin spheres of harm and repair. This duality influences my adoption of the term 'troubled place', to mean an ongoing care-taking in a specific site of contemporary critical matter – for instance of anxiety, racial injustice, trauma, or technoscientific overreach linked to extractive capitalism. If trouble is the situated contestation of negative affects, then for a place to be troubled it must exist in relation to active communities and alliances who collectively and indefinitely strive to abide with, and respond to, troubling pasts and potential futures by arriving at contemporary positions of knowledge, storytelling and action.[6] Contemporary art might be employed as an antagonistic and constructive element in the mix of such emplaced trouble; microtopia is a documentary art method for archiving trouble surrounding controversial matter that binds people and sites together.

Troubled places are places of observation and engagement in caring responses that aim to move resiliently beyond an ingrained emergency. At the core of Harawayan 'response-ability' is a collective, feminist, thinking-with, that interweaves materials, forces, spaces, images, and bodies; artistic and scientific alliances might "inhabit the troubled patterning that is at stake and not finished, and undo and re-do each other, compose and de-compose in risk, so as to somehow strengthen the arts of living on a damaged planet"[7] For Haraway, a fundamental method of such co-operative ethics is the co-making of entangled stories. Rather than thinking from positions of separate expertise, stories should be interwoven from both science-fact and speculative-fabulation, enabling us to think differently.[8] Diverse evidence and antagonistic imagination are equally needed components for circulating memories, myths and policies to help revise and repair ongoing irresponsibility practiced in troubled places. The artistic research presented within this thesis seeks to establish a fieldwork and studio toolkit to compile such multifaceted, situated, ongoing stories as archives.

This research stems from an artistic-archival practice which began in a series of found-footage videos from 2006-10, that montaged artefacts from my personal collection of cinema cue-dots.[9] These tiny, fleeting signals that whirl in the corner of screens were crucial in governing manual changeovers of celluloid reels by film

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[6] This implies a corresponding category of the *non-troubled place* – one where troubling events or materiality lingers, but is yet to be troubled.

[7] Yale University, "Donna Haraway: Making Oddkin: Storytelling for Earthly Survival," YouTube video, 16:40, posted 26 October 2017, http://youtu.be/z-iEnSztKu8.

[8] Haraway, *Staying With the Trouble,* 2-3, 5.

[9] cf. Dave Griffiths, *Ozymandias* (Barcelona: CCCB, 2006); *The Legend of Pwdre Sêr* (Edinburgh: Collective Gallery, 2008); *Seer's Catalogue* (Cardiff: g39, 2010). These videos utilised a collection of sampled clips from my personal archive *Griffiths Cue-Dot Observatory* (Manchester, 2005-10).

projectionists. Inspired by Walter Benjamin's portrayal of a researcher who "hunts the spirits whose trace he scents in things,"[10] I sampled and collected redundant matter from an earlier media era. This work played with Jacques Derrida's notion of archive fever, which regards a repository as holding the authority to select fragments from what was written, but wielding no power over present-day and future meanings construed from these deposits.[11] By gleaning from the canon of analogue cinema I processed its records into a mosaic of fragments, to re-imagine its disappearing cue-dots as sentient bodies in new archival stories. The cue-dot film process dwelt in an idiosyncratic archive to remix its traces, but didn't engage with factual evidence to probe troubling social or material contexts.

The three projects in this PhD inquiry continue to hunt factual evidence, now from scientific actors and places, and to use this data to materialise new fragments of speculative stories about present and future material traces in troubled places, which have an impact on contemporary and as-yet unlived time. I am concerned with how troubled places are recorded and imagined in documents that might inform proceeding generations in their efforts to abide with hazard and repair trauma, or to avoid repeating previous violence technological mistakes.

This thesis uses two related terms to broadly frame this archival transmission. I use a sociological notion of *memory* as a culturally generated and held set of stories. Jacques Le Goff characterises collective memory as both an instrument and objective of power, a pool of material from which different versions of the past are constructed and modified.[12] Maurice Halbwachs shows that a 'collective consciousness' balances both unofficial, non-institutionalised knowledge, and that which is selectively filtered into documents which may serve a particular interest group.[13] Memory is a narrative diversity whose care, or injurious subjugation, is enacted through *remembrance,* which I define as an instituted documentation that attempts to embody and distribute memory in forms such as monuments, libraries museums and archives. This research isn't intended to theorise collective memory and remembrance, and instead focuses on their interrelationship within the possibilities of

[10] Walter Benjamin, *One-Way Street and Other Writings*, trans. Edmund Jephcott and Kingsley Shorter (London: Verso, 1985): 73.

[11] Jacques Derrida, *Archive Fever: A Freudian Impression*, Chicago 1996.

[12] Jacques Le Goff, *History and Memory*, trans. Steven Rendall and Elizabeth Claman (New York: Columbia University Press, 1992) 51-99.

[13] Maurice Halbwachs*, On Collective Memory*, trans. Lewis A. Coser (Chicago: University of Chicago Press, 1992)

the practice of microtopia; the artistic-archive as polyvocal storytelling about difference in troubled places, in past, present and forward time.

Critical theory, art practice and media literature has furthered my understanding of the archive – a term which can be understood both as a form of storytelling and a method of access. This artistic research seeks to engage the sense of the archive as a system that unfolds across time as Michel Foucault notes:

> The analysis of the archive, then, involves a privileged region: at once close to us, and different from our present existence, it is the border of time that surrounds our presence, which overhangs it, and which indicates it in its otherness; it is that which, outside ourselves, delimits us.[14]

By combining its archival medium (microfiche) with story-gathering and -telling methods, I want to test if the practice of microtopia might open to the viewer a sense of archival 'otherness' by constructing a narrative of overlapping factual and speculative spheres of storytelling. Might an artwork that inhabits a troubled place be one which is constructed to seem as if it is distant from us – from a forward time – a document which has compiled what can only be said at different points in time? This sense of intersecting strata of said, imagined and currently unsayable might be enhanced by being told through a redundant, strange optics like microfiche.

Such an archival system, of the said, the imagined and the subjugated, is indicated in *Cumbrian Alchemy* (2011). Artists Robert Williams and Bryan McGovern Wilson employ drawing, photography and artefactual collection to re-narrate nuclear-energy management at Sellafield, which uneasily co-exists with the local landscape, rural tourism, folklore and archaeology in a northern English region (fig.1.2). In a cabinet of descending drawers the viewer encounters documents representing entangled material strata: rambler's maps and guides, a miner's lamp, traditional craft manuals, ghost stories, atomic-era handbooks, and sci-fi comics elaborating its mythology. Cumbria unfolds in the cabinet as a troubled place where radioactive waste crisis, official nuclear-industry discourse and diverse cultural and geological stories are entangled.

[14] Michel Foucault, *The Archaeology of Knowledge*, trans. Alan Sheridan-Smith (New York: Pantheon Books, 1972) 130.

Figure 1.2 *Cumbrian Alchemy*, by Robert Williams and Bryan McGovern Wilson, 2011. Installation view at *Perpetual Uncertainty – Contemporary Art and the Nuclear Anthropocene*, Z33 House for Contemporary Art, Hasselt, Belgium, 2017.

Williams and McGovern-Wilson's assemblage exemplifies contemporary art practice that blends factual and fictional stories of troubled places and events, through documents, images and other inscriptions; an increasing archival turn discussed by artists Raqs Media Collective:

> The art space cannot keep the troubled world at bay, and in order to apprehend reality as it is, in all its disarray, it has to permit the entry of the document as a 'stable' referent of the chaotic world it inhabits… [the document] is also always vulnerable to counter readings, to being prised open, and connected to other 'documents' or other realities, and to being made to reveal the inner logic of power.[15]

Raqs argue that intensified globalisation and mediation of crises leads to their increased visibility, enabling artistic imagination to read documents differently, to recover and reconstruct different memories as discursive counterweights to dominant

[15] Raqs Media Collective, "First Information Report," from "Umfrage: Dokumente Sprechen Nicht Stimmen zu Alten und Aktuellen Dokumentarsime in der Kunst," *Texte zur Kunst* 51 (September 2003) 90-104.

power.[16] Such artistic narrative agency contrasts with official knowledge institutions and archives, enabling the disqualified or subjugated epistemologies that Foucault called for to enrich voices and action around troubling problems.[17] Art historian Hal Foster also identifies this possibility for artists-as-archivists to not only represent the conflict of events, but also to intervene in the storytelling. Making an archival work that is "found yet constructed, factual yet fictive" becomes a "gesture of alternative knowledge or counter-memory" which might construct new positive scenarios of social relations.[18] From Raqs and Foster I learn that tactics of counter-witnessing intervention in storytelling can be used in artistic-archiving of troubled places.

In creating or intervening in archives, what responsibility does an artist have to portray truth about a place? Artist Susan Schuppli demonstrates how archival artworks can play a forensic role in opposing or complementing a singular, or dominant story. She also notes the capacity of images to act as witnesses, in the present and future, to the persistence of past social violence; artworks might therefore critically approach the fraught nature of cultural memory of trouble, by expanding "the narrative terrain in which all versions of events – including inferred and even fabricated forms of witnessing – operate in tension with one another to evolve new meanings."[19] Schuppli's film trilogy *Trace Evidence* (2016) exposes geological, meteorological, and hydrological evidence of global pollution that counters the officially recorded impact of radioactive events at Oklo uranium mine, Gabon, in 1972; Chernobyl in 1986; and Fukushima-Daiichi in 2011. Similarly, Schuppli's *Panning for Atomic Gold* (2014) scrolls through contemporary microfilm to expose the time lag, in April 1986, between two stories of Chernobyl – the data detected by Swedish and German instruments shortly after the accident, and reportage 19 days later by Soviet and international newspapers.[20] From Schuppli I learn that archival artworks do not need to claim to offer 'truth' but instead can tell compelling alternative stories by re-narrating official data, leaving viewers to their own conclusions.

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[16] Raqs Media Collective, "First Information Report."

[17] Michel Foucault and Francois Ewald, *Society Must Be Defended: Lectures at the Collège de France, 1975-1976,* vol.1 (London: Macmillan, 2003).

[18] Hal Foster, "An Archival Impulse," *October* (Fall 2004): 3-4.

[19] Susan Schuppli, "Material Malfeasance: Trace Evidence of Violence in Three Image-Acts," *Photoworks* 17 (November 2011) 33.

[20] Susan Schuppli, *Trace Evidence*, video 53 mins (Umeå: Bildmuseet, 2016); *Panning for Atomic Gold*, video, 6 mins (London: Goldsmiths University 2014).

Other projects that depict places of intra-state violence, illustrate further methods of imaginatively expanding the story-versions told and recorded. The Atlas Group Archive (1989-2003), a self-described "imaginary research foundation" by New York artist Walid Raad, compiles a counter-memory of the period's Lebanese civil wars.[21] Raad eschews normative assumptions that an archive can accurately deliver truth-evidence, or convey trauma, as memory and remembrance are always in flux.[22] Instead, its fabricated notebooks, tapes and dossiers spin absurd witness statements that fictionalise collective memory. In her video *What We Left Unfinished* (2019) artist Mariam Ghani reconstructs feature films abandoned during the 1978-92 Democratic Republic of Afghanistan, in collaboration with their original directors. She notes her accountability as archivist, historian, translator and narrator in making "preserved pasts relate to the present moment of danger […] to translate and narrate that past into the present […] just when and where it is most needed."[23] Ghani asserts "That if the archive is a garden, the speculative archive is not the flowers picked from it, but the scents caught from a passing breeze – partial and imperfect accounts."[24] These works show that artistic impulses to co-create within the archive, to reinterpret fact and weave fiction, create dissonance with the official source of evidence. From Raad I learn about the antagonistic potential of re-imagining documents; from Ghani I learn that speculative story-versions should be balanced by the inclusion of local knowledge about the trouble.

Using similar multi-modal artistic-archival methods to those outlined by Williams and McGovern Wilson, Raqs, Foster, Schuppli, Raad and Ghani, the artworks in this portfolio present real, institutional evidence alongside a speculative sphere. However the medium of this suite of works – microfiche – is engaged to further critically focus the viewer/user to access and perform miniaturised content through browsing, to reflect on compression, replication, manipulation and survival of memorial evidence, and thus on the always-incomplete nature of storytelling. By testing microfiche as a creative medium for archiving, I want to exploit the sense of dissonance experienced when the human eye peers into the miniature – a scalar

[21] *The Atlas Group Archive* (1989-2005), at http://www.theatlasgroup.org, accessed 3 February 2019.

[22] cf. Charles Merewether, "Introduction: Art and the Archive," in Merewether ed. *The Archive* (London: Whitechapel Gallery & MIT Press, 2006) 17; Jeffrey Wallen, "The Lure of the Archive: The Atlas Project of Walid Raad," *Comparative Critical Studies* 8 no.2–3 (2011): 277–293.

[23] Mariam Ghani, "*What We Left Unfinished*: The Artist and the Archive," in *Dissonant Archives: Contemporary Visual Culture and Contested Narratives in the Middle East*, edited by Anthony Downey (London & New York, IB Tauris, 2015) 54.

[24] Ghani, "*What We Left Unfinished*," 62.

disconnect between the body and tiny content – which drives a viewer's curiosity to scrutinise what they instinctively sense as hidden and different knowledge. I hope for a mismatch between viewing a blend of fact and fabulation on a medium more associated with official record-keeping.

I also want to enact a buffer to existing forms of remembrance. Communications theorist André Donk notes that whilst cultural memory might be boosted by recirculation through digital networks, it is also at risk of archival loss due to the speed of evolution and uncertain durability in digital storage code and hardware.[25] Microfiche is an additional safeguard. It is a type of *microform*, an industry term for miniaturised content on high-resolution celluloid-photochemical formats, including 16mm and 35mm microfilm, 148 x 105mm (A6) microfiche, and microdot punch-cards. A simple light source and magnifying optics are all that is required to visually expand their tightly arranged matter. Hand-operated viewing machines enable a user to awkwardly and durationally browse content through gentle gestures. Microforms offer similar integrity to other media: like any digital or analogue information, they can be faked in their entirety. Whilst physical tampering is possible, their surfaces would reveal evidence of splices and emulsion damage. To replicate and transmit their information through time and space, microform documents were contact-copied, although each generation of photographic duplication erodes some legibility through loss of contrast and detail. Currently the industry is resisting obsolescence, by managing the scanning of vintage microforms into PDF and other digital formats, which over recent decades have replaced microform's twentieth-century role of information distribution.[26] Paul Negus, director of Genus, a UK bureau who enabled the technology employed in my research, has advocated microfilm as a line of defence in long-term preservation of valuable heritage artefacts.[27] Microforms can bridge original (such as paper or textile) and digital versions of valuable documents, thanks to contemporary laser-inscribed colour microfiche, and silver-halide grayscale microfilm; these formats secure a life of 500 years for their captured

[25] André Donk, "The Digitization of Memory: Blessing or Curse?" *Media in Transition Conference MIT6: Stone and Papyrus, Storage and Transmission* (Boston: Massachusetts Institute of Technology, 2009).

[26] Heather Brown et al, "The role of microfilm in digital preservation," in *DCC Digital Curation Manual*, edited by Joy Davidson, Seamus Ross and Michael Day (Glasgow/Edinburgh: Digital Curation Centre), accessed 27 April 2019, http://www.dcc.ac.uk/resources/curation-reference-manual/microfilm.

[27] Paul Negus, "The Future of Microfilm", presentation to National Preservation Office, British Library, 23 October 2007.

knowledge as a buffer to outlast the expected redundancy of digital files.[28] The medium's overtones of heritage preservation, compression, longevity, uncertain integrity and simple but unfamiliar apparatus make it a potent format to experiment with artistic archiving of stories arising from troubled places.

To summarise this inquiry: the hypothesis of microtopia suggests an additional communicative mode to join digital documents, physical remains and architectural place-markers in an incomplete plurality of remembrance forms, for events which have occurred or which still unfold. As Foucault argues,[29] and artists demonstrate, archives are the dispersed ensembles of multiple knowledges that continually extend to illuminate and modify discourses. Can the artefacts and stories of the archive include the site's complex material temporalities and spaces, as well as their speculative, and narrativised elements? This research seeks new insights into how the expanded archival format of microfiche might be produced differently, to involve official digital and artefactual evidence from troubled places along with memories or reflections told by real and imagined observers, thus encouraging viewers/users to comprehend the multifaceted natures of memory and remembrance.

I also ask how the research process might invent new aesthetics to communicate these compressed micropolitics and materialities of sites. In addition to offering commentary about the precarity and survival of the archive, the artwork itself should, like any documentary form, reflexively expose the disorderly non-linear, multi-modal, multi-temporal, narrative potential of the medium. The practice of microtopia constructs microfiche as fragmented publishing format to highlight the often-disjointed or hidden narratives of troubled places – such as those at the highly contentious political sites some of this research explores. In Chapter 2, I outline the research methods best aligned to this practice.

Further questions that arose during the research process, which will be explored in the thesis, include: how might archives be robustly documented to face potential future uncertainty? How do epistemic risks such as loss of an archive or site through destruction, or the breakdown of analogue and digital networks, or illegibility in a linguistically different future, contribute to a contemporary understanding of what should be included in an archive?

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[28] Fraunhofer IPM, *Laser Recording System for Color Microfilm: Long-term Preservation of Digital Copies*, product brochure, (Freiburg: Fraunhofer Institute for Physical Measurement Techniques, 2012); William Saffady, *Micrographics: Technology for the 21st Century* (Prairie Village, KS: ARMA International, 2000).

[29] Foucault, *The Archaeology of Knowledge*, 129-131.

1.3 Research Aims and Objectives

My research aimed to explore the technological and aesthetic characteristics of microfiche, to creatively combine data (conversations, photographs, graphics) with speculative responses, so generating the practice of microtopia in the form of archives of troubled places. A secondary aim was to consider the questions that microtopia raises about the content, precarity and survival of such archives; how might memories of troubled places be robustly transmitted forward into an uncertain epistemic future? To achieve this, my objectives were to conduct three site-responsive art commissions of sufficient scope to expand understanding of fieldwork data-gathering, to experiment with new applications of the microfiche medium in the studio, and to reflect on potential loss, erasure or illegibility of memories of troubled places.

My research methods focused on how a discursive use of the medium can be employed to witness and preserve multiple voices and stories. In this written exegesis I detail how three projects developed the conceptualisation and recording of the archival places, and their conflicting and multiple stories of ongoing trouble. For a microtopic artwork to assemble a discursive narrative about material pasts, present and possible futures required my participation (in conversations and accompanied field trips) with a variety of people on location.[30] The research focused on material problems in ruined, current or proposed large-scale infrastructures[31] which are observed and influenced by scientists and activist communities. This enabled opportunities to experience and learn from a diversity of situated knowledges. I developed thinking through critical toolkits, focusing on how Foucauldian genealogy and feminist New Materialisms could support an artist's re-interpretation of a scientific site; these thinking tools were selected as those most focused on mapping social transformation.

Fieldwork data sourced at each of these projects then underwent a gradual creative interpretation and reconfiguration in the studio, unfolding through an agential alliance of my editorial collage in conjunction with other creative practitioners, and responding to discovery of possibilities within microfilm-industry workflow and physical combination of material fragments. Studio methods experimented with different narrative modes in the artworks, using different visual and textual approaches to enrich the field of response to chronicle matter in troubled places. In the third

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[30] Appendix 1 presents information sheet and consent form used in conducting recorded conversations.

[31] Brian Larkin, "The Politics and Poetics of Infrastructure," *Annual Review of Anthropology* 42 (October 2013): 327-343. Larkin defines infrastructure as "matter that enable the movement of other matter" – technopolitical and semiotic apparatus (systems, management structure, machines, labour, architecture) through which phenomena, such as people and waste, flow.

publication this involved co-creation with a poet and a comics-artist, to realise content that was embedded alongside knowledges of scientists and activists more connected with the material conflicts of the sites. The final stages were post-production of the archival documents as microfiche, and various exhibition configurations of the microfiche media. To go beyond microfilm's normative format as ordered information storage, and to experiment with disorderly modes of publication, required connecting with a microfilm industry partner, to learn how analogue microfiche media might be re-thought creatively. For instance, through its production as a micro-zine, a compressed communiqué that is opened up through a simple magnifying lens.

It is necessary at the outset to delimit the scope of my research into 'microtopia', and my use of the term. I use 'microtopia' as a compound form, encompassing the celluloid formats of the microscopic, and the sense of compressed micropolitics that Foucault's concept of heterotopia opens.[32] Expanded archives of troubled places are made palpable through collages of microfilmed content which are magnified for an individual reader. Shrunken, packed-in fragments of evidence, memories and speculation make up the surface of the microtopia (see fig.1.1). Through this apt form of document, the information of the artwork (its idea) is materialised, to encourage a reader's reflection on troubled places that structure cultural and political life.[33] I do not aim to test microtopia as a method of re-containing or resolving affects associated with troubled places, such as trauma or anxiety experienced in communities. Nor will I attempt to measure audience reaction to reading the artworks, to evaluate their impact on changing understanding of the material issues at the sites, or the future of information. Instead I focus on microtopia as a method for witnessing and re-narrating matter and micropolitics of troubled places, and archiving the resulting documents for reading on a microfiche apparatus. This would contribute knowledge to the fields of artistic-archival practice and contemporary media art.

[32] Michel Foucault, "Of Other Spaces: Heterotopias," trans. Jay Miskowiec, *Architecture, Mouvement, Continuité* 5 (October 1984): 46-49.

[33] Library and information scientist Marc Kosciejew suggests that attention to the document's materials resolves the typical disjunction, in art studies, between art information and its materialisation, and helps to "illuminate how art is related to, enmeshed in and a reflection of the material world, and *vice versa*" (68). Marc Kosciejew, "Documenting and Materialising Art: Conceptual Approaches of Documentation for the Materialisation of Art Information," *Artnodes* 19 (June 2017): 65-73.

It is also important to distinguish my usage of 'microtopia' in relation to earlier definitions. My usage of the term is different to Nicolas Bourriaud's 1998 designation of 'micro-utopia' as a tactic of communal art-making aiming to produce a modest sense of social transformation.[34] However, my model does attempt to reflect Claire Bishop's 2004 critique of Bourriaud's model (whose name she shortens to 'microtopia'), by manifesting an element of the antagonism that she insisted accompanies the utopic conviviality of relational art.[35] My model also borders Félix Guattari's use of 'microtopia' to signify a method that opposes both hegemony and idealism, recognises both resistance and co-operation, and does not propose an end-point to action.[36] My use of the term is closest to anthropologist Roger Sansi-Roca's recent sketch of a multi-vocal, fluid, antagonistic and positive microtopia. He notes Claude Lévi-Strauss' description, in *The Savage Mind*, of an artwork as a "small-scale model", the result of a research process by which an artist gains knowledge about a possible world, and produces an artefact "that proposes to imagine the social in different terms; perhaps still imprecise and unstable, subject to revision, but which still contains the promise of a different future".[37] The projects in this thesis gather situated knowledges via conversations with actors, and produce further speculative content; together these narrative spheres combine in small-scale models of places. I have not yet experimented with participatory co-production of meaning that might inspire a co-operating alliance to change. I return to this idea in Chapter Four to discuss further research potential in which microtopia could be applied as a small-scale function within a communal process; for instance, to engage with negative social encounters with sites or imagine new possibilities.

[34] Nicolas Bourriaud, *Relational Aesthetics*, trans. Simon Pleasance, Fronza Woods and Mathieu Copeland (Dijon: Les Presses du Réel, 1998) 22.

[35] Claire Bishop, "Antagonism and Relational Aesthetics," *October* 110 (Fall 2004): 70.

[36] Félix Guattari, *Molecular Revolution: Psychiatry and Politics*, trans. Rosemary Sheed (Penguin, 1984).

[37] Roger Sansi-Roca, *Art, Anthropology and the Gift* (London: Bloomsbury, 2014) 157.

1.4 A Genealogy of Microforms

Whilst producing these research publications in 2013-16 I compiled a genealogy of microforms following the media-archaeological methods of Jussi Parikka and Eric Kluitenberg. As Parikka outlines, an artist might excavate layers in the wider media stratigraphy to re-position the value of marginal or obsolete formats in relation to dominant media, and trace alternative maps of media plurality.[38] For Kluitenberg and other theorists and artists, this stratigraphy includes fictional, dreamed, and speculative devices alongside imagined futures for actual formats whose lifecycles were curtailed.[39] By compiling this genealogy I informed my own research methods by learning about the different spatial, temporal and haptic-optic characteristics of microforms; to reclaim their unrealised potential for long-term archiving in a post-digital future. By understanding their real, unrealised or imagined inventions, along with their specific characteristics as tightly-packed vessels of miniaturised information, I could then explore how they might be re-invented as artistic-archival media.

The medium was pioneered in Manchester and Paris in the 1830-50s, and an industry has since developed in response to political and cultural desires to miniaturise, preserve, and distribute knowledge in ordered grids of documents. This section summarises apparatus that were realised in twentieth-century applications, or imagined by avant-garde publishers, science-fiction authors and information scientists, and outlines contemporary art practice using the condensing, long-lasting characteristics of the medium. This genealogy contextualises my study of microtopia as a new archival-artistic model that uses the creative potential of microfiche.

Emerging from the Victorian milieu of photographic invention, microfilm joined print in the 1940-50s as a dominant archival writing-and-reading medium. In the late twentieth-century its function and creative possibility was engulfed by the different gestures and capacities of emergent digital networks and storage – despite the latter's insecure temporality due to uncertain lifespan of file formats and risk of epistemic loss through periodic data migration.[40]

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[38] cf. Jussi Parikka, "Archaeologies of Media Art: Jussi Parikka in conversation with Garnet Hertz," *CTheory* (January 2010), https://journals.uvic.ca/index.php/ctheory/article/view/14750/ 5621; Jussi Parikka, *What is Media Archaeology?* (John Wiley & Sons, 2013) 7.

[39] Eric Kluitenberg, Siegfried Zielinski, Bruce Sterling, Erkki Huhtamo, Edwin Carels, Zoe Beloff, Timothy Druckery and John Akomfrah, *The Book of Imaginary Media: Excavating the Dream of the Ultimate Communication Medium* (NAi Uitgevers/Publishers, 2007).

[40] Jonas Palm, *The Digital Black Hole* (Stockholm: Swedish National Archives, 2007), accessed 27 March 2019, http://www.tape-online.net/docs/Palm_Black_Hole.pdf.

The microform process was pioneered by a Manchester optician and "philosophical instrument-maker." In 1839, motivated by scientific novelty, John Benjamin Dancer projected a magic lantern slide through a microscope lens, to expose a Daguerreotype microphotograph of a flea, with a diameter of one-eighth of an inch.[41] Similar artefacts, using wet collodion film and reducing original images by a factor of 160, were commercialised by Dancer and other makers from the 1850s to 1890s. E.M London's microscopic Moon image (fig.1.3) exemplifies mid-Victorian power in the scientific and artistic exchange of knowledge and observational tools. Microphotograph editions were sold as collectable curiosities, as seen in one of Dancer's reproductions of Sir Edwin Landseer canvases (fig.1.4). Dancer's innovation was applied in Paris by photographer René Dagron in 1859, to launch *bijoux photomicroscopiques*[42] in which pinhead-sized microdots depicting personalities, religious iconography or texts, tourist sites and erotica were embedded in carved-bone souvenirs and jewellery, to be held to the eye and viewed through Stanhope lenses (fig.1.5).

Figure 1.3 *The Moon: A Photographic Curiosity for the Microscope.* Microphotograph slide by 'E.M. London', date unknown, 7.5 x 2.5 cm. From *A Cabinet of Curiosities*.

[41] cf. Brian Bracegirdle and James B. McCormick, *The Microscopic Photographs of J.B. Dancer* (Chicago: Science Heritage Limited, 1993); Manchester Microscopical and Natural History Society, *John Benjamin Dancer 1812-1887: 19th Century Manchester Instrument Maker and Inventor of Microphotography*, accessed 31 August 2017, http://www.manchestermicroscopical. org.uk/danchom.html.

[42] Sir David Brewster, "On the Photomicroscope," *The Photographic Journal* (15 January 1864): 439-441.

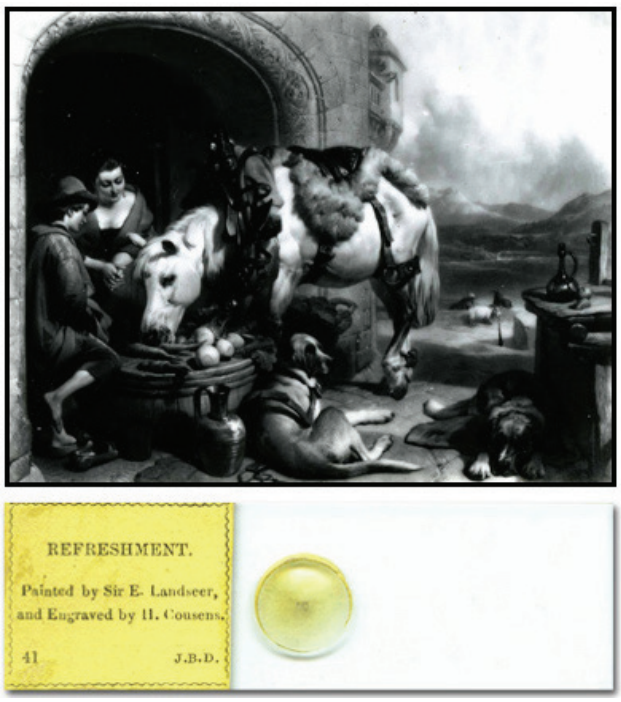

Figure 1.4 *Refreshment – A Scene in Belgium*, Sir Edwin Landseer, 1851. Mezzotint engraved by H. Cousens, on microphotograph slide by John Benjamin Dancer, 7.5 x 2.5 cm, for *Art Treasures Exhibition*, Manchester, 1857.

Figure 1.5 A collection of *bijoux photomicroscopiques*.

Microphotographs and *bijoux photomicroscopiques* are forms of 'miniatures' – scaled-down objects produced as art, remembrance and tools, found globally in ancient and contemporary human cultures, and of enduring interest to anthropologists. For Alfred Gell the miniature epitomises an elite's wielding of technology to promote an idealised past or future; it "achieves its effect via the enchantment cast by its technical means, the manner of its coming into being, or, rather, the idea which one forms of its coming into being."[43] Jack Davy and Charlotte Dixon also recognise miniatures as communiques of power relations, with the potential to be satirical and resistant.[44] When viewers are enticed into scalar differences between petite artefacts and larger entities that are imaginatively mimicked, they experience a dissonant sense that the observed object belongs to a different reality than that of the viewer's body and system of knowledge; the viewer overcomes dissonance by imposing their own interpretation.[45]

Citing Lévi-Strauss' 1966 text *The Savage Mind*, Susanne Küchler notes how a miniature condenses the imagery, operational qualities and surrounding ideas of an entity in order to represent its creation, use and impact; by simplifying complexity the miniature can become a subversive vector of communication that enables intuitive understanding of the social and technological dimensions of its era.[46] Likewise Susan Stewart describes miniature books ('micrographia'), whose "gemlike" compressed interiors are characterised by microscopic handwriting or typefaces, as drawing readers into expecting an insight about something of significance; "the display of a world not necessarily known through the senses or lived experience".[47] For Stewart, miniatures offer "translation of the oral folk forms of the fantastic into the printed fantastic"; an entry to the realm of reverie or the cultural other, uncovering traces of remote narratives brought into the present moment.[48]

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[43] Alfred Gell, "The Technology of Enchantment and the Enchantment of Technology," in *Anthropology, Art and Aesthetics*, edited by Jeremy Coote and Anthony Shelton (Oxford: Clarendon Press, 1992) 47.

[44] cf. Jack Davy and Charlotte Dixon, "What Makes a Miniature?" in *Worlds in Miniature: Contemplating Miniaturisation in Global Material Culture,* edited by Davy and Dixon (London: UCL Press, 2019) 1-17; Jack William Davy, "Miniature Dissonance and the Museum Space: Reconsidering Communication Through Miniaturisation," *International Journal of Heritage Studies* 24 (9: 2018) 970.

[45] Davy and Dixon, "What Makes a Miniature?" 1-17.

[46] Susanne Küchler, "Some Thoughts on the Measure of Objects" in *Worlds in Miniature: Contemplating Miniaturisation in Global Material Culture,* edited by Jack Davy and Charlotte Dixon (London: UCL Press, 2019), 184

[47] Susan Stewart, *On Longing: Narratives of the Miniature, the Gigantic, the Souvenir, the Collection* (Baltimore: John Hopkins University Press, 1993) 44.

[48] Stewart, *On Longing*, 43, 135-8, 151.

Greatly inspired by this fascinating early era of microphotography, microtopia aims to exploit the inquisitive urge of viewers to peer within, via a condensed knowledge portal, to different spaces and times. In exploring a discursive miniature, told through real and speculative spheres, they might be attracted and compelled by its shrunken scale and the crystalline materiality of its celluloid substrate. Using, for some viewers, a novel interface they might navigate by unfamiliar haptic gestures towards the promise of unknown stories and immersion in different power relations.

Soon after the early creative period, when microfilm curiosities expressed the agency of individual makers, the medium was identified as a potential organising function in state knowledge. Writing a month after the August 1858 fire at City Hall, New Yorker and photographic chemist Henry Garbanati considered Dancer's technique a novelty whilst also imagining it as a vital future component in archival remembrance:

> The microscopic uses of the photograph have merely been hinted at, never tried more than as interesting experiments. The recent burning of the City Hall, though no great loss has been sustained in documents, shows the liability to greater damage… A microscopic negative of which, carefully stored away, with the agency of the megascopic camera, would give a document as reliable as the original… Hundreds of thousands of such negatives might be put away in suitable boxes, in a fire proof vault underground, to be resuscitated upon the loss of the objects from which they were taken… I trust that it will be the custom to make microscopic negatives of all valuable public documents, and of documents connected with important cases of law.[49]

In the century after its pioneering stage, microfilm technology was indeed developed for international communication and knowledge preservation in such potentially damaging situations as Garbanati describes. During Prussia's 1870-71 siege of Paris, Dagron again utilised early microphotography in pigeon-borne dispatches to Tours.[50] In the Second World War, the British Airgraph and United States V-Mail (fig.1.6) microfilmed and flew millions of letters around the globe. Axis and Allied

[49] Henry Garbanati, "Negatives of Valuable Documents," *The American Journal of Photography* 1:7 (1 September 1858): 100-102.

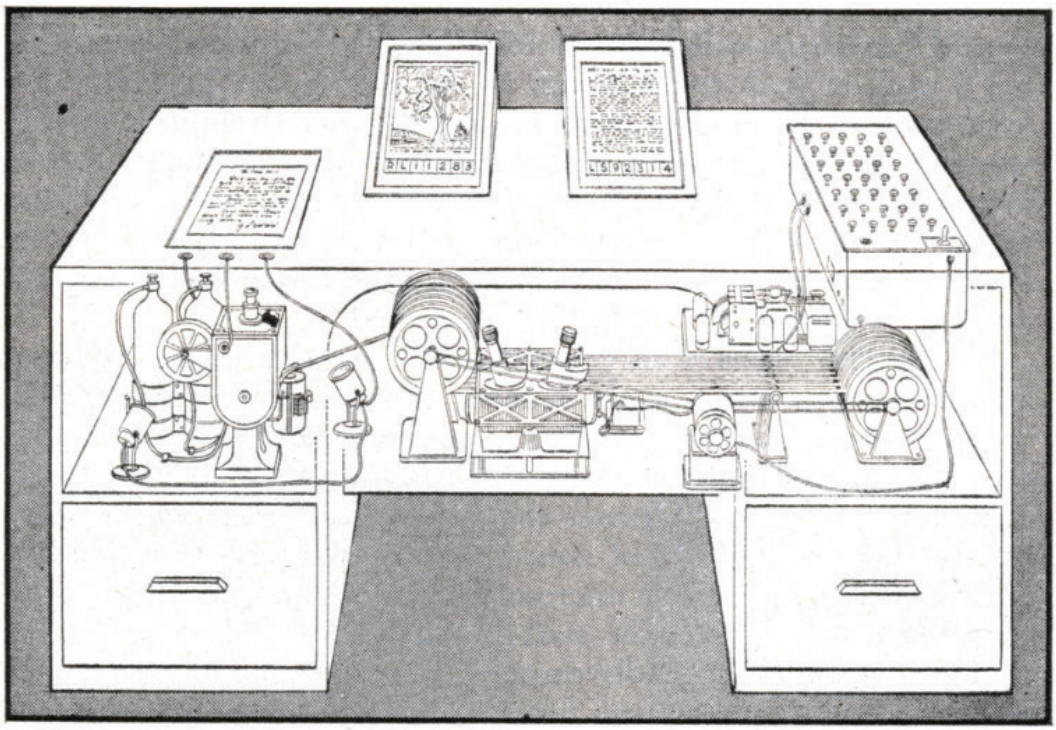
[50] Southern Regional Library Facility, University of California, "The Pigeon Post into Paris, 1870-1871," in *History of Microfilm: 1893 To The Present,* accessed 1 September 2016, http://www.srlf.ucla.edu/exhibit/text/default.htm.

spies, refugees and propagandists trafficked fragments of film, whilst banks, corporations, museums and newspapers preserved their assets using new fire- and water-resistant microfilm media by DuPont and Eastman Kodak.[51] During the Cold War, samizdat copies of Zhores Medvedev's *Rise and Fall of T.D. Lysenko,* an essential discursive exposé of biopolitical crisis, were secretly circulated on microfilm in and beyond the USSR.[52]

The urge for epistemic protection and control took on a cybernetic mode in the nuclear-age imaginary. In 1945, United States scientist Vannevar Bush envisaged the Memex (fig.1.7) as a bank to survive the destructive potential of technologically advancing warfare. Bush describes a (male) user of an unrealised mechanised device, "an enlarged intimate supplement to his memory", spooling through microfilm reels containing all published scientific and cultural information to juxtapose selected pages; crucially, researchers would add new frames to update the microfilm library as they threaded a trail of ideas in the formation of new knowledge.[53]

Figure 1.6 Paper reproductions expanded from service personnel V-Mail microfilm are inspected, redacted and cut into individual letters at the US Pentagon, February 1943.

[51] "Mighty Midgets of Filmdom, *Popular Mechanics* (December 1942): 72-6, 168-9.
[52] Albert Parry, "Samizdat is Russia's Underground Press," *New York Times*, 15 March 1970, 249.
[53] Vannevar Bush, "As We May Think," *Life* (10 September 1945): 122.



MEMEX in the form of a desk would instantly bring files and material on any subject to the operator's fingertips. Slanting translucent viewing screens magnify supermicrofilm filed by code numbers. At left is a mechanism which automatically photographs longhand notes, pictures and letters, then files them in the desk for future reference.

Figure 1.7 Concept drawing for Vannevar Bush's Memex, from the article 'As We May Think,' *Life* (10 September 1945) page 122.

Throughout the 1940s, President Roosevelt backed the US Library of Congress, State Department and the newly formed Central Intelligence Agency to coordinate mass filming of information as a geopolitical resource.[54] By the 1960s microfilming was a widespread library storage response to the exponential growth of academic publishing predicted in 1944 by Fremont Rider.[55] In promoting global knowledge-transfer during the 1970s, UNESCO advocated microform libraries and documentation centres as key components of developing-state infrastructure.[56] However microform storage in the information sector also carries risk of epistemic

[54] Craig Saper, "Microfilm Lasts Half a Millennium," *The Atlantic* (22 July 2018), accessed 13 August 2018, https://www.theatlantic.com/technology/archive/2018/07/microfilm-lasts-half-a-millennium/565643.

[55] Fremont Rider, *The Scholar and the Future of the Research Library: A Problem and its Solution* (New York: Hadham Press, 1944).

[56] G. Müller, H. Müller and G. Thiele, *State-of-Art Survey on Technology and Use of Roll Microfilm, Microfiche and Other Microforms*, report (Paris: UNESCO, 1974).

catastrophe through failure or redundancy of its media technology. Reliance on cumbersome microfilm as utopian knowledge infrastructure was criticised by novelist and essayist Nicholson Baker in 2002, who decries international libraries' destruction of original newspapers and books after microfilming them in the 1980s to 1990s.[57]

Mirroring these real and imagined epistemes, science fiction has often featured microfilm as repository of knowledge for humanity in crisis, a biopolitical resource for civilisation rebirth often controlled by an intellectual elite. The 1951 film *When Worlds Collide*[58] depicts a microfilm bureau preserving crucial books for use by evacuees after Earth's destruction by a rogue star. Ethical concern for knowledge survival and transmission is embodied in Isaac Asimov's 1953 literary invention, the Foundation, a technocratic priesthood who endlessly compile Encyclopedia Galactica, a microfilm library capturing the Empire's entire scientific and cultural knowledge as a bulwark against mutant-tyrant "the Mule".[59] Towards the end of Walter M. Miller Jr's 1959 novel *A Canticle for Leibowitz* a far-future Catholic monastery, on the eve of a second nuclear-armed conflict, resort to microfilming their guarded "Memorabilia", the preserved scientific and cultural knowledge that survived the first nuclear apocalypse thousands of years before.[60]

Daniel Cordle notes that Jacques Derrida's notion of the vulnerable episteme can be detected in post-nuclear literature, where remaining archives are depicted as fragile, inadequate for survival, and representing collective loss of memory, or wonderous outposts of learning; in David Palmer's 1984 novel *Emergence* Candy, the child heroine, guards a microfilm home repository covering science, fiction, art and philosophy.[61] The 2017 film *Blade Runner 2049* depict Agent K and Joi searching post-digital DNA records on a microfilm device (fig.1.8).

[57] Nicholson Baker, *Double Fold: Libraries and the Assault on Paper* (New York: Vintage, 2002).
[58] Rudolph Maté, *When Worlds Collide*, film (USA: Paramount Pictures, 1951)
[59] Isaac Asimov, *Second Foundation* (New York: Gnome Press, 1953).
[60] Walter M. Miller Jr. *A Canticle for Liebowitz* (New York: Bantam, 1988).
[61] Daniel Cordle, *Late Cold War Literature and Culture: The Nuclear 1980s* (London: Palgrave Macmillan, 2017) 174.

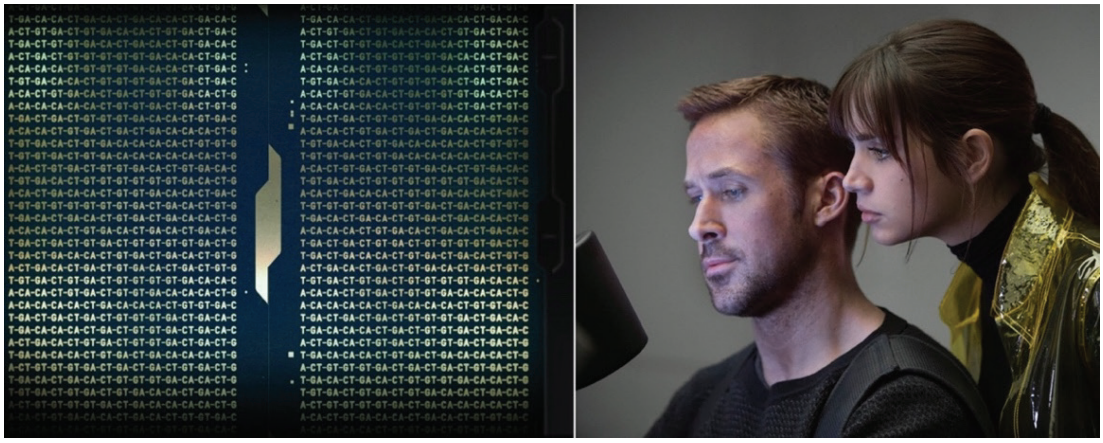
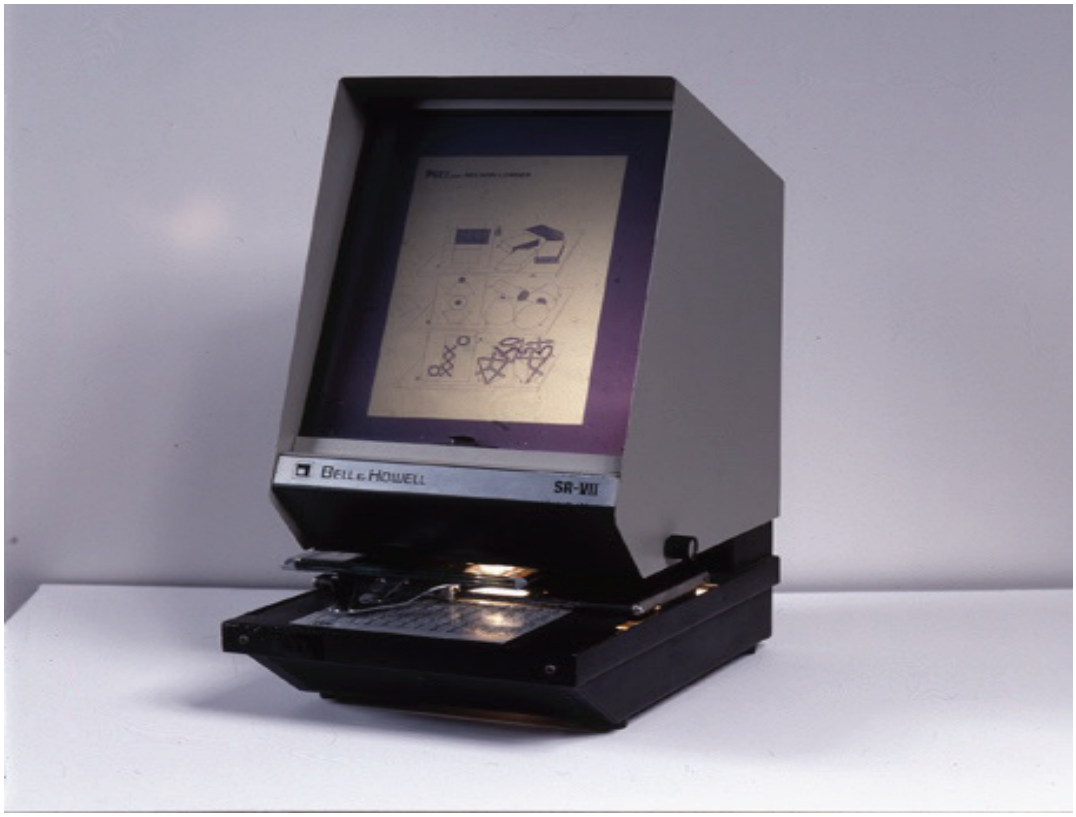


Figure 1.8 Agent K and Joi search microfilmed DNA data. Film stills from *Blade Runner 2049*, 2017, directed by Denis Villeneuve. Alcon Entertainment.

Microforms have been employed in contemporary media-art practice but remain under-explored despite their unique aesthetic potential – no doubt partly due to their increasing invisibility and perceived obsolescence compared to digital media. Artists have exploited the miniaturisation and longevity of microforms to question the social desire for a complete archive, and the ability of digital networks to secure it.

In 1982, the Brazilian artists Regina Silveira and Rafael França organised *Artemicro*, an exhibition in which images of participating artworks were presented on microfiche (fig.1.9). Referring to André Malraux's "musée imaginaire", Silveira's accompanying manifesto satirises the museological problem of maintaining artefactual storage capacity whilst offering compacted accessibility; her text strikingly likens the viewer's perception of microfilmed artworks to that of Lewis Carrol's shrunken Alice entering a garden of adventure,[62] suggesting scope for a new kind of miniaturised publication that enables entry to a discursive, speculative, large-scale narrative space of artistic critique.

[62] Regina Silveira, "Artemicro: a microficha como suporte de arte", *Arte em São Paulo* (São Paulo: Museu de Arte Contemporânea da Universidade de São Paulo, May 1982). Translation by Dave Griffiths: "When Alice, chasing the Rabbit, drinks from the flask on the table she begins to shrink and shrink, becoming small enough to pass through the tiny hole in the garden door. ARTEMICRO is like Alice: also miniaturised; but if Alice doesn't enter the garden for her difficult adventure, ARTEMICRO is already embedded in the open field of artistic communication, where there is free access to the information it carries, a macro turned micro. ARTEMICRO is a parody of the museum. Referring to the "imaginary museum" of Malraux, this micro-collection, almost immaterial, has great potential for growth by inclusion, *ad infinitum*, of works and artists, and fits in any pocket. Compact and portable, it is always ready to travel when required. Alice grew by eating a piece of cake, becoming a giant. ARTEMICRO also grows, without Alice's discomforts; its original size is retrieved at any time in a microfiche apparatus. Micro art? No. Art is macro, and micro is just a matter of optics and, as such, depends on the spectator's point of view and their lenses."




ARTEMICRO

a microficha como suporte de arte

Regina Silveira

Quando Alice, perseguindo o Coelho, bebe do frasco sobre a mesa começa a encolher e encolher, até tornar-se tão pequenina que pode passar pelo buraco diminuto da porta do jardim.

ARTEMICRO é como Alice: também miniaturizou; mas, se Alice não passa ao jardim pelos pergaços de sua aventura, ARTEMICRO já está instalada no campo aberto da comunicação artística, onde há trânsito livre para a informação que carrega, um macro tornado micro.

ARTEMICRO é ainda a paródia do museu. Remetendo ao "museu imaginário" de Malraux, a microcoleção, quase imaterial, mas com grande potencialidade de aumento pelo possível inclusão, ad infinitum, de obras e artistas, cabe em qualquer bolso. Compacta e portátil, está sempre pronta a viajar, quando solicitada.

Alice cresceu comendo um pedaço de bolo, até tornar-se um gigante. ARTEMICRO cresce também e sem os desconfortos de Alice: recupera seu tamanho original em qualquer momento, num aparelho leitor de microfichas.

Micro arte? Não. A arte é macro, e micro é apenas uma questão de óptica e, como tal, depende do ponto de vista do espectador e de suas lentes.

▪

Ao lado o convite para a exposição e uma microficha,em tamanho natural,contendo 45 trabalhos,de quatro artistas:Mario Ramiro, Gerty Saruê,Ligia Pape e Alberto Cedrón.

Figure 1.9 (Top) *Artemicro,* Regina Silveira and Rafael França, 1982. Microfiche 10.5 x 15cm and reader. Museu de Arte Moderna de São Paulo. (Bottom) Regina Silveira, "Artemicro: a microficha como suporte de arte," *Arte em São Paulo* (May 1982).

This theme is echoed in Jon Rafman's work, *New Age Demanded Microfiche Archive* (2013) (fig.1.10). Here Rafman archives his photographic series *The Nine Eyes of Google Street View* and his 3D-rendered sculpture series *New Age Demanded,* in microfiche documents that highlight "the individual's relationship to the archive and the desire for physical presence".[63]

Figure 1.10 *New Age Demanded Microfiche Archive*, Jon Rafman, 2013. Microfiche & reader, 51.5 x 33 x 48.4cm. *Annals of Time Lost*, Future Gallery, Berlin, 27 April-13 June 2013.

[63] Future Gallery, 'Jon Rafman: Annals of Time Lost,' press release (Berlin: Future Gallery, 2013).

Ryoji Ikeda expresses a similar sentiment of data and human mortality in his 2011 artwork *data.microfilm,* which transcribed over 13,000 still frames of abstract data visualisations from his *datamatics* video installation onto an eight-metre strip of microfilm (fig 1.11). In 2005 Ben Rubin used microfiche to display lines of redacted code from the Diebold AccuVote-TS™ touch-screen voting terminal adopted in the USA (fig.1.12), drawing attention to loss of civil liberties and information through gradual privatisation of the utopian Internet. In *Micro-Pages*, curator Abigail Thomas miniaturised selected artists books into a reel of 35mm microfilm which toured British libraries during 2009-10, in a remark on access to, and preservation of, knowledge.[64]

Figure 1.11 *data.film no.1*, Ryoji Ikeda, 2011. 35mm microfilm, LEDs, acrylic panels, 80.5 x 3.5cm. Installation detail, Museo de Arte, Universidad Nacional de Colombia, Bogotá.

Figure 1.12 *Dark Source*, Ben Rubin, 2005. Microfiche and print installation at *Making Things Public: Atmospheres of Democracy*, ZKM Karlsruhe, 19 March – 7 August 2005.

[64] Abigail Thomas, *Micro-Pages* (Bristol: Bower Ashton Library, 2009)

Figure 1.13 *500/500.000.000*, Gaëlle Boucand, 2008. Microfiche 160 x 40 x 40cm. Installation at Centre Européen d'Actions Artistiques Contemporaines, Strasbourg.

Artists have also used microfiche to imagine how preserved documents might be received and translated in the far future. In 2008, French filmmaker Gaëlle Boucand used 500-year colour microfiche to store photographs of 500-million-year-old minerals from the National Museum of Natural History in Paris (fig.1.13). My 2009 artwork *Columbarium* uses colour fiche to archive a collection of cinema cue-dots, which are the registration signals that guide projectionists in seamlessly switching between two 35mm film reels. The cue-dots in *Columbarium* attest to their erasure from analogue image production by digital methods (fig.1.14). Depositing them on another near-redundant celluloid medium, the artwork remarks on disappearance of mediated images and potential for their cultural re-use. My 2010 project *Bauplan* (fig.1.15) offers viewers a browsable grid of thousands of images of my body's surface, to insinuate the fictional possibility of far-future re-animation of the human being from an archived blueprint.

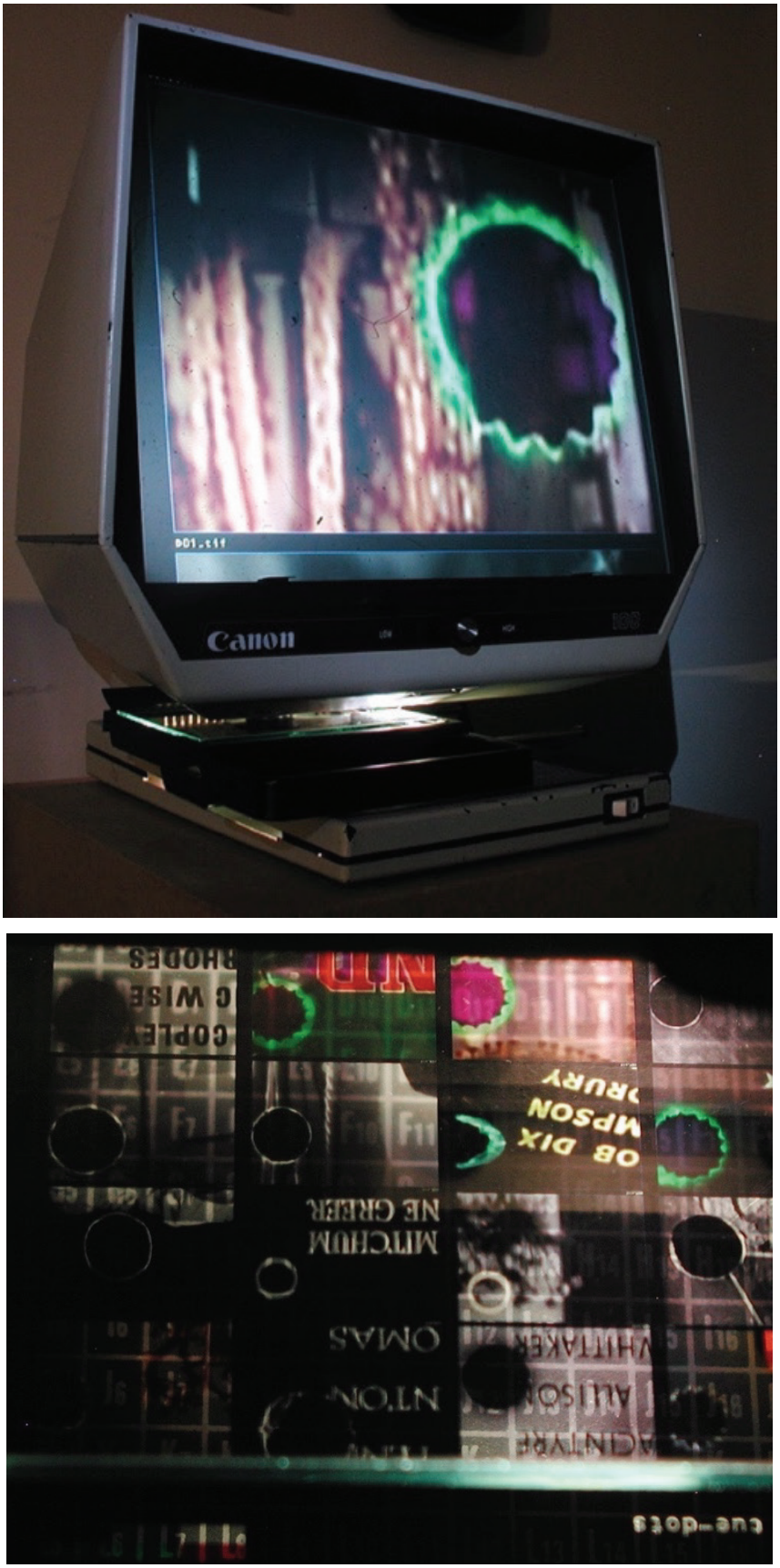


Figure 1.14 *Columbarium*, Dave Griffiths, 2009. Colour microfiche and reader 50 x 50 x 40cm. Installation at Contemporary Art Norwich, UK.

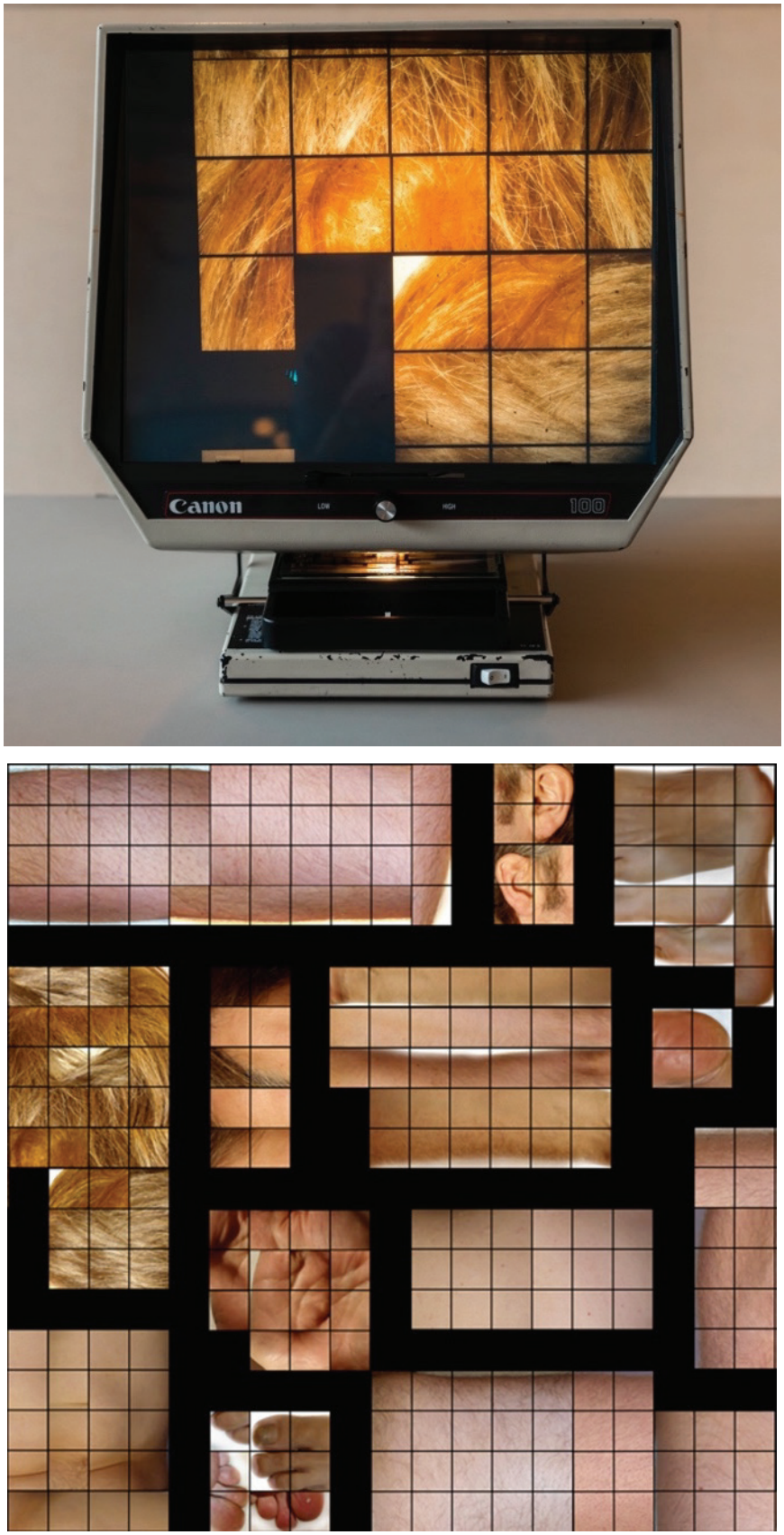


Figure 1.15 *Bauplan*, Dave Griffiths, 2010. Colour microfiche in reader, 30 x 30 x 40cm. (Top) Installation at Contemporary Art Society, London, UK. (Bottom) detail.

In my 2012 project *Babel Fiche*, a collection of 20-second crowd-sourced video clips were deposited onto colour fiche as grids of still frames (fig.1.16). An accompanying short film depicts a pair of researchers at a future-fictional Manchester archive who pore over these found documents with magnifying apparatus, whilst sharing speculative feelings about the origin and meaning of the expanded and re-animated images. Entering Earth's orbit aboard a new United States communications satellite in 2012, *The Last Pictures* (fig.1.17) is a nano-etched silicon wafer, similar in effect to microfiche, atomically stable for billions of years and bearing 100 images selected by artist and geographer Trevor Paglen to potentially transmit a human history beyond human existence.[65]

Figure 1.16 *Babel Fiche*, Dave Griffiths, 2012. Colour microfiches, 14.8 x 10.5cm and LED panels. Installation at San Dao Gallery, Xiamen, China, 23 June-13 July 2013.

[65] Trevor Paglen, "The Last Pictures," *Journal of Visual Culture* (December 2013): 508-514.

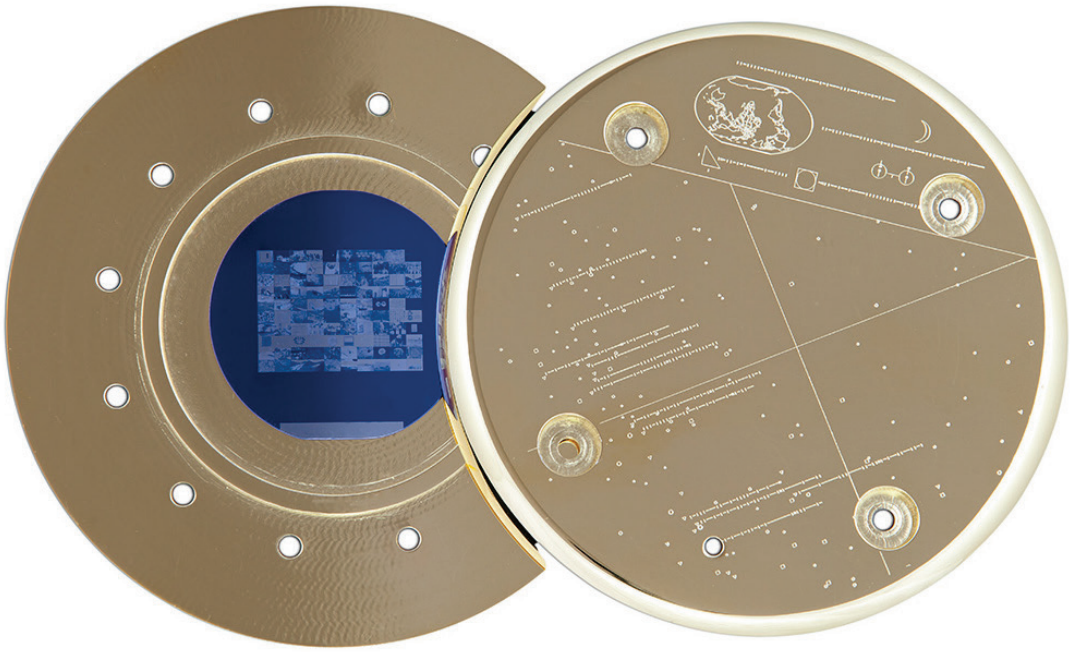


Figure 1.17 *The Last Pictures Artifact*, Trevor Paglen, 2013. Etched silicon disc and engraved gold-plated aluminium jacket cover, 20 x 20 x 1cm.

The above examples of microform art mimic, in order to comment upon, the ordered data matrices seen in the medium's conventional usage for storing pre-existing information objects.

It is also useful to note how the development of commercial microfilm apparatus did not respond to artistic imagination of new, experimental page layout and portable media that might overcome the dominance of the codex as normative design frame for documents. In 1923 El Lissitzky speculated, in his Electro-Library manifesto, that book design would adopt a spatial and temporal infinity to transcend the limitations of the printed surface.[66] The non-linear user motion, expanding optics and hidden space of microfilm would have been ideal for such evolved communicative modalities beyond the codex. However the Optigraph Reading Machine, patented in 1923, displayed microphotographic print on a glass screen whose content resembled standard book-like page design.[67] In 1930 experimental poet and publisher Bob Brown envisioned a portable reader using miniaturised, type-ribbon-sized paper strips scrolling behind a magnifying glass, that would challenge the limitation of sequential

[66] El Lissitzky, "The Topography of Typography", in *Merz* 4 (Hanover: July 1923) 47.

[67] Alessandro Ludovico, *Post-Digital Print: The Mutation of Publishing Since 1894* (Eindhoven: Onomatopee, 2013) 103.

order in printed books.[68] Containing compressed texts by Gertrude Stein, Filippo Tommaso Marinetti and Ezra Pound, which abandoned all but the most indispensable words, *Readies for Bob Brown's Machine* (1931) proposed new forms of reader-text relations for new accelerated, cinema-age conditions within which archived knowledge would be distributed and consumed.[69] Brown explored microfilm as a means to commercialise this venture, but 'readies' weren't produced on the medium.

Microfilm had a domestic potential and could have replaced newspapers; apparatus for home projection of documents was envisioned in "…Closer Than We Think!" a 1959 *Chicago Sunday Tribune* feature (fig.1.18). Similarly, a 1972 *New Scientist* article advocated microfiche (and imagined handheld reading devices) as natural successor to magazine print for its compact, cheap, and ecological advantages, citing US Army information-scientist Andrew Aines' 1972 prediction in *Honeywell Computer Journal* that microfiche would evolve its own stylistic specificity as a knowledge medium.[70] Soon after, the onset of digital information technology saw to the end of these analogue imaginaries.

Figure 1.18 'Electronic Home Library,' illustration by Arthur Radebaugh in "…Closer Than We Think!" series, *Chicago Sunday Tribune*, 1 February 1959, page 10.

[68] Ludovico, *Post-Digital Print,* 19-20.
[69] Ludovico, *Post-Digital Print,* 19-20.
[70] Joseph Hanlon, "A New Kettle of Fiche," *New Scientist*, 24 February 1972, 413.

Beyond early artistic use by Victorian pioneering photographers, microforms, in fact and fiction, have been relegated as mere data carriers, never breaking free from rigid informatic grids or codex layouts. This genealogy shows the medium's capacity for: compression, expansion, duplication, distribution, secrecy, duration, gestural navigation, longevity, alteration and erosion. Despite these spatial and temporal characteristics, the disruptive potential for counter-cultural or counter-witnessing practice using microforms hasn't been widely realised.

In the practice of microtopia, I engage the microform's undeniably cumbersome, and somewhat cold, 'scientific' apparatus. The artworks presented in Chapter Three (*Extinction Event [GRB130313A], Deep Field [Looking Squarely Ahead],* and *Deep Field [UnclearZine]*) offer similar gestures as Silveira and França, Rubin, Boucand, Griffiths, Rafman, Ikeda and Paglen, in expressing uncertainty about future epistemic loss, reception or value of an archive and the data and images it contains. Using new artistic methods, microtopia expands on the limited modality in this genealogy, and re-invents microfilm and microfiche as creative media for communicating discursive narratives about troubled places.

1.5 Thesis Structure

Chapter Two: Methods of Microtopia, sets out microtopia as a new conceptual and practical research method that is trying to achieve a multimodal narration of troubled places, and to contribute new insights to archival art practice. Section 2.1 engages literature on interdisciplinary practice-as-research to understand the scope of an artist's agency in representing a site, where learning about other disciplinary knowledge and everyday experience must be balanced against adoption of a critical, discursive stance in the independent artwork. Section 2.2 applies Foucault's sketch of heterotopia to understand the compressed micropolitics of sites and communities, where a palpable sense of urgency, anxiety and responsibility envelops contemporary decision-making in reaction to troubling matter. Section 2.3 thinks with feminist New Materialist tools to expand the scope of story-gathering. By taking a diffractive approach to genealogy, the practice re-routes and interweaves a diverse array of actors, matter and places, across different timescales, into a multimodal narrative that includes both factual evidence and speculation. Donna Haraway's conceptual figure of OncoMouse informs my invention of a far-future character who offers a material

counter-perspective to that of 'expert' actors in the site. Section 2.4 describes a range of artistic processes for conceptualising the troubled place of inquiry, and for producing and editing text and images in fieldwork and studio post-production. Plastic forms and an array of media such as photography, conversations, scientific data, comics-art and poetry are collaged together, designed as a browsable microfiche layout for the archival artwork.

Chapter Three: Practice of Microtopia: Three Artworks, reflects on published artworks from my journey of practicing microtopia. For each site-responsive project I discuss existing artistic responses to similar contexts, outline the particular observing apparatus used to investigate emplaced materiality of hazards or remains, and highlight features of the artworks that exemplify the compressed site of the microtopia. As I worked through the three projects, new conceptual and practical elements in the microtopia methodology emerged, and were incorporated into the respective pieces, and tested. I progressed from a non-discursive approach of observing and recording sites and communities, to a critical archiving of troubled place.

Chapter Four: Conclusion: Developing Microtopia, offers a summary of findings across the body of artworks, compared to the questions that initiated the study, and recognises limitations that were encountered in the methods. The chapter then discusses further research directions in which microtopia can be taken.

Chapter Two

Methods of Microtopia

2.1 Introduction to Microtopic Art Methodology

This chapter outlines the methodology and methods for the practice of microtopia, which combines conceptual, fieldwork and studio processes to make archives of troubled places. Microtopia, as defined in Chapter One of this thesis, is the repurposing of microfiche as a creative medium for observing, documenting, imagining and locating discourses about sites of trauma and hazard, and their potential transformation. Microtopia is inspired by modes of compression and expansion that distinguish microform production and reading, as sketched in section 1.4. The practice undergoes those same modes by gathering condensed, diverse stories about past and present material problems and potential transformations of different (*hetero*) spaces (*topos*). Fact-based stories then trigger fabulation in the studio – a narrative remix that mutates and expands the evidence into new fictions about the site. The combined stories are miniaturised into a portable document, that is entered into by readers using a magnifying machine to again expand the content. Through microtopia, audiences encounter multifaceted stories that broaden understanding of troubled places, and consider the always-incomplete nature of archives.

If an artist intends to speak independently in archival works about the material problems of troubled places, then which methodology should frame interdisciplinary work with scientists? Mika Hannula, Juha Suoranta and Tere Vadén position transversal experience at the core of artistic research; they note that by using anarchic methodologies and immersion in a new terrain, artists can "come to terms with the diffuseness and uncertainty of a new research field".[71] Where scientists might value the

[71] Mika Hannula, Juha Suoranta & Tere Vadén, *Artistic Research: Theories, Methods and Practices*, trans. Gareth Griffiths & Kristina Kölhi (Helsinki Academy of Fine Arts/University of Gothenburg, 2005) 14.

unorthodox voice of an artist in throwing a different light on a problem, artists similarly value insight into scientific data and conclusions to inform a counter-witnessing narrative. For Hito Steyerl, artistic research needs to speak several languages at once; to absorb and work with scientific "truth procedures" whilst also claiming its own autonomous logic as strategy of "epistemic disobedience".[72] In a similar vein Hans Jorg Rheinberger postulates the "epistemic thing", a vague, experimental system for knowledge production on disciplinary boundaries, which embodies what one does not yet know, and surprises the experimenter with unanticipated trajectories.[73]

In making microtopia I want to loosen the primacy of my personal agency, to allow a multi-agential voice to emerge from the people and materials observed. I want to know if the practice can expand multiple voices rather than centre on a sole author; if it can open to surprise and disobedience, or be emotionally moved, by submitting to immersion in languages, procedures and evidence of different disciplines. Anthropologist Tim Ingold's model of creativity as 'undergoing' is useful in adopting an uncertain position of 'not-knowing' within a skilled practice, rather than 'doing' as executing a pre-fashioned idea.[74] Ingold sees materials themselves as agential, as emerging from a world of unfolding difference, as part of continuing creation; materials are a flow into which the imagination, a process inhabit by creators who submit to being moved by and decided upon by materials.[75] For me, Ingold's active doing-from-within is to undergo not just my tangible materials of analogue microfiche publishing (text, images, plastic film, lenses, mirrors) but also the agencies of real and fabulative observers and dense micropolitics of place that underpin my thinking.

Transversal, multi-agential storytelling about place is therefore enriched by thinking with feminist new-materialist concepts, a toolkit that helps the imagination undergo relational threads. Contemporary context can be thought as speculative, multi-temporal narrative modes yielding further unforeseen results for artwork production. This transversal materialist methodology, which opens dense, burdened terrain, is the most appropriate to arrive at a compressed miniature archive into which readers would immerse, in expectation of expanding different and unknown stories.

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[72] Hito Steyerl, "Aesthetics of Resistance? Artistic Research as Discipline and Conflict," *European Institute for Progressive Cultural Policies,* 2010, eipcp.net/transversal/0311/steyerl/en, accessed 25 June 2017.

[73] cited in Henk Borgdorff, "Boundary Work," in *Intellectual Birdhouse: Artistic Practice as Research,* eds. Florian Dombois, Ute Meta Bauer, Claudia Mareis and Michael Schwab (London: Koenig Books, 2012) 117-123.

[74] Tim Ingold, "The Creativity of Undergoing," *Pragmatics and Cognition* 22:1 (2014): 124-139.

[75] Ingold, "The Creativity of Undergoing," 124-139.

Which methods might help navigate such a complex, transversal folding and unfolding of ideas? Sarat Maharaj suggests that indeterminate artistic "no-how" is a creative "muddle of methods", a cut-and-paste approach using transformative crossover to engender both potential of otherness and propensity of failure.[76] The practice of microtopia cuts and pastes a muddle of methods. It uses contextual inquiry into the places, and fieldwork learning with scientists and activists, to become immersed in the compressed, intricate tensions, traumas and unknowns held in the material places where they operate. It expands the range of stories by applying a new-materialist diffractive lens to contextual inquiry. It develops a skillset, and experiments with the potential for surprise, in working with microfiche collage and apparatus.

In the project portfolio of Chapter Three, I explain how research involved my immersion into complex science, community allegiances and contested sites; unforeseen risks, difficulties and intriguing results of opening to collaborator voices; and artistically utilising analogue microforms. Undergoing a range of agencies influenced the iteration of artworks, and the necessity for me to accept their incompleteness, potential for antagonism, or future amendment; their continual creation.

2.2 Compression: Heterotopia and Micropolitics

To begin archiving troubled places, the microtopia method uses contextual inquiry, by thinking through two key concepts: heterotopia and micropolitics. These tools, and related notions of contemporary time, enable the microtopic archivist to understand how the complex overlap of matter, power and actors forms a compressed site that can be investigated and expanded through fieldwork and studio production. The dense, situated knowledge of a troubled place is somewhat suggestive of tightly-packed informatic surface of microfiche media, which invite close investigation.

In his 1967 lecture, *Des Espaces Autres*, Foucault defines heterotopias as sites where several different places can be experienced at once. Characterising libraries, museums, and cemeteries as exemplar heterotopias, Foucault connects their localised and interior elements with exterior and far-reaching places such as the city, the state, or society at large.[77] He adds previous and forward temporalities to the heterotopic

[76] Sarat Maharaj, "Know-How and No-How: Stopgap Notes on "Method" in Visual Art as Knowledge Production," *Art and Research: A Journal of Ideas, Contexts and Methods* 2.2 (Spring 2009) available at http://www.artandresearch.org.uk/v2n2/maharaj.html, accessed 23 June 2017.

[77] Foucault, "Of Other Spaces: Heterotopias."

complexity of "places where time never stops building up, topping its own summit," where a continuum of events produces difference.[78] In advocating this concept of sites as overladen with simultaneity and juxtaposition – a compression of temporalities and spaces – it could appear that Foucault's heterotopia is defining a *microcosm*. However, where the microcosm describes a simple epitome of something much larger, the heterotopia's difference produces disruptive counter-sites in which "all the other real sites that can be found within the culture are simultaneously represented, contested and inverted".[79] Heterotopias are not models of something larger, rather they are always incomplete, and provoke shifting discourses in relation to that broader sphere, by continually cramming in new events, matter, voices, truth versions, conflict, complexity – in short, difference in all of its forms.

As I discuss in relation to the artworks in Chapter Three, each research context functions with this dynamic of the simultaneity, inversion and juxtaposition of a heterotopia. The proposed radwaste repository of Mol, the mass-execution memorial of Treblinka Camp II, and the intergalactic physical distribution of matter by a gamma-ray burst undergo periodic and ongoing disruption to their materiality, that require a re-mapping of the "knowledge" held through their sites and relational positions.

Heterotopic sites involve micropolitical seams into which observers are drawn in attempts to reveal and understand. As novelty micrographia enchant readers to probe for knowledge within their miniature forms, so might microtopia draw out different knowledges and hidden power relations surrounding troubled places. I became interested in investigating the micropolitical complexity of intersecting forms of power produced by political economies. For example, as discussed in Chapter Three, the community governance of the nuclear site with which I was engaged had to hold a presence in the final work, even as it altered the intended trajectories of the practice. The pressure exerted by presence of the nuclear-energy legacy waste is met by community anxiety and resistance, through which the state gradually transmits and shapes ideas for radwaste burial solutions. This has led to a protracted micropolitical consultation, which I incorporate into the work as a compressed contemporary time. As artist and theorist Susan Kelly outlines, politically produced affects, such as anger and anxiety, interact with social desire and action to creatively and responsibly

78 Foucault, "Of Other Spaces: Heterotopias."
79 Foucault, "Of Other Spaces: Heterotopias."

transform, to mitigate prevailing order and affective encounters for the better.[80] Historian Reinhardt Koselleck describes the increasing brevity of historical intervals, due to technological and political change, where lived experience is adapted to better prepare for the future. For Koselleck there is a tension between the known "space of experience" and hopes or anxieties on the "horizon of expectation", which produces an unpredictable context for agency.[81]

Actors in sites of proposed nuclear geoburial face such a compressed macro- and micropolitical tension as they seek urgent solutions to perform secure containment and marking of hazardous waste from the past, whilst managing trust, commitment and dissent about plans for its uncertain forward legacy. In *The Future*, anthropologist Marc Augé echoes this sense of compression by likening events to literary plots that both provoke anxieties and promise redemption.[82] Augé suggests that "suspended time" imbricates past, present and future, like a thriller where protagonists occupy an investigative state of unresolved examination, uncertainty and expectation of a solution; for Augé the prevailing governance of materiality is no more than "competence and good management", which suspends history to produce "a society that would still care about its immediate future, but would no longer need to look further ahead".[83] Similarly, art historian Tom Holert characterises the contemporary as a "monopoly of now"; narratives of progress or emancipation (for example the utopia of nuclear energy), colonise the spatial present as the only relevant time zone, and render the present as a condition of stasis.[84] Sociologist Avery Gordon recognises the claustrophobic affects of historical conflict, which haunt everyday life and suspend contemporary time, whilst also conceiving how such affects can be uncontained and positively used to produce new narratives.[85] These various concepts of contemporary time are engaged by the practice of microtopia in contextual inquiry into compressed sites of troubling matter and problem-solving.

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[80] cf. Susan Kelly, "What does a Question Do? Micropolitics and Art Education," in *The Curatorial: A Philosophy of Curating,* ed. Jean-Paul Martinon (London: Bloomsbury, 2013) 110.

[81] Reinhardt Koselleck, *Futures Past: On the Semantics of Historical Time* (New York: Columbia University Press, 2004) 256-9.

[82] Marc Augé, *The Future* (London: Verso, 2015) 4,13.

[83] Augé, *The Future*, 51.

[84] Tom Holert, "The Contemporary," in *The Posthuman Glossary,* eds. Rosi Braidotti and Maria Hlavajova (London: Bloomsbury, 2018) 91-92.

[85] Avery Gordon, *Ghostly Matters: Haunting and the Sociological Imagination* (University of Minnesota Press, 2008).

2.3 Expansion: Genealogy and Diffraction

Foucault takes a genealogical approach to discursively analyse the formation of events and places as influenced by plural, inseparable and contradictory forces. Maria Tamboukou notes that Foucault described his histories as "fictions", which begin with a historical truth and can "'fabricate' something which does not yet exist."[86] To do genealogy is to ask: "What is this 'now' within which all of us find ourselves?" and to perform an "active intervention in this present."[87] The microtopia artwork aims to be such an intervention, by expanding and exposing plural factors acting on the compressed site. For instance, the event of deep-time geo-burial of radwaste is constituted by a variety of truth versions: the policies and operations of a state meeting public demand for energy; post-war technology transfer from the USA; journeys of uranium oxide from colonial extraction to spent biohazard; concepts for disposal technology proposed by scientists, based on instruments and data; desires of community monitors and protesters, remembrance experts and wider public; local and global geology and ecology; the hope, burden and anxiety encountered by everyone involved. These story strands are gathered through fieldwork as the basis of microtopia content.

Investigation of a compressed site is then creatively opened up, to undergo its uncertainty, its layers of time, and expand the narrative. Initial story-gathering about a place is expanded by applying the notion of *diffraction* – a term from classical physics that describes the fundamental phenomenon of multiple material waves overlapping and extending into one another. Feminist physicist and philosopher Karen Barad furthers the concept in relation to quantum physics:

> We can understand diffraction patterns – as patterns of difference that make a difference – to be the fundamental constituents that make up the world.[88]

For Barad the uncertain spacetime behaviour of waves and particles, as revealed by instruments observing a subatomic field, suggests that agencies of social bodies and institutions are also complexly and critically entangled.[89] Particular events can be understood as points of "relational ontology", or "dense seeds" that contain

[86] Maria Tamboukou, "Writing Genealogies: an Exploration of Foucault's Strategies for Doing Research", *Discourse: Studies in the Cultural Politics of Education*, 20:2 (1999): 201-2.
[87] Tamboukou, "Writing Genealogies", 202.
[88] Karen Barad, *Meeting The Universe Halfway*, (Durham: Duke University Press, 2007) 72.
[89] Barad, *Meeting The Universe Halfway*, 49.

multiple possibilities.[90] Unpacking this uncertainty produces a richer description of "how matter has come to matter" – to articulate how trouble emerge through ongoing, intra-acting temporalities and spaces.[91] Baradian diffractive reading can be incorporated by artists in an enlarging agency, which helps to expand upon the narrower, singular stories told about places, and to speak differently.[92]

I understand diffractive optics as inclusive – an attentiveness to a dispersed, complex range and depth of genealogical sources. Traces from other real and imagined times and places feed into the story encountered in the contemporary site. Diffractive reading inspired me in this research to augment found evidence with a speculative narrative sphere, that elaborates on the unknown, which broadened the richness of storytelling and thus microtopia's archival scope.

Application of diffraction deepened in the final artwork *Deep Field [UnclearZine]*, which imagined future assemblages of instruments, rock and bodies in response to the evidence and stories gathered in fieldwork. In telling this imagined future of the radwaste heritage site I also applied Donna Haraway's feminist diffraction, which interweaves science-fact and speculative-fabulation in situated stories. My final artwork invokes witness figures: radwaste experts who use instruments to observe matter and establish fact, and a speculative, non-human character who reflects differently on objectively presented evidence.

As defined by historians Steven Shapin and Simon Schaffer,[93] the "modest witness" emerged in the seventeenth century as an apparently objective, trusted investigator with the assumed and conferred authority to produce and officially mediate undistorted matters of fact through technical experiment and public dissemination; a figure driving the innovations of modern science. However, as Haraway argues, such an institutionally situated figure organises knowledge through a cordoned-off, male-only, space giving rise to an exclusive, controlling and narrow

[90] Faculty of Arts, Aarhus University, "Karen Barad: Troubling Time/s, Undoing the Future," filmed June 2016, YouTube video, 36:10, posted 8 December 2016, http://youtu.be/dBnOJioYNHU.

[91] Karen Barad, "Posthumanist Performativity: Toward an Understanding of How Matter Comes to Matter," *Signs: Journal of Women in Culture and Society* 28, no.3 (2003): 801-831.

[92] Faculty of Arts, Aarhus University, "Karen Barad: Troubling Time/s, Undoing the Future." Barad notes that similar to the enlarging of artistic agency, diffraction might also inform readings of activism, as illustrated at Standing Rock (2016+), a site which can be seen as entangling the contemporary violence of mining for ancient uranium deposits on Navajo territory and earlier US settler colonialism.

[93] Steven Shapin and Simon Schaffer, *Leviathan and the Air Pump: Hobbes, Boyle and the Experimental Life* (New Jersey: Princeton University Press, 1985) 22-79.

discourse that lacks a broader social ethics reflective of diverse bodies.[94] She co-opts Shapin and Shaffer's modest witness, and symbolically links it, within a narrative time-machine, as kin of *OncoMouse* – the world's first, patented lab-produced research animal – thus rethinking what a provocative, democratic discourse about technoscience might be.[95] OncoMouse and the modest witness speak in common from the heart of technoscience, about how science might imagine and engage in matters of care at the same time as privileged, expert authority:

> My modest witness cannot ever be simply oppositional. Rather s/he is suspicious, implicated, knowing, ignorant, worried, and hopeful.[96]

Haraway reconfigures cyborg invention OncoMouse as a transgressive conceptual figure in a genealogy that exposes technoscience as a form of colonial extractive capitalism, sexism, and human-exceptionalism.[97] Inspired by this, my research generated the conceptual figure of OncoMole, who appears in the microfiche comics-illustration and poetry as an underground mutant sentinel, counter-witnessing Belgian nuclear materiality in past, present and future spacetimes. OncoMole acts as a device for readers to encounter and understand the plural genealogy of a real, complex system depicted in the artwork. OncoMole is my symbolic counterpart to the modest witnesses of the Belgian radwaste management community, whose matters of fact I saw demonstrated and displayed during an artists' field trip to the HADES lab. OncoMole embodies critical and ethical agency in an archive of site within fields of knowledge and power. It recognises I am implicated as a natural-resource consumer within a global radwaste emergency, and voices antagonism, anxiety, and constructive ideas for remembrance through microfiche documents.

Genealogy and diffraction are used in the practice as thinking tools for approaching creative fieldwork and post-production. They inspire editorial and design decisions for microtopia as a zine made of fragments that document different attitudes, viewpoints, evidence, memories, imaginations, and matter. The artworks imitate the alternative agency and aesthetics of zines, which report micropolitical difference and

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[94] Donna Haraway, *Modest.Witness@Second_Millenium.FemaleMan©_Meets_OncoMouse™: Feminism and Technoscience* (New York: Routledge, 1997) 22-27.
[95] Haraway, *Modest.Witness,* 22-27.
[96] Haraway, *Modest.Witness*, 3.
[97] Haraway, *Modest.Witness*, 3.

geopolitical satire through mixing factual scenarios with folkloric fiction to highlight hopes and fears.[98] ike zines, are snapshots of the contemporary express desire and uncertainty in relation to the material problem and its surrounding technoscience. The resulting documents of site are expanded, yet coded as incomplete or unreliable, encouraging readers to reflect on epistemic limitations of archives in reliably communicating "truths" and the political limits of materials.

Using the tools of Foucault, Barad and Haraway enables a critical approach towards the terms of cultural production that comprise any given site, thus bringing into focus the various (and often conflicting) relationships between knowledge and power.[99] Using diffraction in the practice of microtopia enables the artwork to say what is known and unknown, said and unsaid, by both observing the factual and also *witnessing* the fabulative. Microtopia witnesses from the contemporary, but also narrates across overlapping and compressed temporalities and residues from other spaces and times. To produce microtopia means to think and act from a diffractive-genealogical artistic position that uses interdisciplinary methods to fuse together and expose strands of difference in sites where scientific research indelibly changes environments and communities. Chapter Three will demonstrate how inclusion of speculative content, alongside documentation of the factual, expands and exposes the compressed sites featured in the three artworks.

[98] cf. Stephen Duncombe, *Notes from Underground: Zines and the Politics of Alternative Culture*, second edition (Bloomington: Microcosm Publishing, 2008) 6-21; Janice Radway, "Zines, Half-Lives, and Afterlives: On the Temporalities of Social and Political Change," *PMLA* 126 (January 2011): 140–143; Paul Clements, *The Creative Underground: Art, Politics and Everyday Life* (New York: Routledge, 2016).

[99] Michel Foucault, "What is Critique?*"* in *The Politics of Truth*, eds. Sylvère Lotringer and Lysa Hochroth (New York: Semiotext(e), 1997) 23-82.

2.4 Process: Expanding – Compressing – Expanding

This section describes the practical artistic elements in producing microtopia. Fieldwork is used to observe scientific sites and their wider, local environments, to gather **data**, consisting of conversations, graphic visualisations and photographs. These provide expanded accounts of factual evidence, memories and experience from the materiality, events and significant actors of compressed sites. Fieldwork findings are opened-up through a speculative filter, by inviting artistic collaborators to generate fictional content in **poetry** and **comics** which respond to the site, further opening it to undergo imaginative realms whilst also supporting a narrative spine conveying how the real-world material emergency became assembled. Editorial post-production in the studio involves **collage and layout** to assemble the elements generated through the above stages, and **printing and mounting microfilm** to miniaturise and embed the factual and speculative spheres of the document. Finally, in the artistic process: compressed, entangled chronicles of material legacy, micropolitical affects or future possibility are transmitted and expanded for the reader through non-linear browsing of the zine artwork through **microfiche apparatus**.

2.4.1 Data

All three artworks resulted from learning interactions with different communities of scientific researchers, during which the assemblage of actors, their instruments and troubling matter were recorded. Firstly I conduct and transcribe conversations[100] with people who create new knowledge about the places – gamma-ray astronomers, forensic archaeologists and nuclear geoburial experts and activists. The researchers map or investigate different types of material change and its affects, and want to transmit new knowledge to people in the future for different purposes: as a cartographic guide, a memorial testimony, or to warn about a deep-time hazard. Conversation topics therefore range from the journeys and impacts of troubling matter; experimental techniques; scientific and political decision-making; material affects such as hopes and fears for the future; and speculation on how the sites should

[100] After PhD enrolment in January 2016, data gathering for the final artwork (*Deep Field [Unclear Zine]*) was approved and conducted under Manchester Metropolitan University ethical research policy. Participants were advised of the research aims and scope of questioning and gave informed consent. They were able to remain anonymous or not to be quoted or photographed in resulting publication, and hold the right to request withdrawal at any time from the research. Information sheet and consent form is in Appendix 1.

be cared for and remembered. Some conversations were edited to become content, others remained unpublished but vital to informing my learning and artistic response.

Secondly, data is collected in the form of graphic visualisations produced by the scientists at sites, which depict locations, measurement and constitutions of matter observed by underground, overground, and Earth-orbiting instruments. Due to the political and commercial sensitivity of long-term Belgian nuclear geo-burial research I was unable to utilise any data from instrumentation I'd seen during that field trip. During my residency with the NASA astronomy team I collected graphs, optical images and textual data about a particular gamma-ray-burst event; these data were automatically generated by X-ray and infra-red sensors aboard a space satellite, and ground-based telescopes around Earth. The Treblinka forensic-archaeology team provided images of airborne laser-sensing (LiDAR) of the site's topology; ground-penetrating radar used to pinpoint locations for trial-trenching in search of evidence of the Old Gas Chamber; and photographs of artefactual findings from the dig.

Thirdly, data is generated through photography, which records instrumentation and experiments operated by scientists and their working environments. During the third project in the Belgian nuclear zone, I spent several days engaged in what I called 'cycling-photography', to comprehensively survey the wider locale and record everyday life – commerce, housing, industry, canal system, flora, fauna, agriculture, leisure space, human and animal inhabitants, streets, retail, and construction works. As microfilming apparatus rapidly scans a book, by operating the camera aboard a bicycle it is possible to quickly obtain detailed imprints of, and narrative clues to, the locale that could be later condensed through collage. Cycling-photography provides a detached thinking space for processing the multi-temporal strands of discourse encountered, akin to Robert Smithson's sensing of past, present and futurity traced through his sci-fi-lensed walking observation of the Passaic environs.[101] Data thus becomes rich visual and textual content for the evidentiary sphere of the microtopic discourse.

[101] Robert Smithson, "A Tour of the Monuments of Passaic, New Jersey", *Artforum* (December 1967): 52-7. This focused activity is also akin to the queer walking-writing practice in Stephanie Springgay and Sarah Truman, *Walking Methodologies in a More-Than-Human World: Walking Lab* (London: Routledge, 2018) 130-34, 256. Walking-writing practice is a method of "speculative concept generation" to produce "tales that might be told about particular actualities" and "experimentally imagined collective futures" to unsettle thought about environmental and socio-political crises.

2.4.2 Poetry

After fieldwork, the gathered data is edited in the studio, to begin forming the microtopia document. Factual stories, gleaned from conversations and photography, are transcribed in reports and photo-collages, and also transformed through methods of speculative-fabulation. In the studio I express my own voice through occasional poetic means, encompassing wordplay, repetition, highlighting and juxtaposing visual metaphors and recurring motifs, to conjoin and condense the language, materials and people of the site. This textual method is a deliberate, political act of agency in line with the diffractive genealogies of Barad and Haraway explained in section 2.3. My compression and expansion of observations and language – drawn from facts, memories, uncertainties and historical anecdotes – is meant to witness and expose the 'now' of troubled places. For example, the line "Looking squarely ahead" is from the anthem written by Treblinka's commander to regulate the machinic camp operations, and is sung by a witness in the documentary *Shoah*.[102] I reconfigure this quote in the artwork title *Deep Field [Looking Squarely Ahead]*, to expose the complex, compressed execution site as revealed through contemporary evidence found in the square-metre archaeological trench, and spatially re-imagined in the square-shaped microfiche screen. Further instances of my use of poetic fabulation will be given in the analysis of three published artworks in chapter 3.

I also invited an anthology of new verse in the third publication, *Deep Field [Unclear Zine]*, in order to develop further artistic methods that re-narrate the enfolded spaces and temporalities of the geo-burial site, its material problems and technology. Sam Illingworth is a science-communicator whose poetry practice uses simple, traditional rhyming forms as a method for conveying scientific research, controversies and mythologies forward through time.[103] Writing from my editorial brief, Illingworth further developed the voices of characters in response to the fieldwork (such as OncoMole, and the future archaeologist), to enable microtopia to use poetry, like comics illustration, as a means of counter-witnessing within the multimodal narrative.

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[102] Claude Lanzmann, *Shoah* (Paris: Les Films Aleph, 1985).

[103] Dave Griffiths, Sam Illingworth & Matt Girling, "Deep Time Moles: An Interdisciplinary Approach to Geological Archiving," in *Field to Palette: Dialogues on Soil and Art in the Anthropocene*, eds. Alexandra Toland, Jay Stratton Noller and Gerd Wessolek (Boca Raton: CRC Press, 2018) 229.

2.4.3 Comics

During the third publication, I invited a response from illustrator and DIY zine publisher Matt Girling. In *Deep Field [Unclear Zine]* I developed the speculative narrative mode by including comics-art for its potential to visualise alternative universes and potential consequences of unpalatable realities[104]. The use of comics methods in a genealogy of troubled place can be seen in *Days of Void,* a graphic novel by Palestinian architect Samir Harb that centres on reconstruction of Mukataa sites in Ramallah.[105] To pedagogy researcher Sarah McNicol, comics invite readers to make sense of social ghosts in the fragmented present, through their complex interweaving of past, present and future that "allow for interaction between the empirical and what can be sensed in other ways."[106]

I therefore briefed Girling about my experiential knowledge from fieldwork and contextual reading, about the past and present material emergency and conflict of the radiological geoburial site, questions of its future governance, and plausible or unknowable risks. In a similar editorial dialogue as that with Illingworth, we worked on speculative characters, such as the underground sentinel OncoMole, and scenarios that Girling would draw for my editorial use in the collaged content. Through these means, the zine would voice outsider perspectives to counter-witness the site's dominant socio-technical discourse, and express anxiety about what isn't known; the inconceivable futures where haunted imaginations stray.

2.4.4 Collage and Layout

In combining narrative fragments of images and writing my aim was that, whilst browsing the microfiche surface, the reader would encounter a fusion of different temporalities and spaces of the sites. In the first two published artworks, my

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[104] cf. Muna Al-Jawad, "Comics are Research: Graphic Narratives as a New Way of Seeing Clinical Practice," *Journal of Medical Humanities* 36 (December 2015): 369-374; Virginia Gerde and R. Spencer Foster, "X-Men Ethics: Using Comic Books to Teach Business Ethics," *Journal of Business Ethics*, 77 (February 2008): 245-258.

[105] Samir Harb, "Ramallah's Mukataa: An Architectural Colonial Object," *The Funambulist: Politics of Space and Bodies* (July/Aug 2016): 28-33. By interweaving temporalities, re-imagined colonialist conferences, encounters at the site between actors, sampled blueprints, archived memos and maps, Harb re-narrates the micro- and geo-politics of urban and ideological transition in the neo-Palestinian state.

[106] Sarah McNicol, "Visible Fragments: Instances of Social Haunting in Graphic Novels", 2016, Available at: https://figshare.com/articles/Visible_fragments_Instances_of_social_haunting_in_graphic_novels/4009689/1 [Accessed: 3 January 2019] 1-3.

designs were digitally produced in Adobe Photoshop, to build RAW image files for direct printing onto microfilm. This process felt rigid, lacking flow and invention; rather than undergoing collage to bring materials into appearance, the painstaking operation of layout software leant more towards executing a design using fiddly digital assets. For the final artwork in the series, *Deep Field [Unclear Zine],* I switched to a more tactile technique akin to that of a paste-up artist in a pre-digital publishing studio. This decision was also influenced by the sudden change in formats available to me at commercial microfilm bureaux (see section 2.4.5 below). Using hundreds of laser-printed photos, along with the comics, conversations and poems, I ripped copier paper and acetate overlays, quickly comparing and juxtaposing content, submitting to the arrival of an idea, and fixing it together with glue and masking tape, making an A0 (1,189 x 841mm) sheet for each zine article. This satisfying, physical approach supported both the ethics of zine-making and a diffractive spirit; a freer, more instinctive hands-on workflow helped me focus on finding surprising juxtapositions and narrative fusions; 'undergoing' the material, as Ingold identifies, to make a discursive cut through collaging conversations, photos, poetry and comics-art.

2.4.5 Printing and Mounting Microfilm

The first publication in 2013, *Extinction Event [GRB130313A]*, was printed by UK commercial bureau Genus Microfilm using specialised digital-to-colour Ilford microfiche; this format was available in Europe only through their Zurich-based partner, Gubler Imaging. Returning in 2015 to Genus to print *Deep Field [Looking Squarely Ahead]*, we were informed that Ilford colour stock was discontinued and Gubler had ring-fenced its remaining European supplies for major museum sector clients; this was a key moment in my research that brought to life Foucauldian epistemic hierarchies. This encouraged me to explore what I could achieve by reverting to older, black-and-white 35mm microfilm for my next two artworks. I observed microfilm workflow at Genus, from traditional image compression using rostrum cameras, to current digital scanning of A0 sheets, to exposing and photo-chemical developing of prints. This learning triggered a re-think of the medium through mimicking and adapting its traditional use as simple receptacle of finished information, to undergoing the medium within a creative collage approach similar to that of a zine (see above). I sliced apart and glued the resulting printed 35mm microfilm, to creatively re-assemble the content on A6-sized plates for the microfiche reading apparatus.

2.4.6 Microfiche Apparatus

At this point the microfiche zine, as compressed story of troubled site, is expanded for reading. The magnifying lens and screen of the microfiche reader allow for scrutinising the zine-like DIY document, complete with fingerprints, masking tape and glue, in parts illegible due to photographic and printing errors such as incorrect contrast and brightness. There is only one page, where all the overlapping voices and stories, evidence and speculation, past, present and future, share equal access through gentle nudges of the fiche tray as non-linear browser. Manipulating the machine is a gesture of haptic and optical immediacy, akin to the sustained sensing behaviour of OncoMole journeying in the dark. Up, down, side-to-side, pause, focus, observe. The reader has the means to unearth the miniature, to glean and fathom – to dig into and peer into the text by expanding it as a projection of light, through lens and mirrors, onto a diffused screen. The curious antique instrument signifies detection, search, secrecy. It assists a reader to uncover material evidence, to find discourse. They learn what went on… they speculate: what went on? what will go on?

2.5 Summary of Methods

The combination of conceptual, fieldwork and studio methods activate and ground microtopia as art, forging a link between audience and artwork, acting as provocations, disruptions, and challenges stories of troubled places. The practice embodies a counter-cultural thumbnail about contemporary uncertainty and becoming, located by exploding a compressed space suggestive of the quantum field.[107] Microtopia interconnects official information from conversations, data and photographic recording in the micropolitical and scientific realms of places, with disorderly speculative voices and images generated through artistic agency. All editorial content shares the same non-linear plane. To make microtopia means to undergo a narrative deposition, in a genealogical and speculative process of connecting fragments and exposing the materiality of past, present and future in a different space. Microtopia can thus be likened to a plot, in three senses of the word: as a locative map; as a depiction of marking-out, digging and planting a site; and as a story that conjugates past, present and future in connected locations.

[107] Barad, *Meeting the Universe Halfway*.

Chapter Three

Practice of Microtopia: Three Artworks

3.1 Introduction to the Portfolio

The practice of microtopia has developed through three published artworks. Two artworks from 2013 and 2015 preceded PhD registration, falling within the 36-month period for prior publication allowed under Manchester Metropolitan University regulations; the third project was undertaken during PhD supervision beginning January 2016.

These publications generated archival stories of troubled places that were documented on archival microforms. Sections 3.2 to 3.4 below summarise the genealogies forming each compressed site around which the research formed. I describe the gathering of data about movement, deposition and affects of matter, which is observed using instruments, and by different actors who witness or influence the material events that shape the sites. Section 3.4 describes how, in the final artwork of this research, some findings were reconfigured and collaged to create a counter-witnessing narrative about the site, by developing a diffractive perspective on the data. Documented facts and opinions were overladen with artistic speculation about uncertainties and possibilities of the site's material past, present and future.

Each project is a document that joins other forms of remembrance in archiving a site. I summarise here how each project furthered the development of microtopia as a new modality for archival practice.

3.2 *Extinction Event [GRB130313A]*, 2013

3.2.1 Introduction

Extinction Event [GRB130313A][108] resulted from my observation, with a multinational team of astronomers, of a short gamma-ray burst (GRB) – a distant, brief, cataclysmic event where two neutron stars collide, emitting an intense column of afterglow radiation to journey through deep space. On 13 March 2013 an orbiting telescope detected nine photons travelling towards Earth, which was ample evidence to prove a burst lasting 300 milliseconds had occurred several billion years ago. This microfiche, and accompanying audio, documents that event (fig.3.1).

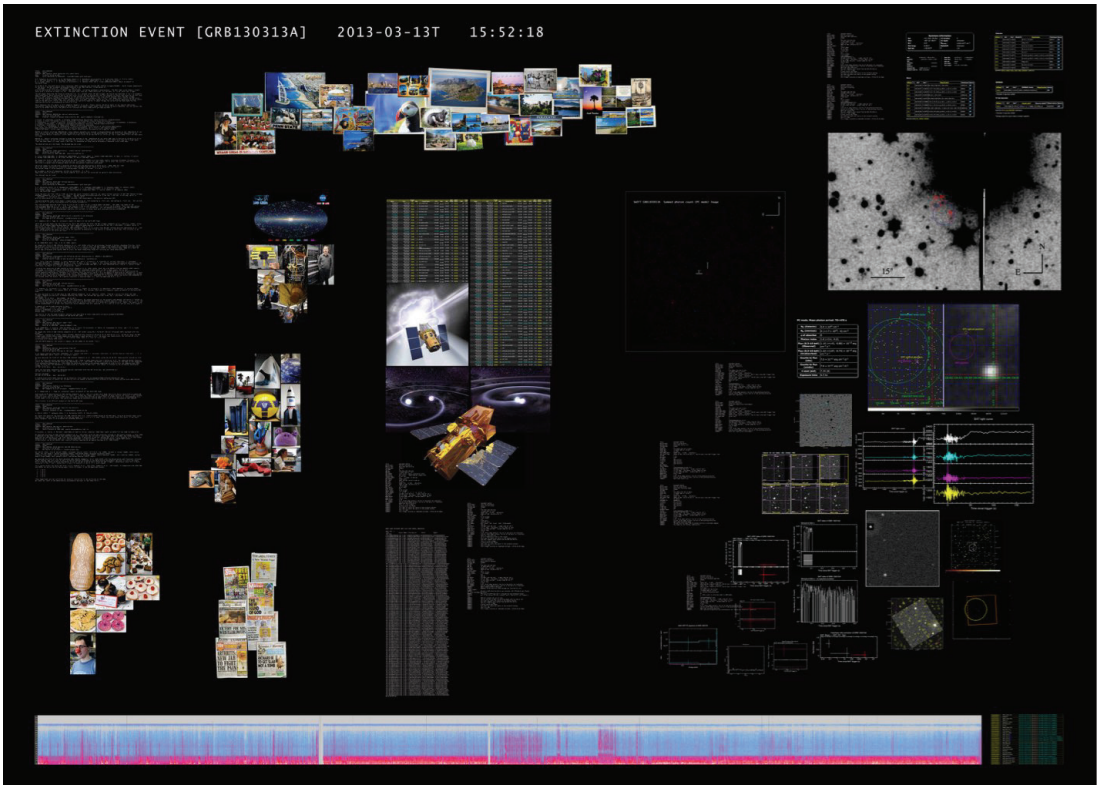

Figure 3.1 *Extinction Event [GRB130313A]*, 2013. Microfiche 14.8 x 10.5cm.

[108] Dave Griffiths, *Extinction Event [GRB130313A]*, microfiche artwork (Coventry: Meter Room, 2013)

3.2.2 Context of Gamma-Ray Observation

My initial interest in the topic was to discover how the material trauma of a distant deep-space event might be archived as a story on microfiche, using data and photographs. I approached a data centre specialising in GRB observation, based in the Department of Physics and Astronomy at University of Leicester, led by Professor Julian Osborne. This UK team are part of a global NASA-led mission who operate the Neil Gehrels Swift Observatory, a satellite with onboard instruments to observe bursts in X-ray and ultra-violet spectra. Astronomers use data mapping of GRB coordinates and frequency to theorise the scale and material nature of the Universe.

3.2.3 Science-Fact and Speculative-Fabulation

I undertook a short residency from 13-15 March 2013 to shadow the team, learn about their daily scientific work, and join them in witnessing a typical GRB. During the first afternoon the orbiting satellite alerted a flash detection, and rapidly panned its afterglow sensors towards its target, like a cine camera. Data began to arrive on PC screens. I recorded a teleconference between scientists at three NASA Swift labs in Leicester, Goddard Space Flight Centre in Florida, and Penn State University. In this conversation they triangulated and verified the observed data, to name and catalogue the event (GRB130313A) as a natural phenomenon.

I gathered metadata about the GRB event from the automated Swift Wiki, and later designed a text and image-based depiction of the explosion and observation sites (fig.3.2). This map for a virtual photograph was constructed through light-curve graphs, plots of the GRB's astral neighbourhood, and software-generated transcripts of the process of its observation triggered by automated instruments on the Swift satellite and other telescopes (fig.3.3).

During the residency I noticed that the destructive affects of GRBs were absent from scientific discussion in the lab, which was instead focused on the moment of explosion. I acted on a sudden hunch that the microfiche document could combine a science-fictional catastrophe narrative alongside the science-fact that I'd started to collect. This moment marked the beginning of microtopia research, that would shift the document from a data repository of an observational moment, to a multimodal story that connected different spaces and times through both fact and fabulation.

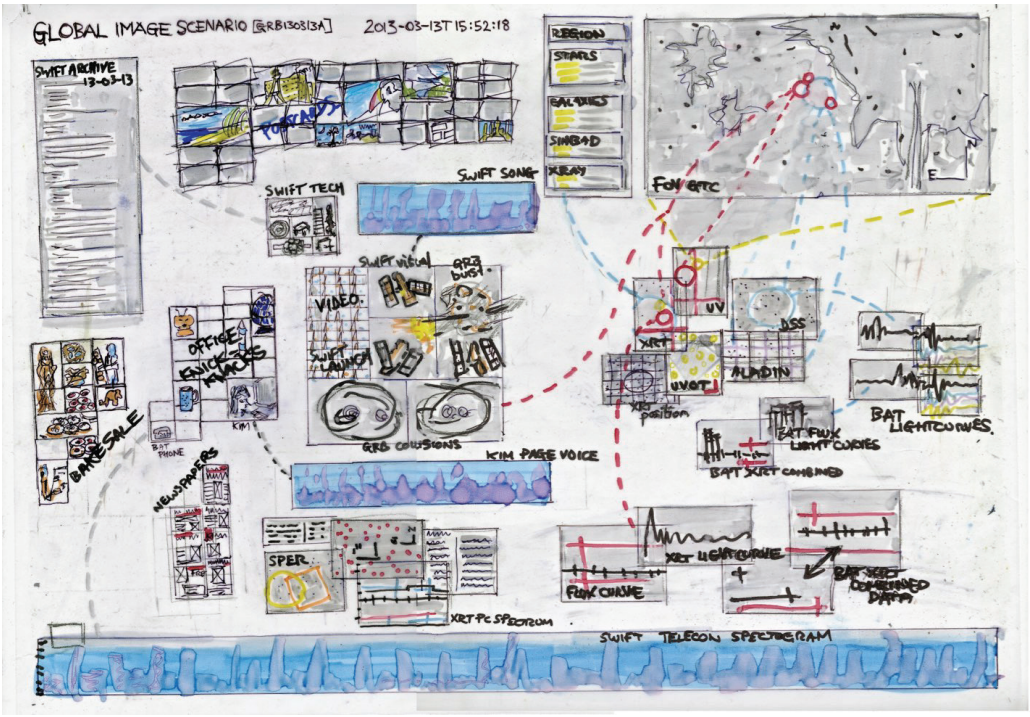

Figure 3.2 *Extinction Event [GRB130313A]*, 2013, design sketch.

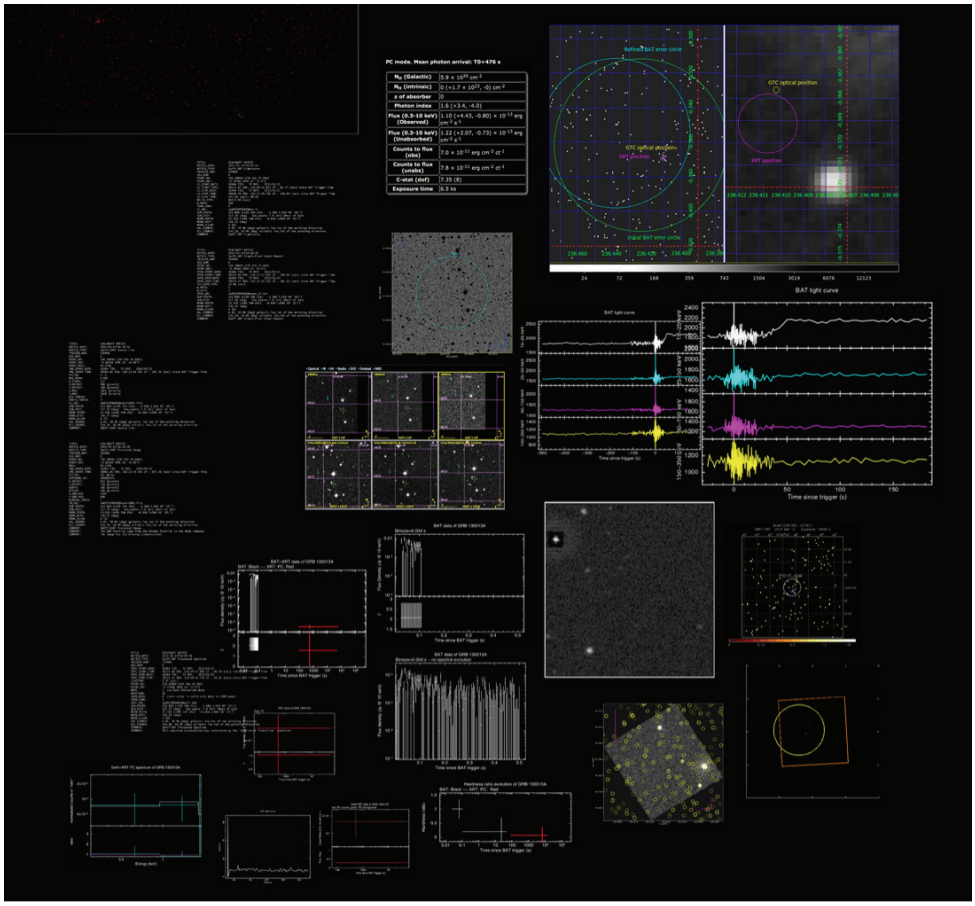

Figure 3.3 *Extinction Event [GRB130313A]*, 2013. Detail. Visualised light-curves, photon counts, coordinate maps, and catalogued known-objects in the shot.

I invited data-scientist Dr Kim Page to speculate on the radioactive affect of the GRB, and how such a deadly event would impact on a local Earth-like biosphere. Through this interview recording I realised first-hand how a scientist was less comfortable with a fictional narration about extinction, than a story evidenced by verifiable science. This triggered me to further fictionalise the material context of observation. I photographed the everyday departmental environment of the observers, such as their extra-terrestrial themed office knick-knacks, and Professor Osborne posing amongst the roaring patchwork of the server room – the heart of Swift's sensing apparatus (fig. 3.4). I photographed their display of postcards from international destinations for astronomy conferences; the students' extinction-themed bake sale for Red Nose Day; refectory newspaper headlines reporting the papal changeover, Richard III's Leicester memorial, and other worldly happenings on the day (fig.3.5). These coincidental events seemed to poetically resonate with the gamma-ray narrative unfolding in the lab – a cosmic sequence of death and rebirth through deep-space migration and mutation of particles.

Layout was completed in Photoshop as a single high-resolution RAW file and then produced on colour microfiche using an RGB laser printer at Gubler Imaging, a specialised bureau in Zurich.

Figure 3.4 *Extinction Event [GRB130313A]*, 2013. Details of (Left) Swift apparatus and models, UK Swift Data Centre. (Right) Swift UK Data Centre office paraphernalia.

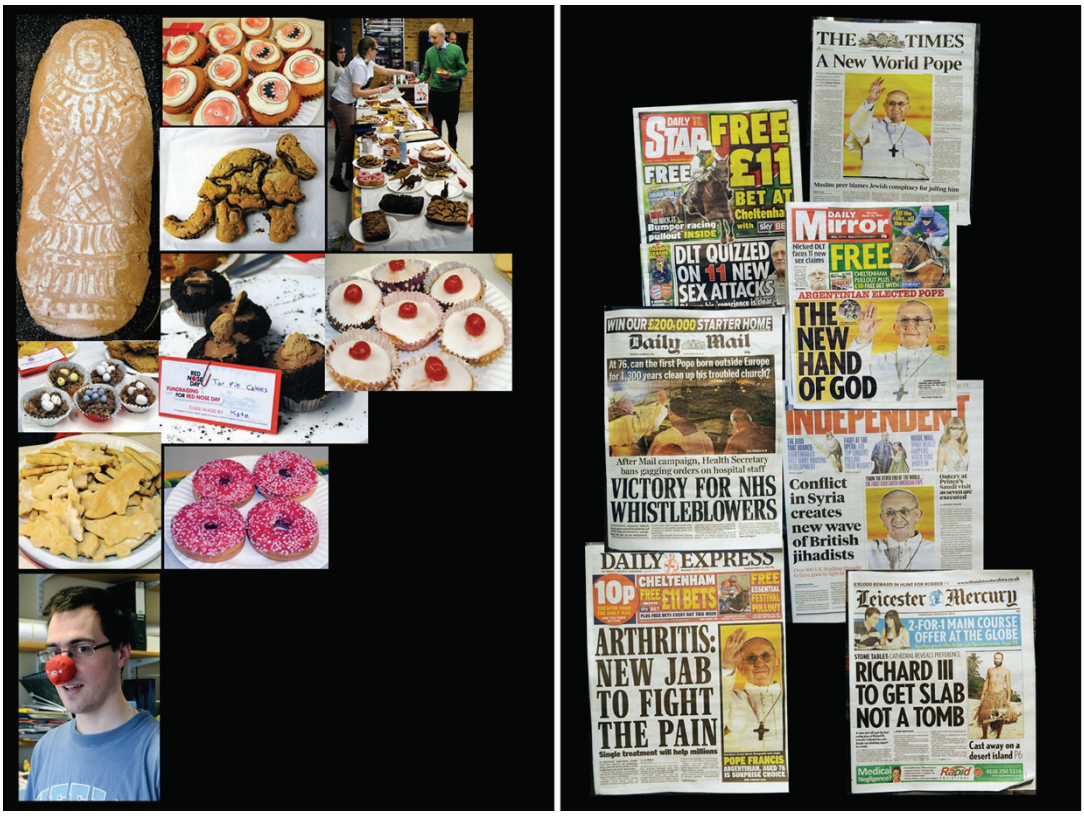

Figure 3.5 *Extinction Event [GRB130313A]*, 2013. (Left) Red Nose Day bake sale at Department of Physics and Astronomy. (Right) Newspaper headlines, 13 March 2013.

3.2.4 Discussion and Insights

Exploring a single GRB observation was an excellent pilot for a burgeoning set of fieldwork and studio methods for content-gathering and editing. I trialled a working process within an observing apparatus. Through the *Extinction Event [GRB130313A]* residency and artwork I tested ideas about the kinds of visual and textual information I might collect through conversing with a community of scientists, using data from their instruments. Audio recordings were included on the microfiche as spectrograms.

A diffractive method began to emerge during the SWIFT residency to observe GRBs. I tested how I might approach recording observers at work in their lab, and their willingness to speculate about unknowns bordering their field. I was immersed in the contemporary detection of microscopic, material remnants of a far-distant spacetime event. This was a global science infrastructure of more-than-human witnessing; a coalition of algorithms, machines and actors in systematic routines of observing, storing and interpreting new phenomena.

This artwork mapped a deep-time genealogy, linking the explosion, intergalactic path of the radiation column, and contemporary machine-human observation of the remaining photons as an event. Although a relatively minor burst not requiring any follow-up observation, GRB130313A nevertheless marked out a point in spacetime that may be drawn upon in future hypotheses about the scale and material composition of the Universe. It is another fragmentary node in the map of creation being accumulated in globally interconnected cosmological databases. I commented on the survival and value of this episteme through my microfiche of an expanded-yet-incomplete version of GRB130313A. It is a gesture towards securing this brief event in alternative documents, a counterpart to the digitally archived data. Both the microfiche archive and Swift Wiki might be encountered in the future as tools for cosmological investigation, as surviving archival modes for the minutiae of creation to be remembered and re-narrated.

The artwork marked a beginning to exploring microfiche's potential as a creative publishing medium. Through this first project I realised the story of a place of material change could be told in different spacetimes: the billions of light-years separating the catastrophe from the moment of observation of the altered matter on Earth; and future re-readings of the microfiche in connection to as-yet-unknown knowledge. Through this work I took my first steps in making a multimodal narrative by combining some actual evidence (graphic visualisations) of an event with a fictional layer arising from the context. By responding with an imaginative witnessing, where I connected the "scientific" observation to contemporary local and global matters on Earth, I'd begun to operate an alternative artistic agency within an interdisciplinary situation. I upheld the speculative position to remark on poetic serendipity, or imaginary scenarios, that professional scientists wouldn't normally speak about in relation to their discoveries.

However, the journey of GRB matter from catastrophic site to observation ultimately felt like an abstract, intangible event, rather than one of contemporary trouble, in the Harawayan sense. Overall the artwork lacked a critical tone. I knew that for my research to fully explore an artist's counter-witnessing of an institutional story, and to produce a more discursive narrative which might expose power and difference, I needed to work in response to politicised sites of human technology, where journeys of matter and bodies lead to significant contemporary conflict or ongoing trauma. My next locations, in the publications constituting this PhD, would be places where researchers operate cautiously in a wider geopolitical situation, where knowledge has become a troubled matter to communities within and beyond the site.

3.3 *Deep Field [Looking Squarely Ahead]*, 2015

3.3.1 Introduction

Deep Field [Looking Squarely Ahead], 2015 (fig.3.6) is a re-interpretation of factual data gathered by forensic archaeologist Caroline Sturdy Colls, from Centre of Archaeology at University of Staffordshire. Her project *Finding Treblinka* investigated material evidence of atrocities which happened at Treblinka Extermination and Forced Labour Camp in Poland during World War 2.[109] Excavated from the extermination site at Camp II during 2013, the previously concealed remains corroborate long-standing eyewitness testimony and other archival sources that evidenced knowledge of crimes.[110]

In 2015 I was commissioned by Sturdy Colls and curator Michael Branthwaite (School of Art and Design, University of Staffordshire, UK) with the support of Rothschild Foundation, to produce an artwork for *Finding Treblinka: Artists Respond*, a travelling interdisciplinary exhibition in which artworks and archaeological interpretation would enable international audiences to access and understand new finds and narratives emerging from the investigation. *Finding Treblinka* showed from August 2015 to February 2016 at Museum of Struggle and Martyrdom in Treblinka (now known as Muzeum Treblinka), followed by Wiener Library for the Study of the Holocaust and Genocide in London, from July to September 2016.

3.3.2 Context of Treblinka

Today, Treblinka is a cemetery and memorial of human victims of the gas chamber and forced labour, where a monument of jagged stones mark dispersed European cities and towns from where victims were transported (fig 3.7); this overground marker adjoins a counterpart underground sphere of evidence of mechanised killing, and the architecture thereof. Actors seek to uncover more of this matter, to reconfigure a narrative which more accurately communicates the infrastructural scale of Nazi atrocities, where between 800,000 to 1 million Jewish,

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109 Caroline Sturdy Colls, "Finding Treblinka: Archaeological Evaluation," unpublished fieldwork report, Centre of Archaeology (Stoke: Staffordshire University, 2014).

110 Caroline Sturdy Colls and Michael Branthwaite, "'This is Proof? 'Forensic Evidence and Ambiguous Material Culture at Treblinka Extermination Camp," *International Journal of Historical Archaeology*, 22:3 (2018): 430-453.

Sinti, Roma and Polish people were murdered over fifteen months in 1942-43.[111] Muzeum Treblinka, and interconnecting international archives, remember the event through maps, drawings, clandestine photographs, documents, testimony and monuments – but Sturdy Colls is conducting the first methodical archaeological investigation at the site. She has noted a wider problem affecting European Holocaust archaeology in which political, social, ethical, and religious factors have often inhibited the systematic research and marking which would enable remembrance of many more sites.[112] Legal investigations of Camp II in 1944-45 lacked archaeological input and concluded that all traces of evidence had been effectively demolished and hidden by the retreating Nazi guards; as Sturdy Colls notes "despite the physical presence and impact that Treblinka extermination camp had, it has come to be defined by absence."[113] The Treblinka infrastructure, both during and after operations, functioned through deception and concealment in its entire socio-technical enabling, its process of movement and disposal of victims.

My commission proposal aimed to apply my emerging practice of microfiche archiving to the wider distribution and understanding of material culture uncovered through *Finding Treblinka*. I thought the medium's characteristic compression and expansion would suit the project's pedagogic aim to combine art and archaeology, helping audiences "to re-imagine the site maybe not as it was, but as it is, and is becoming."[114] The genocide landscape can be thought as an archive of compressed, ageing, buried remains whose investigation is a contemporary trouble. To observe and expose its previously hidden data will augment epistemes that communicate and repair ongoing injustice and trauma affects; care generated through action and new knowledge might reconfigure known narratives and enact memory as a future warning.

111 Sturdy Colls & Branthwaite, "'This is Proof?" 431.

112 Caroline Sturdy Colls, "Holocaust Archaeology: Archaeological Approaches to Landscapes of Nazi Genocide and Persecution," *Journal of Conflict Archaeology* 7:2 (2012): 70-104.

113 Sturdy Colls & Branthwaite, "'This is Proof?" 433.

114 Sturdy Colls & Branthwaite, "'This is Proof?" 446.

Figure 3.6 *Deep Field [Looking Squarely Ahead]*, 2015. Installation view.

Figure 3.7 Memorial at Treblinka Camp II, with thousands of quarried stones whose inscriptions indicate European places of Holocaust train departures. Photograph by Adrian Grycuk, CC BY-SA 3.0 PL.

Contemporary art and museum practice have approached Holocaust sites in contrasting ways, using existing art-historical and popular-cultural depictions and real evidence to depict understandings of events and architecture. Jake and Dinos Chapman's *Fucking Hell* (2008) employs miniature tableaux of plastic figurines to invoke a voyeuristic fascination with horror, whilst attempting no link with factual evidence of particular genocidal events or sites. Tom Sachs' *Prada Deathcamp* (1998) is a concentration camp model constructed from a cardboard hatbox (fig. 3.8), that likens the Holocaust to consumerism as processes that subjugate identity, whilst in *LEGO Concentration Camp* (1996) Zbigniew Libera invents a toy version of Auschwitz to express a tortured personal relationship with a place he doesn't know directly.[115] Although these artworks discuss the impossibility of adequately representing the Holocaust, they could also be viewed as "trivializing the event, and, above all, sacrificing the victim's dignity – essentially making them victims for a second time."[116] I also 'know' Treblinka through received cultural motifs, but aim through *Deep Field [Looking Squarely Ahead]* to focus on hidden, contemporary material evidence, rather than already-circulating depictions. If an alternative is to show proof of crimes, then how should museum curators approach displaying artefacts? For James Taylor, Holocaust museum practitioners need to build narratives that expose what perpetrators tried to conceal,[117] whilst for Robert Ehrenreich and Jane Klinger the display of personal items in context can "turn the huge numbers of victims back into individuals and return their humanity."[118] Dark tourism expert Derek Dalton remarks that Auschwitz remnants provide a *mise-en-scene* which invokes "a powerful affective sense of individual loss" as the viewer re-imagines events.[119] In *Deep Field [Looking Squarely Ahead]* I aimed to offer viewers a sense of proximity to victims through expanding a map of compressed, microfilmed images, within a miniature.

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[115] James E. Young, "Looking Into the Mirrors of Evil," in *After Eichmann: Collective Memory and the Holocaust Since 1961*, edited by David Cesarani (London: Routledge, 2005) 161-2. Cited in Sturdy Colls & Branthwaite, "'This is Proof?" 443.

[116] Robert Ehrenreich & Jane Klinger, "War in Context: Let the Artifacts Speak," in *Does War Belong in Museums? The Representation of Violence in Exhibitions*, edited by Wolfgang Muchitsch (Bielefeld: Transcript Verlag, 2014) 145. Cited in Sturdy Colls & Branthwaite, "'This is Proof?" 443.

[117] James Taylor, "Concentration Camp Uniforms as a Tool of Subjugation and a Symbol of the Holocaust," in *Bodies in Conflict: Corporeality, Materiality and Transformation*, edited by Paul Cornish and Nicholas Saunders (London: Routledge, 2014) 151.

[118] Ehrenreich & Klinger, "War in Context" 146.

[119] Derek Dalton, *Dark Tourism and Crime* (London: Routledge, 2014) 34. Cited in Sturdy Colls & Branthwaite, "'This is Proof?" 443.

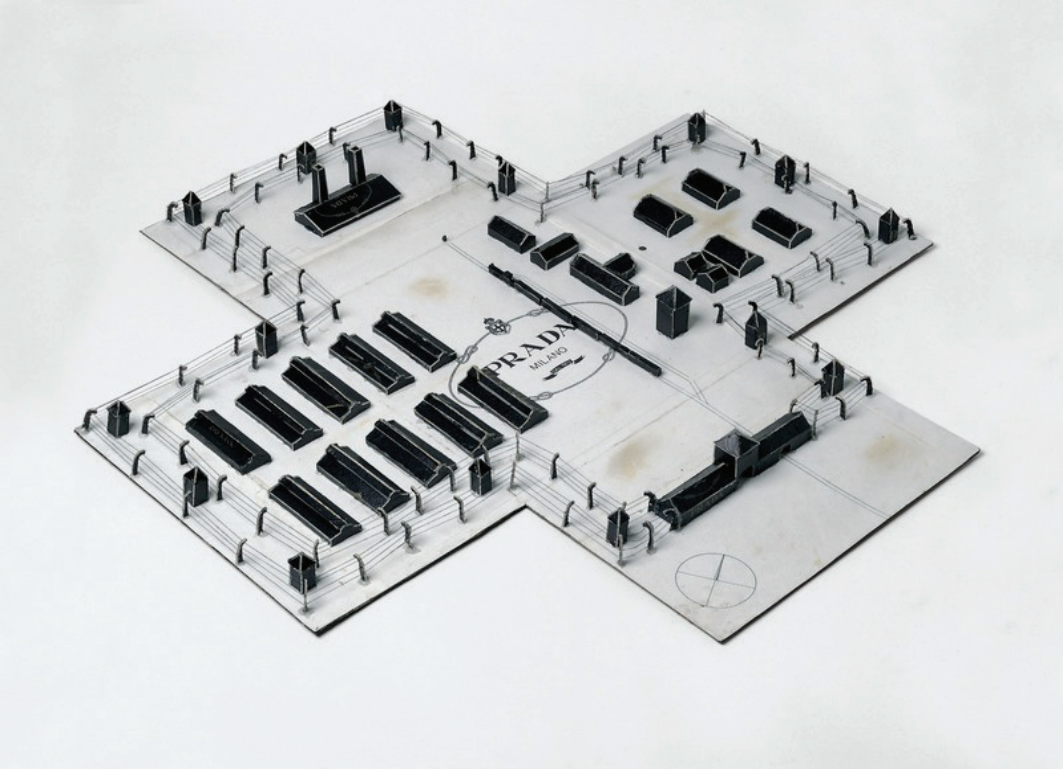

Figure 3.8 *Prada Deathcamp*, Tom Sachs, 1998. Cardboard, ink, adhesive, 69 x 69 x 5cm. Photo available at: http://www.tomsachs.org.

3.3.3 Science-Fact and Speculative-Fabulation

As part of a group of artists commissioned in February 2015, I attended Nyspace, a Manchester-based artist-run gallery, for a briefing by Sturdy Colls and Branthwaite.[120] Along with contextual history of the site, we heard stories surrounding the fieldwork experience. Sturdy Colls' 2013 excavations had been documented by television companies Channel 5 and Smithsonian Channel[121] and public announcement of her research had triggered hostility from Holocaust deniers.[122] It was therefore vital to create wide access, through travelling artworks and forensic archaeology

[120] Described in Sturdy Colls & Branthwaite, "'This is Proof?" 438.

[121] *Treblinka: Inside Hitler's Secret Death Camp*, directed by Alex Nikolic-Dunlop, aired 27 November 2013, Channel 5, UK; *Treblinka: Hitler's Secret Killing Machine*, produced by Charles Furneaux and David Edgar/Group M Entertainment, aired 29 March 2014, Smithsonian Channel, USA.

[122] Authors notes from *Finding Treblinka: Artists Respond*, briefing at Nyspace Gallery, Manchester, 20 February 2015.

interpretation, to the assemblages found at Treblinka, whose analysis proved their presence to be consistent with existing testimony from the Holocaust period.[123]

The assemblage is investigated through both non-invasive methods and traditional excavation. We were introduced to the team's contemporary geophysical data tools used to 'see' above and below ground. LiDAR (light detection and ranging) used airborne lasers to sense unnatural indentations in the site topography; walkovers and fingertip searches found surface artefacts; ground-penetrating radar (GPR) surveyed different resistances to indicate buried remains in disturbed soils (fig.3.9).[124] The instrument data located targets for keyhole excavations most likely to yield commingled physical remains, and therefore keep invasive forensic methods to a minimum in a consecrated site. Finds from ten trenches had been digitally photographed and re-interred under rabbinical guidance, apart from exemplar evidence retained and now permanently displayed at Muzeum Treblinka. Artists were given access to sample photographs (fig.3.10) of trench features and artefacts including: architectural matter (concrete, tiles, brick, pipes, rubble, plaster, nails) indicating built structures such as gas chambers and barracks; functional objects such as tools, wire, coins, glass, scissors, bullets; and personal items such as jewellery, shoes, utensils, combs – all materially dated to the Holocaust era.[125] No images of human remains were shared with the artists.

Integrity was required to treat the data with care, to emphasise the absent material story rather than already-told witness-accounts. Reviewing the finds images, I was moved by the enormity of events they evidenced, and sensed a proximity to Treblinka's victims. The work would be seen in international museums and archives, by survivors and descendants; I decided not to embellish the factual sphere with the site's micropolitics which might overshadow a connection to trauma that viewers might form.

123 Sturdy Colls, "Finding Treblinka," unpublished fieldwork report.
124 Sturdy Colls & Branthwaite, "'This is Proof?" 434-5.
125 Sturdy Colls & Branthwaite, "'This is Proof?" 434-5.

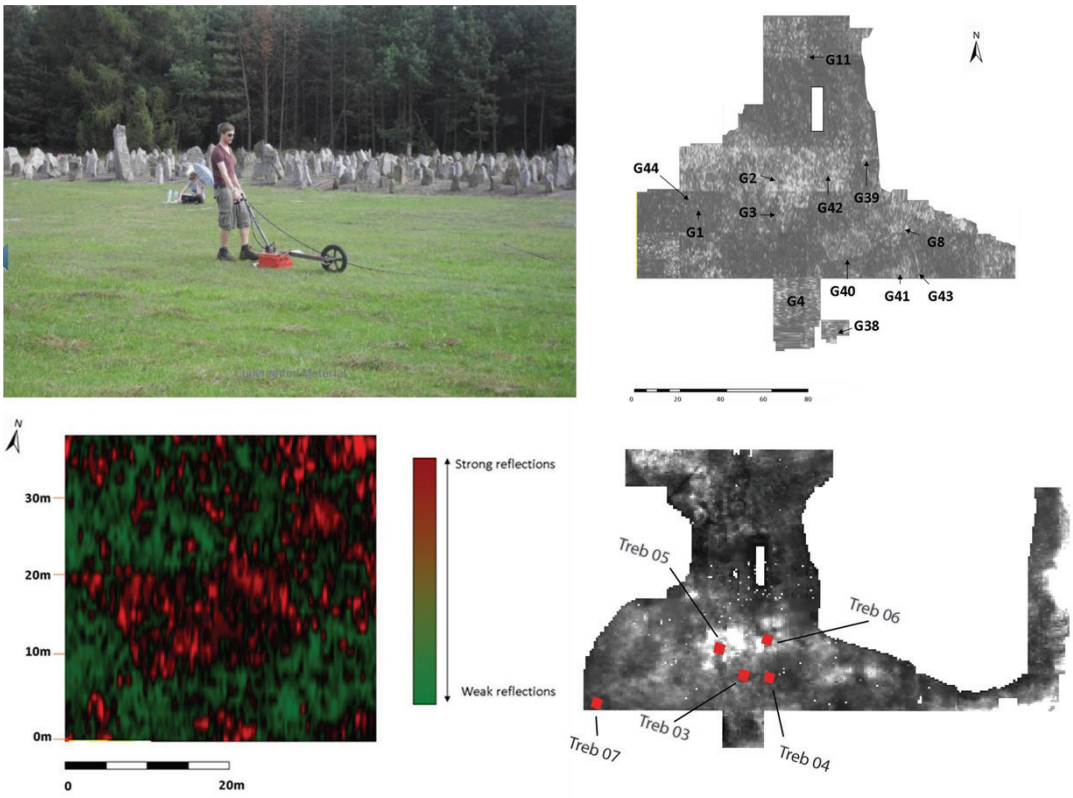

Figure 3.9 GPR survey and resistance data identifying keyhole trenches at Camp II.

Figure 3.10 Sample trench finds images supplied to *Finding Treblinka* artists.

I used supplied data to re-imagine a one-cubic-metre keyhole trench, TREB4, which Sturdy Colls dug over the suspected – and confirmed – site of the Old Gas Chamber (fig.3.11). The main microfiche area measures 100 x 100mm, a 1:10-scale reduction of the excavation, a browsable image-map corresponding to an index of remains found at particular soil depths (fig.3.12). LiDAR and GPR data gives the exact geographical location (fig.3.13).

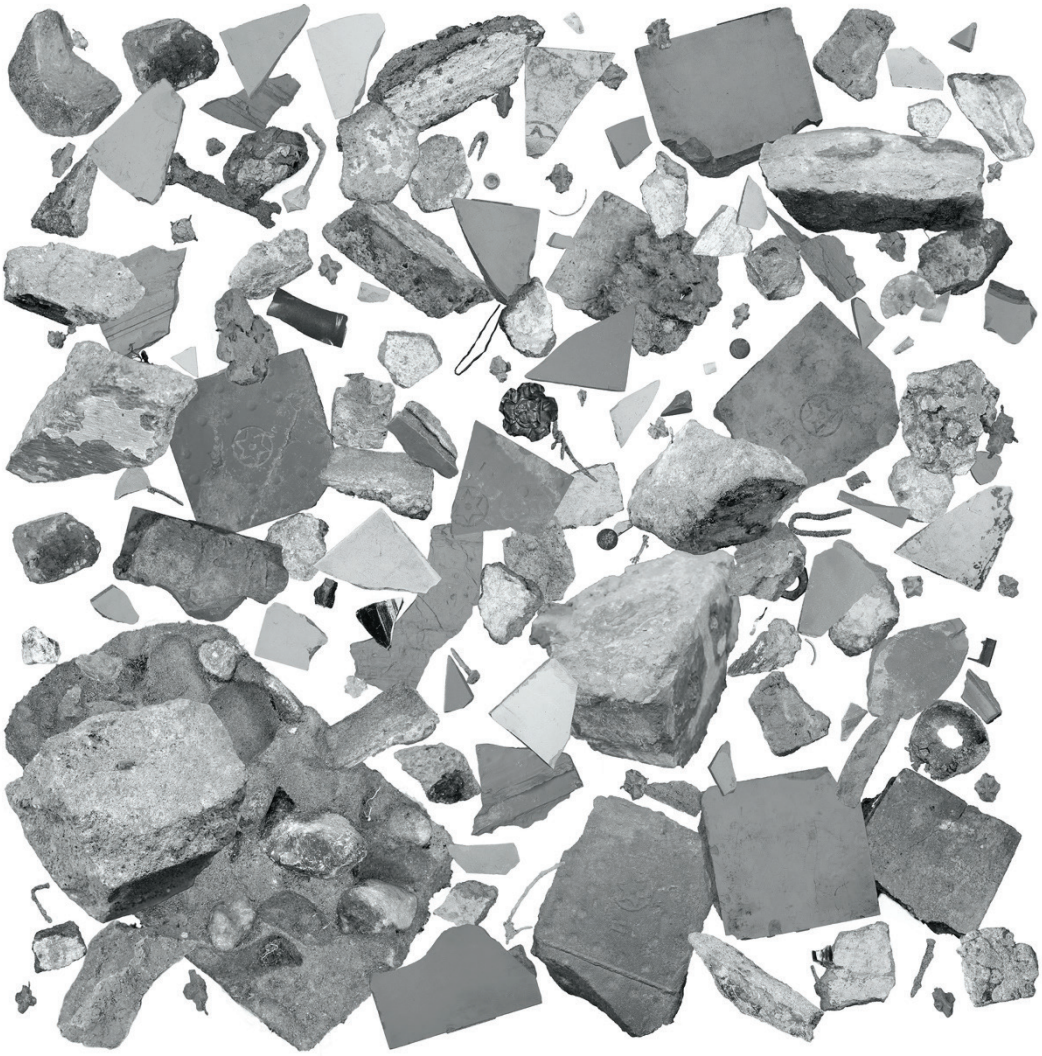

Figure 3.11 *Deep Field [Looking Squarely Ahead]* layout re-imagining TREB4 finds.

	□ TREB04 (1000mm³)					
Finds by context	6000 (-150mm)	6001	6002 (-850mm)	6003	6004 (-950mm)	6005 (-1450mm)
Pottery		1				
Cement				23		6
Stone material		2				
Black stone material	49	14		6		3
Nail		3	1	1	4	
Glass	1	10	1	6	1	2
Burnt stone		12				
Brick	72	79		15	2	3
Concrete	72	84			5	
Metal		9	1			6
Tile (red & yellow)	7	33	2	7	13	10
Plastering cross	19	36	9	4	12	4
Charcoal		1				
Comb		2		1		
Barbed wire		1	1			
Burnt slag concretion		8			2	
Concrete with cross		2				
Mixed bag of building material		1				
Concrete with whitewash & nail		1				
Road cobble		1				
Button		1				
Coin		20 zloty	1 pfennig	5 grosz		
Brass rose brooch		1				
Gold-plated glasses rim fragment		1				
Hair clip		1				
Gold-plated brass clasp		1				
Hairclip part, stainless steel		1				
Can lid		1				
Curved brick		1				
Flint		1				
Ivory		1				
Burnt concrete with nail		1				
Shell		1				
Burnt stone		3				
Ceramic		1				
Metal spanner			1			
Gold earring fragment			1			
Plaster with paint or whitewash			1	2	7	3
Large concrete block			1			
Tile with concrete			1			
Button pendant, mother-of-pearl				1		
Burnt wood				1		
Brick and concrete					1	
Burnt tile and slag					1	
Iron nut						1

Figure 3.12 *Deep Field [Looking Squarely Ahead]* layout detail, table indexing finding-type and quantity by trench depth (context).

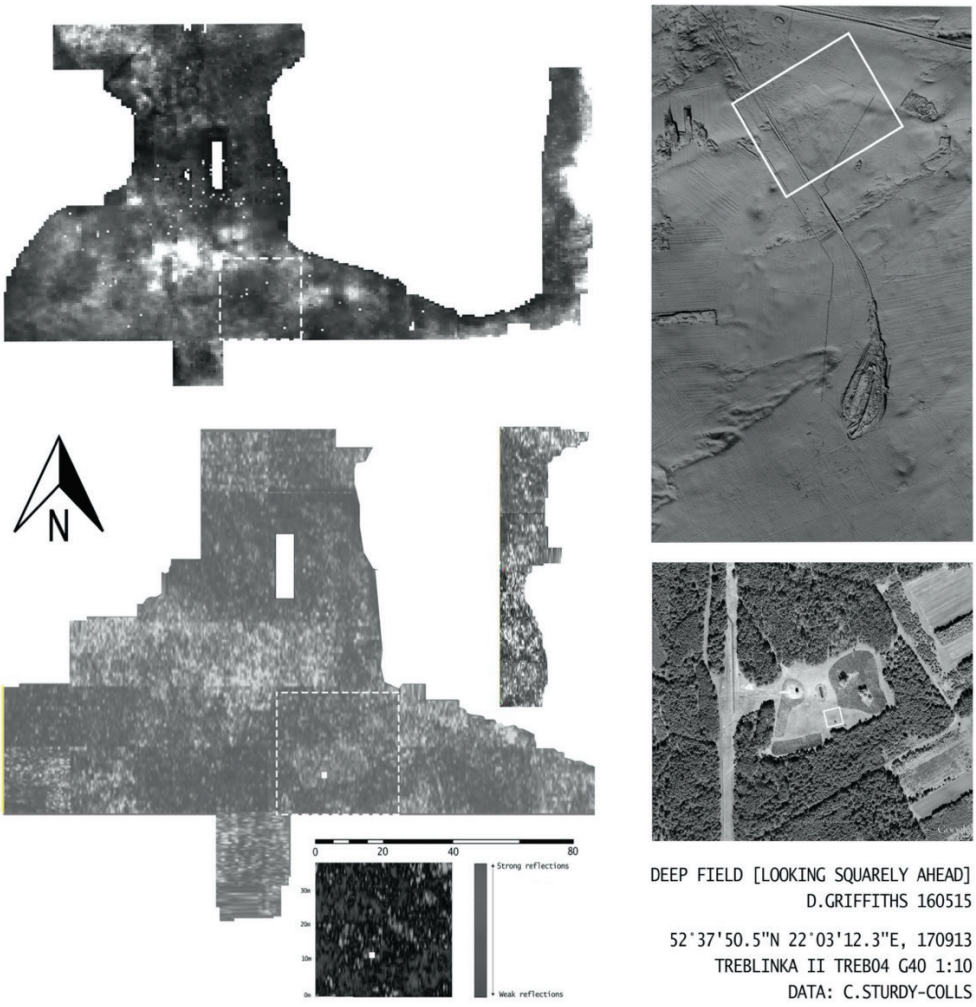

Figure 3.13 *Deep Field [Looking Squarely Ahead]* layout, showing evidence location.

Discontinuation of colour microfiche (see section 2.4.5) prompted a turn to collage and rethink of how I used the medium. I was unable to access remaining Ilford stock held in Zurich, which was reserved for heritage clients. Consulting with Genus Microfilm, I printed onto traditional 35mm black-and-white format, which I sliced and glued to assemble a 148 x 105mm fiche (fig.3.14). Scissor-cuts rendered sharp edges to film fragments, which under the high magnification of a microfiche-reader lens appeared violently torn. Film-editing cement and epoxy resin caused organic glassy effects in the clear areas between images. I stacked celluloid frames to create a sense of different depths, representing descending trench layers; from zero to -100cm. Pull-focus viewing across the layers is performed using a dial knob on the reading apparatus. I felt these crystalline, fragile aesthetics were better suited to the document than the crisp RGB laser-writing of the first artwork (section 3.2). Browsing the B&W cut-up feels like searching a chaotic assemblage of matter buried in soil (fig.3.15).

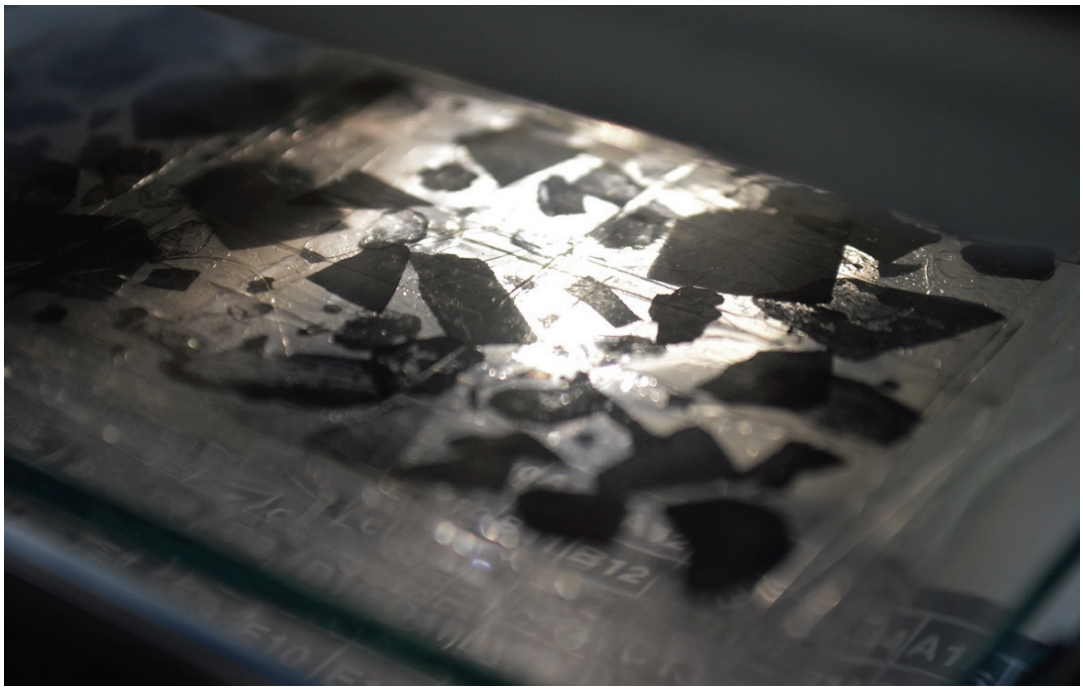

Figure 3.14 *Deep Field [Looking Squarely Ahead]* microfiche detail, showing layered collage of microfilm arranged into 148 x 105mm format on glass tray.

Figure 3.15 *Deep Field [Looking Squarely Ahead]* screen detail, showing images of architectural remains and functional objects, at different layers.

3.3.4 Discussion and Insights

The microfiche depicts a mise-en-scene of compressed, buried building materials and everyday human possessions moved from all over Europe and deposited during Treblinka Camp II's operation and chaotic abandonment. I applied insights from the first artwork (section 3.2) by connecting different temporalities of Treblinka through matter: its past movement, destruction and concealment during the Holocaust; its observation and recovery in 2013; and future re-reading in light of new investigation and knowledge.

Unlike the first and third artworks in this portfolio (sections 3.2 and 3.4) I didn't try to include stories about the wider context of material journeys to the site. Instead I followed *Finding Treblinka* project aims; that archaeologists, artists and audience members would collectively make meaning. I contributed to co-storying by focusing on the material remains; tiny images are expanded through hand navigation and refocusing of microfiche tray and lens, activating viewers to perform a close haptic observation to 'find', observe and interpret the data. The first artwork began to veer from ordered information grids typical of microfiche layout and go beyond normative archival style. In this second project I furthered a disorderly use of the medium, partly due to required change to previous workflow. I underwent a collaged, handmade aesthetics that linked the haphazard demolition of the crime site with the uncertain constructedness of the document, hence highlighting its status as a form of witnessing. *Deep Field [Looking Squarely Ahead]* doesn't claim to truthfully mirror how remains were strewn and buried, but re-imagines data to complement the expanded narrative terrain in which the artwork interacts, and to fulfil the forensic role of an archival artwork.

Through undergoing materials in this new approach, I found an intriguing way to connect the allure of the miniature and the viewer's existing knowledge of the trouble. This artwork taught me that microtopia can follow in the tradition of micrographia, by engaging users to peer into a shrunken text, to realise a relationship between themselves and hidden information. In browsing this translucent content I felt a connection with the otherness of Treblinka's material evidence – the untold underground remains – whose significance I understood from other forms of documentation but had not felt. I concluded this intimate, 'finding' gesture would enable other viewers to form an emotional interrelation with a horrific space of murder for unknown victims; and to reflect on the power of a mechanised state against humans.

Insights arising from production of this collaged miniature confirmed microfiche's great potential to convey expanded stories of compressed places, and add to their complex, always-incomplete archiving through diverse forms of remembrance.

3.4 *Deep Field [Unclear Zine]*, 2016

3.4.1 Introduction

This final project responded to the trouble of radioactive-waste disposal – a theme of interest to UK curator Ele Carpenter, who commissioned *Deep Field [Unclear Zine]* for the 2016-18 touring exhibition *Perpetual Uncertainty – Contemporary Art in the Nuclear Anthropocene*.[126] The first two publications in sections 3.2 and 3.3, produced prior to PhD enrolment, enabled me to gain a basic understanding of using microfiche as an archival tool in which images, text and other data might be gathered as multimodal stories about sites. An Arts Catalyst commission led to this final publication by which I could build on earlier insights, and test further fieldwork and studio methods to develop modes of compression and expansion that document troubled places.

Deep Field [Unclear Zine] (fig.3.16) responded to the nuclear condition in Belgium. Firstly, this artwork traces stories about the impact of uranium oxide in civil energy, and its future radioactive legacy which is proposed to be buried in technically and politically complex disposal megaprojects. It archives the compressed micropolitics of a nuclear community; haunted from the past and also from a possibly transformed future, by an urgency to manage fuel waste that served the wider society, that may indelibly change the region, and which awaits a long-term solution. Secondly, the artwork occupies archival microfiche to remark on the epistemic problem of communicating radiological inheritances to far-future humanity. By inscribing a multimodal narrative onto microfiche, the artwork reflects on today's problem of reliably translating and transmitting nuclear knowledge into an unknown post-digital information ecology.

[126] Ele Carpenter commissioned *Deep Field [Unclear Zine]* in association with Arts Catalyst (London) and Z33 House for Contemporary Art (Hasselt), for the exhibition *Perpetual Uncertainty – Contemporary Art in the Nuclear Anthropocene* (Umeå: Bildmuseet, 2016) which also toured in 2017-18 to Z33 Hasselt, and Malmö Konstmuseum in 2018. Fieldwork was supported in Belgium by Z33 House for Contemporary Art, Hasselt; ONDRAF-NIRAS, the Belgian National Agency for Radioactive Waste and Enriched Fissile Materials, Brussels; and STORA, Dessel, a group representing local business, community and politics in study and consultation around planned low-level radwaste storage in the municipality, and wider nuclear activities in the region. STORA is funded by ONDRAF-NIRAS to independently monitor the government's projects. This partnership recognises artists as cultural actors who work tactically with other disciplines to raise questions about the co-existence between planetary life and radiological inheritance.

Figure 3.16 *Deep Field [Unclear Zine]*, 2016, installation view, Z33 House for Contemporary Art, Hasselt, Belgium.

3.4.2 Context of Radiological Trouble

Ele Carpenter invited me to apply the compressed textuality and 500-year lifespan of microfiche to a complex community and material site of nuclear technology research. She defines the problem like so:

> Whilst radiological inheritance takes place through genetic and cultural processes, the drive towards nuclear modernity negated older forms of knowledge production that we might now rely on to make sense of the future.[127]

A strand of Carpenter's *Perpetual Uncertainty* project discusses the form and content of communications that must be urgently enacted to warn far-future life on Earth facing our contemporary nuclear-waste inventory. Remembrance must be

[127] Ele Carpenter, *The Nuclear Culture Source Book* (London: Black Dog Publishing, 2016) 100. The book juxtaposes the work of writers, artists and philosophers who critically consider material and social affects of deep-time radiological inheritance, along with other contemporary nuclear concerns regarding the arms industry, war, energy production, and catastrophe.

maintained, or dangers be signalled, about radioactive geoburial sites whose presence will span hundreds of thousands of years of human linguistic, cultural and technological change. Assuming the redundancy of today's digital and paper records, remembrance stories might need to be carried through time by continuing cultural engagement with troubled nuclear places – including the agency of artists in collaboration with nuclear experts.

Twentieth-century problem-solvers theorised this transmission of warnings to far-future generations, who are imagined to require deterrents that prevent hazardous encounters with nuclear legacies. The semiotician Thomas Sebeok proposed in 1984 that an elite "atomic priesthood" could safeguard buried nuclear hazards by laying false trails of invented superstition; the embedding of physical or cultural markers, rituals, and folklore would secure guardianship.[128] A 1993 report for US Department of Energy on WIPP (Waste Isolation Pilot Plant) recommended public archives and daunting monuments (fig.3.17) in a cordoned zone of Chihuan Desert, New Mexico, employing linguistic, pictographic and architectural modes to signify omens that prevent intrusion.[129]

Figure 3.17 *Landscape of Thorns, view 1*, Sandia National Labs, Albuquerque, 1993.

[128] Thomas A. Sebeok, *Communication Measures to Bridge Ten Millennia*, No. BMI/ONWI-532 (Indiana University, Bloomington, 1984) 24.

[129] Kathleen Trauth, Stephen Hora and Robert Guzowski, *Expert Judgment on Markers to Deter Inadvertent Human Intrusion Into the Waste Isolation Pilot Plant*, report (Albuquerque: Sandia National Labs, 1993): 1.4–1.12.

Contemporary artists, activists and archaeologists have questioned this assumed communicability of nuclear remembrance, remarking instead on the unknowable future understanding of today's nuclear burial places and embedded messages. Activist Susan Garfield debunked Sebeok's constructed haunting of future geologies as based on a dark disbelief in our descendants capacity for continuity and care.[130] A 2013-19 OECD policy review emphasises the obligation of assembling records, knowledge and memory (RK&M) strategies around waste repositories, through networked actors and institutions that continually engage monuments, and intergenerational art and education, to preserve knowledge.[131] Archaeologists Cornelius Holtorf and Anders Högberg argue we cannot assume that nuclear sites will be understood as significant by future generations; hence the imperative for sustainable epistemological conservation.[132]

In her *Laboratoires* series (fig.3.18), Belgian artist Cécile Massart addresses the problem of future memory of geological repositories through drawings that imagine non-elitist research communities at nuclear sites, where interdisciplinary practice would co-design and update "architectural, musical, poetic, and choreographic markers"; thereby weaving an intergenerational cultural relay to propel memory.[133] Researching the potential of ancient myth, artist Andy Weir has produced the "anti-marker" *Pazu-Goo* (fig.3.19), a transferrable object code for communities to modify and 3D-print Pazuzu, the Sumero-Assyrian demon of dust and contagion. Plastic figurines encased in clay would be flushed into water supplies near a biohazard site, to be salvaged by superstitious future humans, or destined for leaky decay into the land; a reminder of uncertainty about nuclear geoburial.[134] Massart and Weir remark on hope and hopelessness in the survival of nuclear knowledge through deep time. Adaptability of their artworks, in response to changing context, might aid communal reworking of memory rituals and signification of dangers as generations pass; they also satirise the

[130] Susan Garfield, "Atomic Priesthood" is Not Nuclear Guardianship: A Critique of Thomas Sebeok's Vision of the Future," *Nuclear Guardianship Forum, On The Responsible Care of Radioactive Materials* Vol.3 (Spring 1994): 15.

[131] Jantine Schröder et al, "Preservation of Records, Knowledge and Memory (RK&M) Across Generations: Final Report of the RK&M Initiative," report, NEA No. 7421 (Organisation for Economic Cooperation and Development, 2019).

[132] Cornelius Holtorf and Anders Högberg, "The Contemporary Archaeology of Nuclear Waste: Communicating With the Future," *Arkæologisk Forum* 35 (November 2016): 31-37.

[133] Cécile Massart, "Constructing memory through artistic practices", *Radioactive Waste Management and Constructing Memory for Future Generations*, report, NEA No.7259 (OECD, 2015) 127.

[134] Andy Weir, "Deep Decay: Into Diachronic Polychromatic Material Fictions", *Parse* 4 (Autumn 2016): 68-9.

notion that meaningful connections can be made to far-future human societies, whose uncertain evolution may technically and linguistically advance, or regress.

Artists Thomson and Craighead propose *Temporary Index* totems (fig.3.20) as semiotic reminders of linear time, that signpost entombed waste sites and count down hundreds of thousands of years of radioactive decay in seconds. Documentary films, such as Michael Madsen's *Into Eternity* (2010) and Peter Galison and Robb Moss' *Containment* (2015), interview state, private-sector and pressure-group actors to probe the emergency of nuclear wastes that are vulnerable to climate changes to sea-level, seismic activity and glaciation, and social changes requiring symbolic warnings alongside sustainable storage. Considering deep-time material affects, these works ponder the epistemic problem of alerting our descendants to lurking toxicity, and of preventing repository intrusion – archaeological, military, malevolent, economic or otherwise motivated.

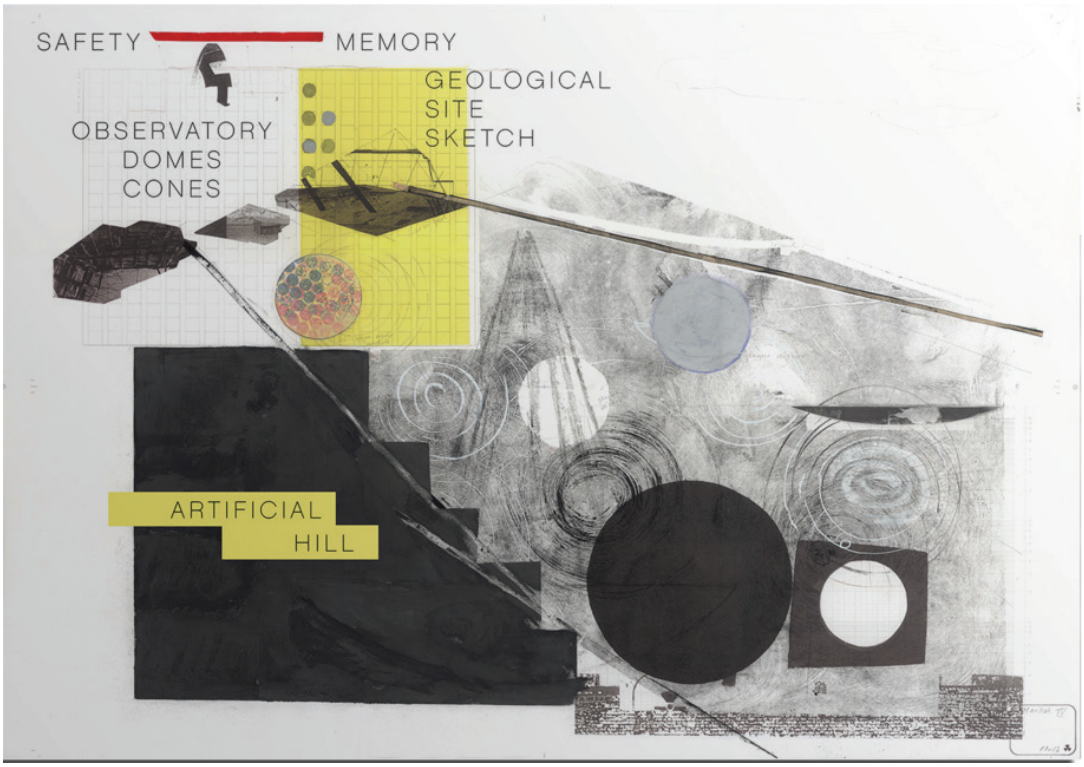

Figure 3.18 Cécile Massart, *Artificial Hill*, 2013. Drawing, 63 x 90cm, from *Laboratoires* series.

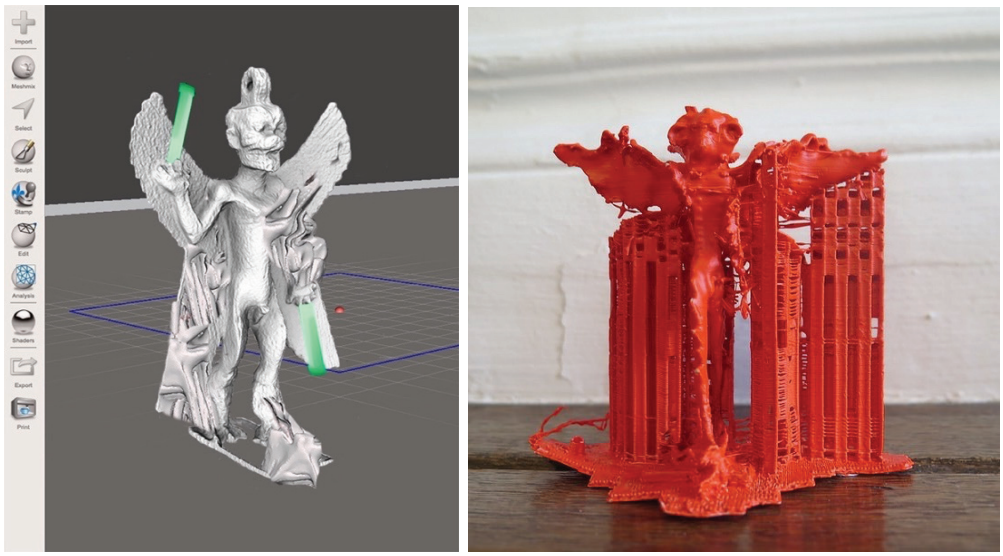

Figure 3.19 (Left) Andy Weir, *Pazu-goo: 3D Printable Marker for a Future Posthuman Palaeoarchaeologist (c. 700BC – 4.6 x 10^9 AD).* (Right) Andy Weir, *Pazu-goo*, 2017, Nylon 12 figurine, Z33 House for Contemporary Art, Hasselt, Belgium.

Figure 3.20 Jon Thomson and Alison Craighead, *Temporary Index (Dessel)*, 2017, installation at Z33 House for Contemporary Art, Hasselt, Belgium.

These cultural works acknowledge the need for spatial and temporal management of toxicity, whilst remarking on the anthropocentric oddness of any technoscience that assumes waste might be passively contained in rock strata away from an unaffected biosphere; as if denying, in the words of geophilosopher Ben Woodward, "the power of matter and earth to propagate new forms of life".[135] However, in these artworks the genealogy of how the matter came to matter is implicit rather than made explicit in their aesthetics. In *Deep Field [Unclear Zine]* a wider, diffractive discourse of colonial uranium extraction, civil energy production and current governance of disposal is inscribed alongside speculation about future architectural marking, potential ritual and uncertainty that are typical concerns in this strand of cultural works discussing nuclear heritage.

3.4.3 Thinking Heterotopic Compression

An assemblage of agencies and material timescales produces a heterotopic, compressed time in nuclear municipalities. This artwork centres on two neighbouring northern Belgian villages, Mol and Dessel, whose rural inhabitants co-exist with the Atom Village – a grouping of labs that research the burial of decommissioned low- and high-level vitrified nuclear waste, and operate a research reactor and temporary storage of languishing waste. Twentieth-century anti-nuclear discourse has been supplanted by twenty-first-century consensual policy-making between international, state, scientific and citizen bodies, to tackle contemporary ethical and technical realities of nuclear-waste management. The Belgian government's radioactive-waste agency, ONDRAF-NIRAS, leads research and – subject to consensus – will eventually operate radwaste disposal, its place-marking and documentation. Citizens groups in Mol (MONA) and Dessel (STORA) are government-funded to independently monitor and consult on burial projects operated by SCK-CEN, the Belgian state research centre.

In experiencing this nuclear community, I sensed a pressure that demands they understand many different superimposed temporalities and spaces; a compression that the microtopia strives to reflect in its editorial content. Geohazard engineers and community actors have overlapping remits, since 1980 researching how to manage a 60-year legacy of spent fuel and industrial waste, itself sourced from ancient uranium deposits in colonial territory since post-war reconstruction deals brought civil energy

[135] Ben Woodward, *On an Ungrounded Earth: Towards a New Geophilosophy* (New York: Punctum, 2013) 68.

know-how from the USA to Belgium. High-level waste is proposed to be contained for 100,000 years in steel and concrete capsules, in underground tunnels in billion-year old clay strata; and low-level waste in an above-ground tumulus for 300 years. The ideal of overground post-nuclear security is made possible by a parallel, dystopian, underground domain of infernal hazard. Actors simulate and observe test data to predict future security against contamination and human intrusion to the burial sites; this science-fact can only ever envision best-case scenarios.

Such production of situated foreknowledge absorbs uncertainty, and typifies costly long-term megaprojects with high political and planetary stakes.[136] Mol and Dessel, having already hosted civil-energy industry since the 1950s, now potentially face a future dominated by radiological legacy.[137] The possibility of indelibly transformed regional power (rising industrialisation, GDP, global corporate interests, threat of terrorism) further complicates the compressing approach, from the future, of the material hazard whose security is unknowable. External voices, such as twitter pundits, disrupt delicate consensus. It might not be surprising if Belgian nuclear actors were paralysed by spectral anxiety about unknowable consequences of their contemporary planning of radwaste burial and its memorialisation. Theirs is a dense responsibility to continually refine and communicate robust findings that influence political regimes to safeguard eventual burial sites, and to mitigate psychic affects about perceived risk of future radionuclide escape. However, the nuclear community that I witnessed remains focused on the trouble, thinking collectively in trans-temporal and planetary perspectives, aiming for absolute containment requiring no human monitoring; they are working with ethicists, educators and artists to design new epistemes for communicating and marking the danger sites.[138]

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[136] cf. Bent Fluvbjerg, Nils Bruzelius and Werner Rothengatter, *Megaprojects and Risk: An Anatomy of Ambition* (Cambridge University Press, 2013); ANDRA, *Foreknowledge Assessment: Proving Futures and Governing Uncertainties in Technosciences and Megaprojects*, conference (Paris: 12-14 December 2016). Retrieved from http://www.foreknowledge2016.com on 13 June 2017.

[137] ONDRAF/NIRAS, *The cAt Project in Dessel: A Long-Term Solution For Belgian Category-A Waste*, masterplan (Brussels: ONDRAF/NIRAS, 2010).

[138] Jantine Schröder, presentation, "Art and Deep Time Radiation" roundtable (Umeå: Bildmuseet, 2016).

3.4.4 Expanding Science-Fact and Speculative-Fabulation

Deep Field [Unclear Zine] fieldwork started in May 2016 to document matter, bodies, instruments and power relations involved in the problem of radwaste. I photographed sites, conducted conversations to learn from scientists and citizen observers, collected contemporary social-media comments – all to make sense of multiple stories entangled in the site, seeking factual clues to trigger the later speculative-fabulation mode.

My first conversation with Christoph Depaus, an ONDRAF/NIRAS geohazard expert, discussed the ethics and process of geoburial (fig.3.21). Visits to projects in the Atom Village then enabled me to gather science-fact and science-feeling as the basis for both evidence and speculation in the documentary artwork. I visited the demonstration site for cAt (fig.3.22) with Geert Lauwen, an activist from STORA, the Dessel community group who monitor implementation of a huge ground-level tumulus to immobilise 70,500m^3 of low-level (category A) radwaste from hospitals or industry, for 300 years.[139] I touched and sensed the solidity of reinforced concrete and corten-steel structures, under which future robots would test for cracks or toxic water-seepage. Lauwen talked about Belgium's post-war civil-energy origins in Congolese uranium and United States investment, and about the 1980s–90s period of new ideas for disposal after international treaties banned sea-dumping.

With Lauwen I observed other sites of natural-resource exploitation near the Atom Village: old coal mines; white sand quarried as export for glass manufacture and shale-gas extraction; and experimental geothermal energy. Katleen Dervaux (fig.3.23), also a member of STORA, reflected on everyday life in the compressed time; speculated on radwaste burial's potential impact on emotional and economic lives; comfortable living standards in the nuclear community; differing levels of acceptance of a future infrastructure; and concerns about future political change affecting stability in the nuclear project.[140]

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[139] ONDRAF/NIRAS, *The cAt Project in Dessel.*

[140] Katleen Dervaux, recorded conversation with Dave Griffiths at STORA, Dessel, 27 May 2016.

Figure 3.21 *Deep Field [Unclear Zine]*, 2016, detail of interview with Christophe Depaus discussing process and ethics of toxic geoburial.

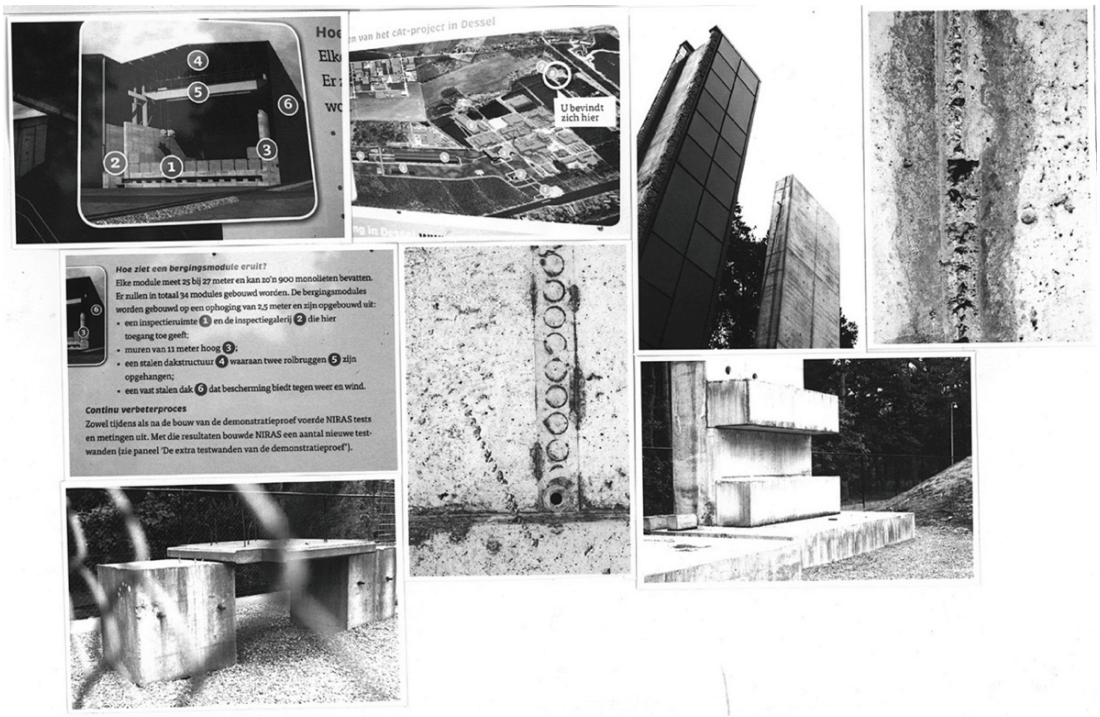

Figure 3.22 *Deep Field [Unclear Zine]* 2016, detail, photographs of cAt demonstration site.

Figure 3.23 *Deep Field [Unclear Zine]*, 2016, detail showing interview with Katleen Dervaux, STORA, Dessel.

Practical barriers of language and timescale deterred me from arranging more conversations with community members, and the leadership of a different activist group withdrew co-operation in an email stating: "It's too early to speak of geological disposal". I hadn't fully grasped this displaced future haunting felt in the present, and realised that my planned use of a fictional narrative mode could be seen as insensitive by some people in the nuclear community. In the compressed time of radiological inheritance it is perhaps politically risky for a community to acknowledge, or speak publicly of, an infrastructure in the future tense, which might indicate tacit acceptance of that future. It is also risky and antagonistic for artists to adopt a speculative witnessing within a sensitive context. This made me aware that I couldn't open up diffractive documentation of place to the extent I'd hoped, without ample local, situated knowledge to balance the potential antagonism of the fabulative method.

The wider geographical context of the nuclear zone was surveyed using cycling-photography in Dessel and Mol's suburbs, forests, lake resorts and industrial parks. A December 2015 plot by an Isis Parisian cell against a senior nuclear official in Mol[141] meant security patrols were enhanced around the Atom Village. During my

[141] cf. Samuel Osborne, "Isis Suspects Secretly Monitored Belgian Nuclear Scientist, Raising Dirty Bomb Fears," *The Independent*, 19 February 2016, retrieved from http://www.independent.co.uk/news/world/europe/isis-dirty-bomb-nuclear-scientists-paris-attacks-a6884146.html, accessed 16 January 2017; Cynthia Kroet, "Paris Attack Suspects Filmed Nuclear Official's Home," *Politico*, 17 February 2016, retrieved from

April-July 2016 fieldwork I collected tweets about entangled terror-related and nuclear fears which narrated the alleged presence in Belgium of returning jihadists, alongside tweets about inter-faith peace demos and airstrikes on Syria in the wake of the 22 March 2016 Brussels airport bombing (fig.3.24).

In Mol I discovered the village's Flemish name translates to English as 'mole', the burrowing animal. I'd seen a mole-themed opticians branding and a civic statue of a hobo-stick-laden mole (fig 3.25); clearly this local symbol was telling me something. Tourist officers were unclear of its origins, but suggested the name derives from early settlers encounters with land that was agriculturally challenging. "Mol" is etymologically linked to the old Norse "mold" and Latin "modulus"; I saw the mole as giving shape to a problem through thought and technology, amongst dusty muck for planting.

Figure 3.24 *Deep Field [Unclear Zine]*, 2016. Belgium nuclear tweets, April-July 2016.

http://www.politico.eu/article/paris-attack-suspects-filmed-nuclear-officials-home-isis-terrorism-counterterrorism-isil-belgium-mol-plant, accessed 16 January 2017.

Figure 3.25 Civic statue of mole with hobo-stick, outside Mol tourist office.

A key fieldwork realisation was sensing my mole-like agency within Belgian nuclearity. I felt like an investigator, traversing local communities and knowledges (of scientists and citizen activists), feeling in the dark about the unfathomable conundrum of communicating the trouble to future beings in a way that would be linguistically accessible across vast timescales. Thinking as the mole mascot, I photographed piles of sand, soil and grit hills at corners of industrial plants, fields and streets (fig.3.26), shifting me into witnessing in both modes of science-fact and speculative-fabulation. As the Passaic highway-construction holes became "memory-traces of an abandoned set of futures" for Smithson,[142] so Mol and Dessel's piles suggested both harbingers of a post-industrial future boon in the villages, and imaginative residues of a giant mole's tunnelling made through witnessing the nuclear zone.

[142] Smithson, "A Tour of the Monuments of Passaic," 52-7.

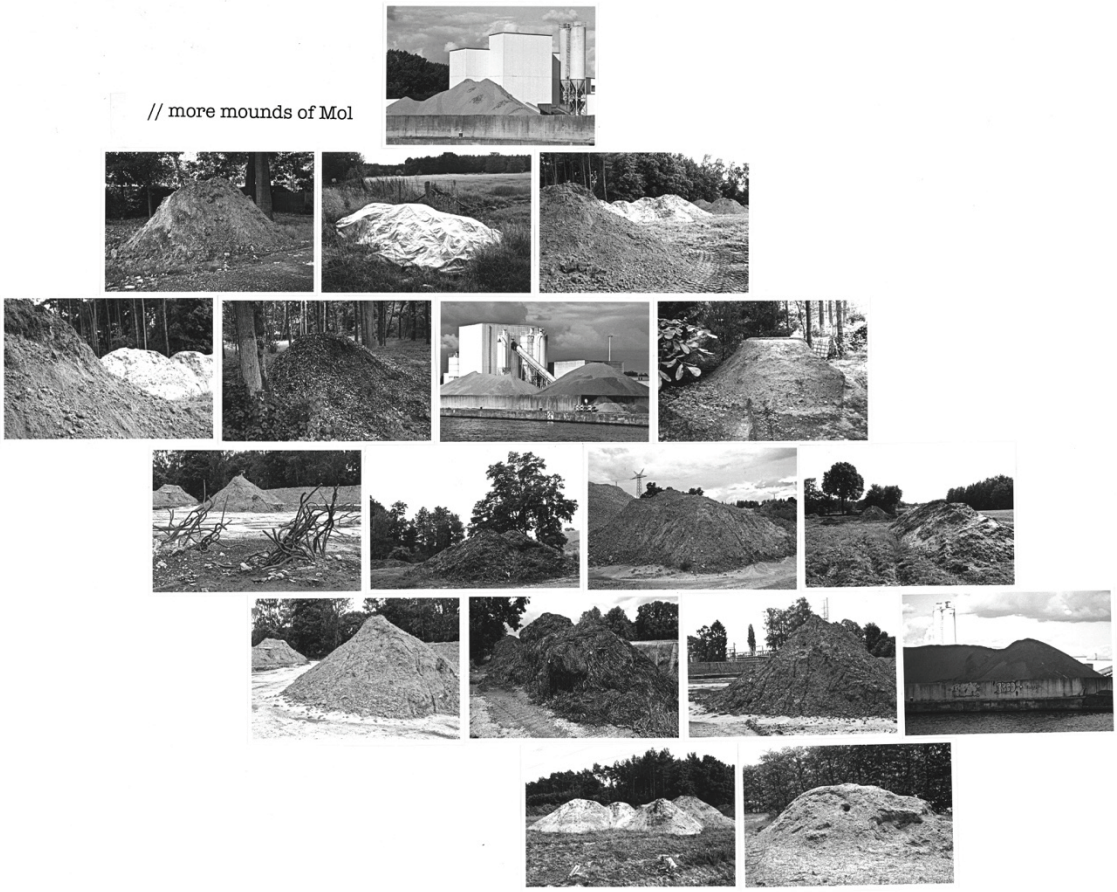

Figure 3.26 *Deep Field [Unclear Zine]*, 2016, detail, "More mounds of Mol" article.

The mole-like sensation returned during a July 2016 artist's visit to HADES,[143] the High Activity Disposal Experimental Site, accompanied by ONDRAF/NIRAS staff; this was later documented as a photo-collage "Into the Deep Field [Mapping HADES]" (fig.3.27). HADES isn't an actual waste repository. It is a laboratory 225 metres underground, an observing apparatus which since 1980 has tested a multi-layered engineering concept for interring concrete-and-steel supercontainers in a tunnel network ('galleries') and simulating the high thermal conditions expected from spent fuel in its first few thousand years.[144] HADES tests the region's boom-clay strata as a feasible sedimentary host, a natural barrier for geologically containing high-level (category C) radwaste.[145] I recorded the sound of descending by lift cage; down in HADES I handled clay samples, and photographed tunnel-boring machines and other instruments, and chalked marks of measurements on tunnel walls – data left by scientists during nearly 40 years of experiments.

As explained by Depaus, the best-case scenario for any repository would acknowledge it cannot guarantee radiological confinement for an eternity; over deep timescales, radionuclides could eventually escape their corroding pods, but natural decay and the retarding clay barrier will render them harmless before they migrate to reach the biosphere.[146] The much greater threat is inadvertent or purposeful human intrusion in the repository.[147] This gap between scientific material proof and unclear future-human behaviour inspired a speculative mode in narrating the nuclear zone in the artwork.

[143] Arts Catalyst and Z33 House for Contemporary Art (Hasselt, Belgium) organised a field trip to HADES in July 2016 for an international delegation of artists and curators.

[144] cf. Herman Damveld and Robert Jan van den Berg, *Discussions on Nuclear Waste: A Survey on Public Participation, Decision-making and Discussions in Eight Countries,* report, (CORA, Dutch Commission for the Disposal of Radioactive Waste, 2000); Christoph Depaus, recorded conversation with the author, ONDRAF/NIRAS, Brussels 25 May 2016.

[145] cf. Norbert Maes, Sonia Salah, Christophe Bruggeman, Marc Aertsens, Evelien Martens, Van Laer Liesbeth, "Strontium Retention and Migration Behaviour in Boom Clay," external report (Belgium: SCK-CEN, 2012); Pierre Van Iseghe et al, "Radionuclide Behaviour and Geochemistry Upon Geological Disposal of High-level Waste in Boom Clay: Overview and Critical Assessment," report, (Belgium: SCK-CEN, 2009). SCK-CEN is the Belgian state nuclear research centre operating HADES.

[146] Christoph Depaus, recorded conversation.

[147] Christoph Depaus, recorded conversation.

Figure 3.27 *Deep Field [Unclear Zine]*, 2016, detail showing Arts Catalyst/Z33 artist field trip to HADES.

Following our brief experience as underground moles in HADES, I gave the other delegates a lesson (fig.3.28) at a golf driving-range near the Atom Village. This performance was an opportunity for convivial communication between artists and scientists involved in Carpenter's *Perpetual Uncertainty* exhibition and roundtable. It imagines a leisure pursuit of Belgian royals, colonial officials and expat US nuclear workers; an inaugural deal in the post-war nuclear establishment of Mol.

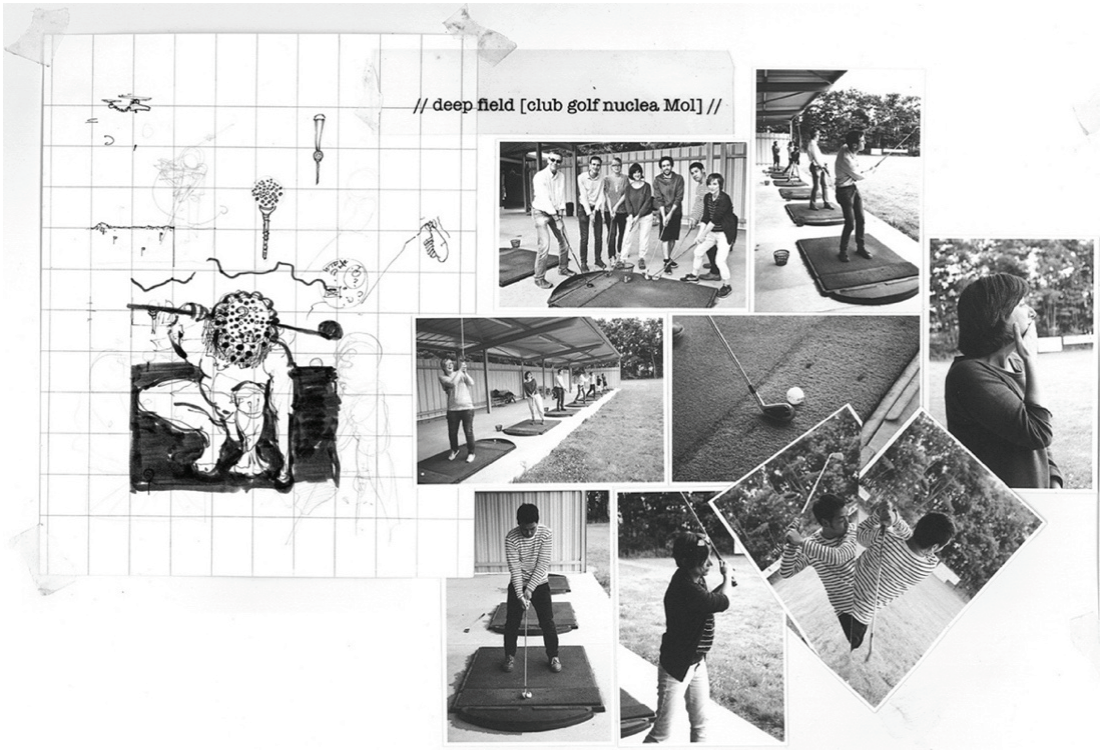

Figure 3.28 *Deep Field [Unclear Zine]* 2016, microfiche detail, showing "Deep Field [Club Golf Nuclea Mol]" performance.

I began to think of the mole as witness of the journey of uranium across timescales, embodying the affected land as OncoMole, a fantasy creature mutated by the future possibility of radionuclide contamination, who disrupts today's technoscience. To begin thinking through this non-human character, I wrote a speculative nuclear-material story:

> There's a sandy field I visit through the ages; to sense and claw my food and observe the folk. In the rough a tuber trail thins to smoother fairway space. North American, Flemish, Congolese voices, royals and pioneers of energy sourced from the rocks. The clack of iron striking rubber, a white orb bounces past my snout, and stalls in an inverse molehill they call 'the bunker'. The ball, a compressed miniature of the building they call 'the reactor', or an expanded model of what they call 'the atom'. Voices pass… a sale of land, a journey of fuel, an exchange of secret knowledge for security. I surface from my den another time to hear French, Flemish, Japanese, British accents. Artists and scientists, re-imagining the inaugural moment. Ages pass and I re-emerge, my body scaring a treasure seeker sensing this land, in search of food where poisonous concrete tubers were interred, their galleries entangled with mine.

I decided the artwork's title, *Deep Field [Unclear Zine]* would contain a mistranslation of 'nuclear zone'; the artwork gathers evidence and fiction, facts and speculation, that condense and translate material journeys leading to and from the contemporary nuclear zone. It documents the bodies who generated radiological legacy, and attempted its care. My method troubles understanding of the nuclear zone by adding a fictional layer onto existing sites, communities and events.

My fieldwork documentation of disposal technologies and local knowledge was shared with poet Sam Illingworth, and zine illustrator Matt Girling. As artist-editor of the zine, I commissioned contributions that further developed the speculative-fabulation sphere, by responding to the conversation transcripts, tweets and photos gathered in Belgium. Data was treated to a mythological remix, working on the idea that documents of radioactive heritage sites might construct folklore to aid active remembrance. Through editorial discussion we produced speculative content addressing the postcolonial past, troubled present and potentially hazardous forward continuum of the matter and site, through drawings, poetry and photo-collage (fig.3.29.

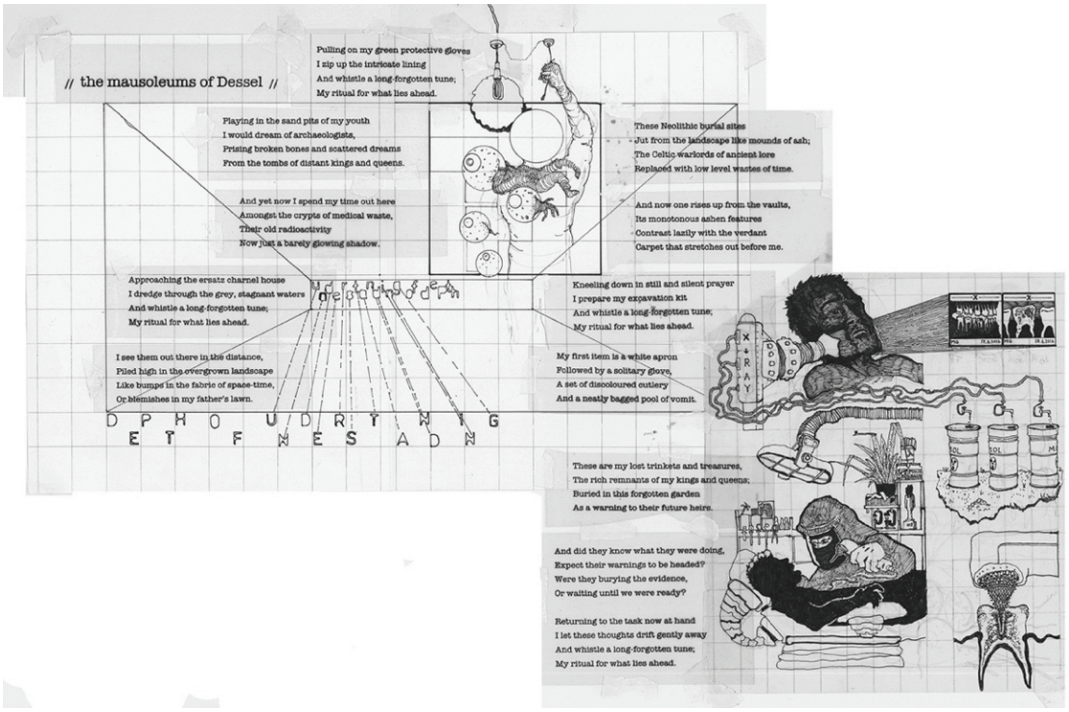

Figure 3.29 *Deep Field [Unclear Zine]* 2016 detail, collage with poem by Sam Illingworth and drawing by Matt Girling.

Illingworth produced a short poetry anthology for *Deep Field [Unclear Zine]*, including the following:

> While making deep excavations we found some quaint bronze jewellery,
> Then discovered something old hidden in this pocketful of geography;
> We were panicky, losing all our favourite letters at a hideous rate.
> They leaked to the surface faster than the wet, pounding night;
> We couldn't keep up as they calligraphically disappeared.
> And then we gulped, as all we knew to write was:
> Do not go into that area, then kept to this:
> Danger – keep out!
> Danger![148]

[148] Sam Illingworth, 'When Deep Geology Leaks Out', in Griffiths ed. *Deep Field [Unclear Zine],* (Umeå: Bildmuseet, 2016).

This poem opens with a pangram using all letters of the alphabet; line lengths gradually reduce as letters leak out of the writing. The poem references the possibility, described by Depaus, that human disturbance of thermal-stage supercontainers could release a dangerous flux of isotopes to migrate to the Earth's surface. Another motif developed by Illingworth is the fallibility of place-marking in nuclear landscapes, in which inscribed knowledge indicating material hazard is both semiotically problematic and may lose meaning over a 100,000-year radioactive period.

Content also fleshed out OncoMole as a character that narrates through the past, present and future timescales of the Atom Village, whose mutation, as a result of contact with radionuclides and futuristic technocrats, is inferred in poems and illustrations. OncoMole's expanded size, longevity, unclear vision, cyborg sense-ability and autonomy operates as a fictional guardian and witness, formed by material hazard. Figure 3.30 shows my layout for "From Our Own Correspondent", also from Illingworth's anthology; in ghazal form, the poem repeats the word "soil", to accentuate OncoMole's habitat as embodiment of the nuclear infrastructure's postcolonial material source, earlier resistant voices, and unclear Anthropogenic impact:

> Deep in the Congo alongside malicious soil,
> Mined for men in Manhattan with ambitious soil.
>
> A democratic route of being instructed,
> "These sites will be placed on your inauspicious soil."
>
> They actively remember to forget their past,
> Buried deep amongst this blurry, fictitious soil […]
>
> Amongst dirty poisoned clay Mol moves unguided,
> Searching for answers in this repetitious soil.[149]

[149] Sam Illingworth, "From Our Own Correspondent," in Dave Griffiths ed. *Deep Field [Unclear Zine]*, microfiche (Umeå: Bildmuseet, 2016).

Figure 3.30 *Deep Field [Unclear Zine]*, 2016, detail. "From Our Own Correspondent", showing Illingworth poem and Girling drawing.

In the zine drawings and poems, OncoMole witnesses human troubled relationship to matter. It narrates its sensing and tunnelling, lampoons colonial extractivism, admires and co-operates with technology. Characterised as a terrifying netherworld defender, OncoMole consumes waste and mutates through time, guarding repository galleries and surrounding terrain as a monstrous place-marker. We also designed a future golfing treasure-seeker who encounters OncoMole whilst transgressing its hazardous territory at various times (fig.3.31). A control centre was visualised (fig.3.32), which operates OncoMole to monitor radionuclide migration and deter intruders, satirising Sebeok's 'atomic priesthood' notion.

During my July visit, Belgium's annual Graspop music festival was being rigged in an adjacent field to the Atom Village – in figure 3.33 re-imagined as a future scenario with 100,000 punters, one for every year of half-life. Hooded, priestly nu-metal stars celebrate rites to OncoMole as a vengeful sentinel. Again, Sebeok's elite is imagined in its dystopian unfolding, where mass deception and fear triumphs over informed, intergenerational care of our geological waste.

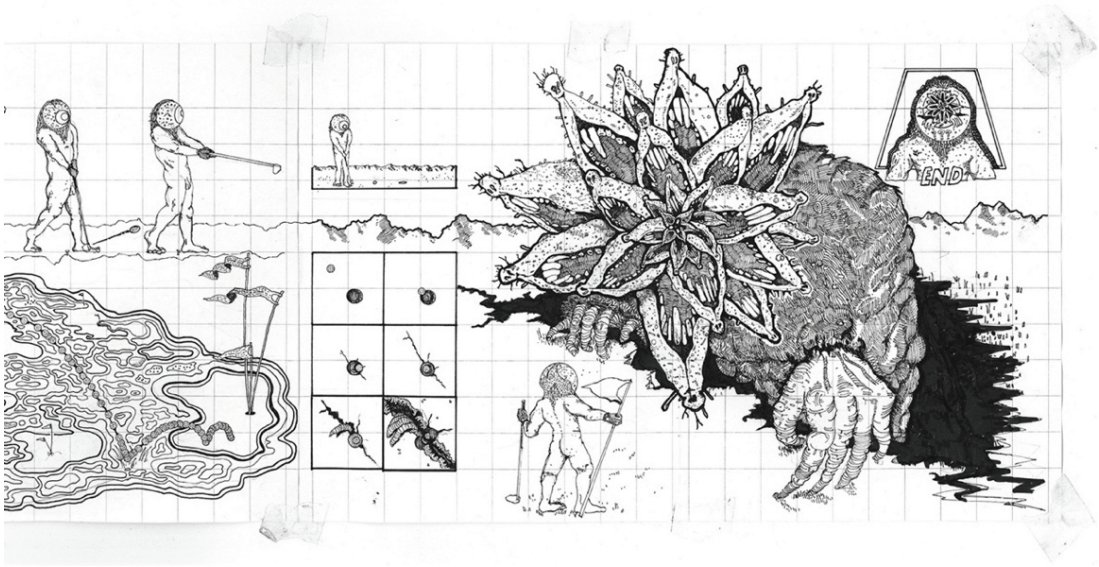

Figure 3.31 *Deep Field [Unclear Zine]* 2016, microfiche detail, OncoMole and far-future treasure-seeker drawing by Matt Girling.

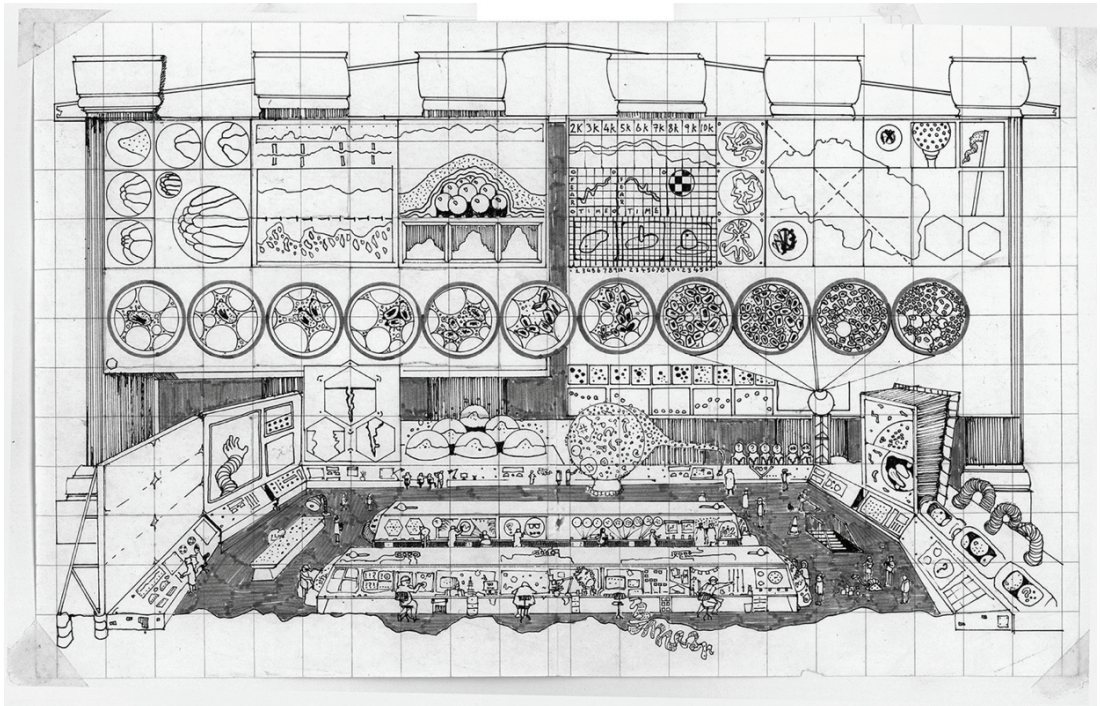

Figure 3.32 *Deep Field [Unclear Zine]* 2016, microfiche detail, drawing by Matt Girling.

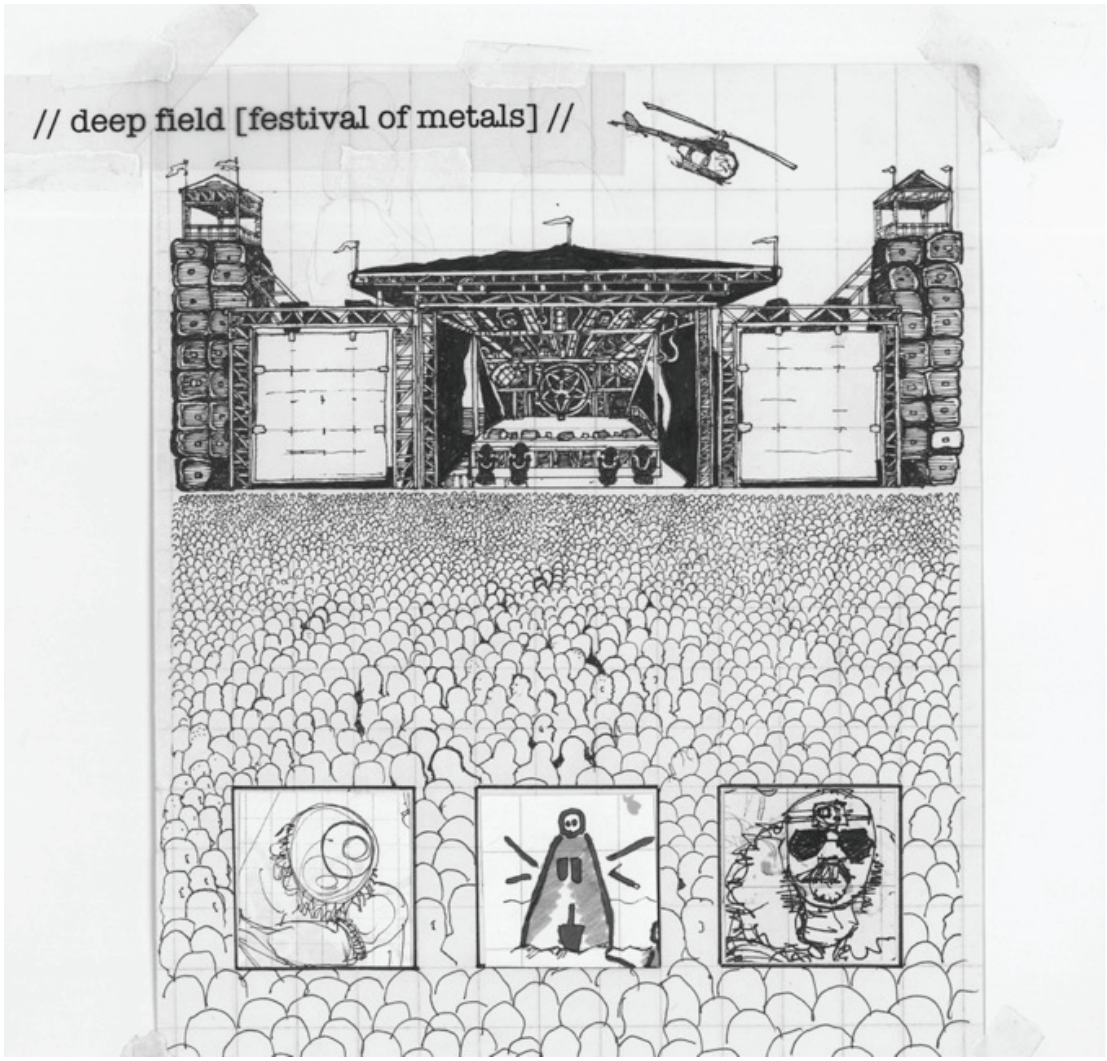

Figure 3.33 *Deep Field [Unclear Zine]*, 2016, detail showing drawing by Matt Girling imagining the atomic priesthood of OncoMole.

3.4.5 Making (and Remaking) the Microfilm Zine

Using a grid reference in place of page numbers to enable content location, the edited conversations, photographs, tweets, audio spectrograms, poetry and drawings were collaged onto A0 layout sheets. High-resolution scanning at a commercial microfilm bureau then reduced the zine to 35mm black-and-white microfilm strips. In the spirit of DIY zine-making, celluloid frames were cut-and-paste into an A6-size microfiche plate (fig. 3.34), complete with finger-prints, masking tape, hairs, glue and illegible sections; a haphazard method reflecting the uncertainty of future knowledge

management surrounding nuclear-waste disposal.

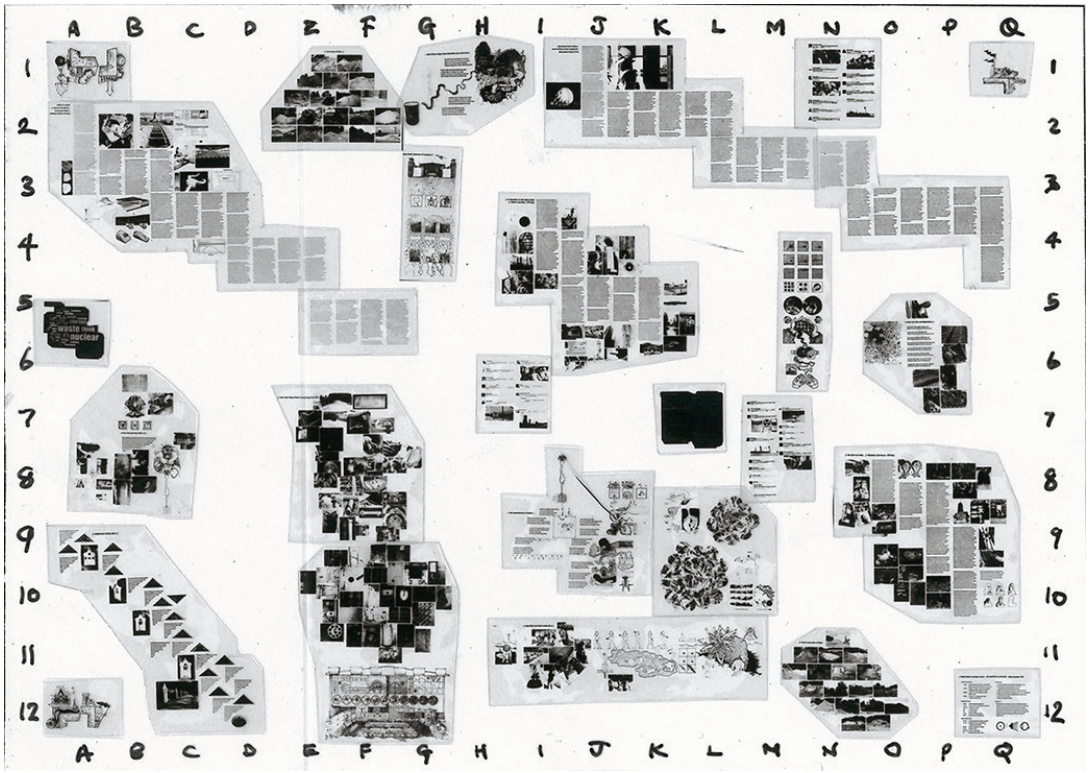

Figure 3.34 *Deep Field [Unclear Zine]* 2016, microfiche 10.5 x 14.8cm.

During exhibition transit and changeover of microfiche zines into different machines, several fragments of film became detached from the celluloid plate, and had to be repaired by myself or gallery staff. This incident further materialised the idea of the artwork and led to a key insight, expanded in section 3.4.6, that the microtopia document would always be incomplete, or subject to damage, tampering or erosion. The metaphor of OncoMole's underground counter-witnessing, in an always-incomplete, politicised story, is emphasised by staging *Deep Field [Unclear Zine]* in a vintage Minox portable microfiche reader (fig.3.35). This apparatus was standard East German Cold War issue. Its non-linear microfiche browser folds out from a briefcase, resonating with popular-cultural depictions of moles as transient, searching animals.

Figure 3.35 *Deep Field [Unclear Zine]* 2016, installation view at Bildmuseet.

3.4.6 Discussion and Insights

This final project significantly developed the research towards a model I now call microtopia, a method of witnessing and archiving materiality in troubled places. *Deep Field [Unclear Zine]* built on earlier insights from two artworks, outlined in 3.2 and 3.3, which were published prior to PhD enrolment. For this final research stage I aimed to develop a toolkit of fieldwork, studio collaboration and miniature aesthetics, inspired by modes of compression and expansion embodied by microfilm media, that would document multiple, overlapping spaces and times of troubled places. *Deep Field [Unclear Zine]* set out to gather stories from bodies, material and events of a nuclear zone, to express a subcultural agency, and contribute to investigating today's pressing cultural problem of how to warn far-future humans about radiological inheritance.

My answer to this was to collect fieldwork data as source for developing content in the studio. Heterotopia was found useful as a way to delve into a complex space and expand its narrative; also fruitful was the mix of science-fact and speculative-fabulation that channelled the diffractive methods of Haraway and Barad.

The artwork also exploited the characteristic textual compression and enlargement of analogue microforms and viewing apparatus, which is absent, or even absurd, in today's media consumption practices. Senses of enchantment and dissonance, experienced when peering into the strange celluloid miniature, would draw a reader into facing and interpreting the interwoven differences of official and unofficial stories.

An interesting insight was the usefulness of employing a non-human figure as a conceptual lens to focus the speculative-fabulative sphere of microtopia. The fictional agent OncoMole arose from a situated inquiry and is encountered at different timescales in the radiological space of Mol. Although it was a potent, antagonistic tool to investigate buried matter, or politicised issues of extraction, land and community, I do not think that OncoMole should always inhabit further microtopia artworks that narrate other troubled places. Further microtopia could think and speak through different non-human figures that are thought through the micropolitics and situated knowledge of each place, and the material characteristics of their medium; microfiche.

Three events during the *Perpetual Uncertainty* exhibition tour in 2016-18 triggered further insights about this artwork, and the practice of microtopia. Firstly, shipping damage and repair to the microfilm-zine surface accentuated the insecurity of the document, and further materialised the idea of the artwork leading to a realisation; that this archival cycle of making and re-making reflects wider uncertainty about future knowing of the genealogy of nuclearity through its transient, incomplete archives. This documentary artwork will make a future voyage into instability. It is a communique to future humans whose culture, language and technologies will inevitably evolve or regress. It is a malleable surface that might be preserved or adapted by future editors, in unknown contexts, with new or erased factual and speculative strands, according to prevailing discourse, or may erode altogether. It seems to hang in a strange tension: offering on the one hand a gesture of care to defend knowledge as a benefit to future kin, and on the other a disruption of its own archival potential by inhabiting an archaic celluloid medium that is cumbersome, fragile and prone to deletion, forgetfulness and ruination. Microtopia aesthetics could be seen as a flux, a process unfolding in future time and space. This unclear, brittle materiality of the microtopic artwork suggests that a similarly hazy and delicate epistemic future must be a factor for any other archived communique about troubled places, inscribed in any other digital or physical medium.

Secondly, in late 2016 archaeologist Cornelius Holtorf published a review of *Perpetual Uncertainty*, referring to my artwork as a missive to future generations:

> That message differs significantly from a sober factual record of nuclear waste […] Pasts, presents and futures are not simple and straightforward but complex. Who is to say that seemingly sub-cultural processes and events in the present will not be significant in the far future in order to make sense of what lies beneath? This work raises the intriguing question of what kind of record may be most interesting and revealing in the future about the nuclear waste we leave behind in the present […] Is there a message in the cumbersome and often frustrating experience of reading a microfiche? Are poetry, myth and folklore legitimate ways of engaging with future generations when the matter is radioactive? Should we communicate with the future in simple or complex ways? [150]

Holtorf's review supports my overall research imperative – that microtopia, employing the 500-year life of microfilm, could add to the plurality of tools used in nuclear records, knowledge and memory. For Holtorf the clunky interface seems to amplify the subcultural tone of the fabulation, which generates new folkloric means of remembrance through a diffractive fusing of testimony by arts, science and community. The review affirms that these forms of document have helped to materialise one idea of the artwork; that we should continue to design new mechanisms for archiving troubled places, to convey diverse, complex, entangled times and spaces.

Thirdly, as mentioned in section 3.4.4, one of the community groups ceased interacting with my fieldwork in mid-2016. I re-encountered the group whilst attending "Underground/Overground" in 2017 at Z33 House for Contemporary Art in Hasselt, a roundtable discussion about radiological remembrance, between artists and experts in radwaste technology. A member of the group regarded artistic responses to Belgian nuclearity as secondary to technical problem-solving around the infrastructure proposal; he found problematic the future-fictional aspect of my microfiche zine.[151] Alongside factual evidence and lived experience, it vocalises anxious fictions – reflecting gaps in public awareness of the global radiological legacy and potential safeguarding solutions. This is perhaps redolent of twentieth-century cultural responses that opposed rather than co-operated with the nuclear condition; and of a

[150] Cornelius Holtorf, "Towards Nuclear Cultural Studies," *Heritage Futures*, accessed 13 December 2016, from http:/www.heritage-futures.org/towards-nuclear-cultural-studies-2

[151] Authors notes, "Underground/Overground: Roundtable on Art and Radioactive Waste Disposal in Belgium" at Z33 House for Contemporary Art, Hasselt, Belgium, 19 November 2017.

twenty-first century cultural return to science scepticism or distrust. I realised that my diffractive approach to archival storytelling was antagonistic; rather than only testing how to signpost a dangerous site to future generations, the microfiche zine also alluded to the genealogy of how this material crisis came to be unfolding. Zines are provocative, and this one reminds that despite consensual socio-technical problem-solving there can still lurk a fear of deep-time material uncertainty. At the Z33 roundtable I observed other Belgian nuclear experts positively value the contribution that artists can voice in critically memorialising nuclear-material legacies.[152] This suggests that the microtopia model could be useful in highlighting complex, diverse knowledges troubled place which might be captured in, or removed from, ongoing engagement with archives and storytelling transmitted over many generations. I realised that in future microtopia projects I would need more robust ethnographic fieldwork methods, to strengthen care and engage more trust and pluralism, so that more local knowledge would be collected, and sensitively and equally imbricated within the factual and speculative narrative.

My experiments with microfiche archiving are indirectly referenced in the intergovernmental Nuclear Energy Agency's final report discussing knowledge preservation mechanisms within radwaste management:

> Visual arts are a powerful means for mediation with the public. They can help expand awareness of radioactive waste issues to a large public, and may act as an introduction or a pointer to more specific information [..] visual art may document changing perceptions of RWM [radioactive waste materials] and bring together academic research and professional knowledge from different disciplines and industrial sectors, engaging diverse parts of the population over many years […] Artists are also experimenting with durable sustainable formats such as distributed online networks, microfiche, land-art, gesso and stone carving.[153]

The practice of microtopia is therefore of value in producing further documentary media-artworks that add to existing forms of remembrance, that speak truth to power in contexts of material conflict or trauma.

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[152] Authors notes, "Underground/Overground."

[153] Schröder et al, "Preservation of Records, Knowledge and Memory (RK&M) Across Generations," 145.

Chapter Four

Conclusion: Developing Microtopia

4.1 Revisiting Research Aims and Objectives

This research sought to develop a new artistic practice of *microtopia* – a method of editing and publishing archive documents that might expose the often-disjointed known and hidden narratives of troubled places. It aimed to explore how multiple stories could be arranged and carried within microfiche, a publishing medium whose conventions are here rethought and remade as an apt means to reveal complex micropolitics and materiality to a reader browsing and peering into its miniaturising format. A secondary aim was to consider the questions that microtopia raises about the content, precarity and survival of such archives; how might memor of troubled places be robustly transmitted forward into an uncertain epistemic future of potential loss, erasure or illegibility? The key objectives were to combine official digital and artefactual evidence from three sites along with memories or reflections told by their real and imagined observers; and to experiment within the disorderly, fragile aesthetic forms afforded through combining studio collage with fragments of analogue microfilm, to realise three published artworks.

4.2 Key Findings

This research has established a new method for artistic know-how to interact with the archive – Foucault's border of time. An archive absorbs story-versions, and re-informs readers seeking to find or construct knowledge of complex events and affective encounters of the actors involved. A small-scale model of this process is found in microtopia. Manipulating the microfiche zine is a gesture of searching: up, down, side-to-side, glimpsing fragments. The reader gleans meaning from simple lens-

and-light-based apparatus and hand-eye haptics. Its non-linear format offers different temporalities on the same plane: the troubled past, burdened present and unclear future entangled in a place. It offers a method to speak about the complex eventsmatter we observe today in troubled places, and to investigate and record diverse, overlapping stories.

The three projects in this research portfolio differently communicate scientific, criminal and cultural inheritances. They speak to an international field of archival-art practice which samples and reconfigures such bodies of factual evidence to invent new fictional strata for injection into ongoing archival memories of places. In order to blend these spheres of fact and fabulation, this research has developed and tested a new method which connects Foucauldian and feminist New Materialist thinking tools to produce multimodal narrative experimentation. Microtopia takes its cue from processes of compression and decompression associated with the genealogy of microfilm apparatus both realised and imagined. It applies a diffractive lens to condensed, heterotopic places in order to open multiple narrative strands across different temporalities. It operates a disorderly formatting of content that veers from the traditional, ordered grids of its normative use in industry, state and library.

Data, recorded numerically or in conversations and photography, are then expanded through artistic processes such as poetic fabulation, comics illustration and collage, to produce microfilm artworks that critically and creatively archive discourses of troubled places. Microtopia is an artistic-archival method of observing how events and matter came to happen or arrive at a place, who or what forces placed this matter, and what it may become. Microtopia is a means to transmit the contemporary condition forward to a time in need of clues about the decisions and behaviours of a previous age. It compiles different situated knowledges that surround matter and events, and depicts the trouble – natural, cultural, real or imaginary – that accompanies the matter now and into its future. By overlapping stories of science-fact with a layer of speculative-fabulation, microtopia reconfigures factual evidence as other imaginary possibilities. This contributes an artistic voice to troubling the matter, and promotes the use of diverse and ongoing forms of storying, in a wide range of media and documents, so that remembrance of troubled places might continue through time.

Artworks arising from the archival turn often reflect anxiety about the reliability, completeness or survival of archives; the artworks in this thesis use their material form – fragile, obscure and alluring microfiche – to both acknowledge this sense of archival insecurity, and to advocate for new and diverse forms of

documentary remembrance within an expanded episteme. The gesture of sending analogue microfiche forward in time (it can survive 500 years if the celluloid is stored properly) supposes future readers across successive generations, who may receive narratives evolved through re-telling. Reprinting and remaking might erase legibility, via myriad mistranslations, losses and or politically motivated deletions. The microtopia is subject to linguistic and photo-chemical ruination just as digital and paper records face their own threats. It may or may not be copied into new forms and lifecycles, subject to micropolitical decisions to remember, or to erase. The research concludes that this epistemic uncertainty could be countered by dispersion of archives across numerous diverse and resilient forms of document; as microtopia, microfiche might reconfigure its twentieth-century role in orderly deep-time information storage, to join monuments, artefacts, and digital records in creative and antagonistic remembrance of troubled places.

4.3 Contribution to Knowledge

The insights and artefacts produced during this PhD research have contributed new knowledge to the field of contemporary art. I am singular in my field as an artist who has experimented extensively with microfilm and microfiche to repurpose a medium not usually associated with creativity. Building on an internationally scattered category of works on microfilm, microtopia has intervened in the field of critical documentary practice by reorganising the range of choices of media to add a new, reflexive format. This work has combined matters of fact, provocative fabrications and discursive translations embedded in past and ongoing places, within a new approach to the archival turn that also raises questions of medial ruination.

During public exhibitions at Bildmuseet and Malmö Konstmuseum (Sweden), Z33 House for Contemporary Art (Belgium), Wiener Library and Meter Gallery (UK), and Muzeum Treblinka (Poland), the body of artworks has demonstrated a new modality for documentary art's pedagogic and affective purpose. I see the works as having the potential to reacquaint older audience members with pre-digital informatics familiar in their earlier working lives, and introduce younger people to a browsing gesture that is strange, yet oddly similar to their culturally normative screen devices. Unlike other seamless, digital, invisible gallery formats for presenting documents, microtopia's cumbersome, outdated, fragile machinery and analogue, glued surface *is* the document. Like the subcultural cut-and-paste zine, it calls its own constructedness

to attention, having the potential to encourage the range of viewers to reflect on: archival incoherence, manipulation and mortality; the risks to epistemic plurality present in today's digitally networked information; and the need to continually trouble the means of production of remembrance.

Microtopia has also contributed outside the art world to sectors associated with memory and remembrance. The research has contributed to the international records, knowledge and memory (RK&M) field discussing long-term remembrance solutions to manage dangerous radiological legacies. My research was referred to in a 2019 OECD report as amongst a range of experimental, durable artistic forms that may powerfully mediate public awareness and changing perceptions of deep-time nuclear hazards through engaged work between academia, industry and diverse populations.[154] *Deep Field [Unclear Zine]* featured in a roundtable hosted at Z33 as part of session on intergenerational cultural relay of radiological legacy. Similarly, the possible future significance of subcultural processes, as embodied in my microfiche zne, was noted in the blog of Heritage Futures, an AHRC-funded investigation of innovation and diversity in a conservation sector faced with an uncertain "deep future."[155] In the field of Holocaust archaeology, microtopia contributed a new, interactive way of allowing remote audiences to explore trench finds held at consecrated sites, and to access hard-to-decipher LiDAR and GPR data, which increases knowledge of techniques to investigate the material culture of historic genocide. Physically sifting the compressed contents of the microfiche browser tray gave viewers "a chance to access the rich textures of the findings while performing the role of finding, and giving meaning to data and information – much like an archaeologist."[156] These citations prove the usefulness of my transversal-materialist methodology to troubled places. Through contact with fields of heritage practice I exchanged learning and knowledge towards ongoing care-taking in specific sites of contemporary critical matter, and demonstrated an additional platform to further pluralise the display and remembrance of contentious events and sites.

[154] Schröder et al, "Preservation of Records, Knowledge and Memory (RK&M) Across Generations."
[155] Holtorf, "Towards Nuclear Cultural Studies,"
[156] Sturdy Colls and Branthwaite, "'This is Proof?" 446.

4.4 Further Research: Microtopia as Social Art Method

Further research should develop the epistemic capacity of microtopia, to achieve a more plural discourse in its story-making and archival activism. As noted in chapter 3.4 one of my final project's aims – to gather a wide range of narratives from community members – was not achieved, and this artwork was dominated by voices of scientists, community activists, and artists. What of the non-expert, or non-privileged, who are likely to express further difference in their version of material affects? There is certainly room for a multitude of voices due to the miniaturising capability of the medium; but there is an ethnographic complexity in compiling diverse voices.

The practice of microtopia is a model of witnessing that can be conducted through alliances – for instance of artists, community members, scientists, scholars, cultural heritage specialists, archivists. This might occur through facilitating horizontal, inclusive, intergenerational, co-creative collaboration, in ethically robust public-art settings. Teams might intra-act as storytellers or place-writers, in fusing strata of official and unofficial response to the uncertainties of places, or enacting repair through addressing lingering traces of past conflict. A socially produced microtopia could enrich the archived discourse of dissent, anxiety, hope and care, towards a plural and long-lasting remembrance of troubled places. It might enable far greater diversity of voices to experience and influence a social-artistic encounter that is both convivial and critical.[157]

Such alliances might also co-create a conceptual figure, such as the fantastic myth of OncoMole, as a tool in staying with the trouble or exorcising ghostly matters. Decided in response to the knowledge and place in which microtopia is produced, such a conceptual non-human agency can channel imaginative diffractive observation, that witnesses matter, apparatus and formulations of power. This figure would guide co-creators and readers through infrastructures, land, affects, material movement, displacement, compressions and blockages, expansions and flows of various and as-yet-unknowable kinds.

There is further scope for microtopia to critically explore places of technological mediation of human and more-than-human life. Microtopic zines might investigate and add to documentation of a range of troubling events arising from industrial globalisation, social violence, and land use. Microtopia might therefore

[157] Dave Beech, "Don't Look Now! Art After the Viewer and Beyond Participation," in *Searching for Art's New Publics*, ed. Jeni Walwin (Bristol: Intellect, 2010) 24-28.

become an activist tool, an example of the "usological turn" in art as a mode of operation with effects in the real.[158] Microtopia might become a method operated within a modality of care in response to emergencies, or to problems of organising matter, that might assist in producing different kinds of futures.

[158] Stephen Wright, *Towards a Lexicon of Usership* (Eindhoven: Van Abbemuseum, 2013).

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Appendix One: Research Ethics Documents

The following pages contain the information sheet and consent form used prior to recording conversations during fieldwork in Belgium for *Deep Field [Unclear Zine]* in May-July 2016.

MANCHESTER SCHOOL OF ART

Manchester Metropolitan University

Deep Field [Unclear Zine] - information sheet

I would like to invite you to take part in a research study. Before deciding you need to understand why the research is being done and what it will involve for you. Please take time to read the following information carefully. Ask questions if anything you read is not clear or would like more information. Take time to decide whether or not to take part.

What is the research project about?

I am producing a new artwork, *Deep Field [Unclear Zine]*. This will be produced as a short fanzine-style publication using archival 35mm microfilm. Microfilm has a 500-year lifespan. Through using this medium I hope to offer a different perspective on the problem of archiving knowledge about spent nuclear fuel repositories. I want to capture some of the decision-making consensus and conflict that has led to this point. The artwork will highlight contemporary debates surrounding secure remembrance (or forgetting) of these sites, which face threats of environmental, linguistic and political change.

Through this artwork I am attempting to communicate the contemporary repository to far-future readers. Ultimately it will act as a marker, a folklore message to future citizens about what happened here, and what lies underground. In theory, this microfilm zine could be re-translated and reproduced many times through deep-time. But there would be a decision at each 500-year cycle: to remember, or to delete, this archived knowledge.

Why have I been invited?

I am keen to include a range of voices from the citizens groups, government agencies and scientists who monitor, consult with and work for SCK in the planning of underground spent nuclear fuel storage. As I see it, the community and SCK co-exist closely, and I am seeking active participation from both in shaping this artwork.

How are you producing this artwork?

I will be photographing around Mol & Dessel during visits in May and July. I am aiming to understand the everyday life, regional ecology and geology, tourism and leisure. I want to understand the non-nuclear aspects of life in 2016 in the community and its environment. During both these trips I aim to record informal interviews with a range of community members. These will be transcribed and edited as content for the publication, along with images of participants where permitted. I also want to use archive materials -such as data, photographs and news stories - that have been previously produced by the citizens groups. I will gather natural materials from the Mol and Dessel environment. I have also invited a Manchester-based writer to respond to the images, text and data that I collect with new poems. Dr Sam Illingworth is a physicist who uses traditional poetic forms to communicate contemporary science research and issues.

All of the images, text and data and archive material I gather will be cut & pasted together in a collaged film negative. This will be printed into an edition of microfilms.

Why are you making the artwork in this way?

I'm interested in how knowledge of the repository might travel forward in time - as an archival warning to future generations. The interviews, images, poems and archived data that I source will provide valuable local perspectives that I can use as raw material to imaginatively depict issues surrounding repositories. Microfilm is particularly useful for compressing large amounts of data and text into small sizes.

What kind of questions might I be asked?

- What is the community like now? how do they live? what do they want?
- What is your role and interest in the decision-making or construction?
- Who is building this repository? what are their stories?
- What are the concerns of the community about deep burial of spent nuclear fuel?
- How would you like the waste to be protected?
- How should the community have a future role as overground guardians of the site and the knowledge?
- What happens if the community becomes unstable, or declines?
- What kinds of future changes do you fear the most?
- What will people here be like in the future?
- What would you like to say or show on this microfilm?
- Should my artwork be allowed to survive, or perish in order to protect the secret?

Where will the artwork be displayed?

This artwork is being produced for *Perpetual Uncertainty*, an art exhibition at Bildmuseet, Umea, Sweden during September 2016-January 2017, curated by Ele Carpenter (Arts Catalyst, London). Copies of the microfilm zine will also be deposited in library collections across Europe, including the North West Film Archive in Manchester. I am interested in your thoughts and suggestions about where copies of the publication should be stored.

How will I be safeguarded?

Along with this information sheet I will ask you to sign a consent form. This will provide full transparency about my aims, methods and what I intend to do with my findings. There would be no pressure to record an interview. You may instead speak informally off the record. I would respect individuals right to security by ensuring anonymity where requested, and will ask you to confirm your statements will not breach security protocols and endanger yourself, others or the natural environment. You would be able to request a copy of your transcript and, if you decide, can withdraw any contribution at any time before final production of the artwork on 1 September 2016.

How will my contribution be formally acknowledged?

I will ask you to permit free use of your contribution for non-commercial usage in this artwork, and its potential reproduction by future humans in the far-future. All contributions would be acknowledged in the microfilm publication credits, and no payment or gift will be provided to participants.

Who are you?

My name is Dave Griffiths, an artist based in Manchester, UK. I am a Senior Lecturer in Interactive Arts, and carry out research at Manchester School of Art, who have funded this project. I can be contacted by email at dave.griffiths@mmu.ac.uk, and by phone on +447731831233. You can read more about my work at www.davegriffiths.info, and can follow me on Twitter @dgrifff.

THANK YOU!

If you have a concern about the conduct of this study, please contact me, and I will do my best to answer your questions. If you remain unhappy, or wish to complain formally you can do this by contacting Manchester School of Arts Head of Ethics, Professor Jim Aulich, j.aulich@mmu.ac.uk.

MANCHESTER SCHOOL OF ART

Manchester Metropolitan University

Consent form

Research project: *Deep Field [Unclear Zine]*

Name of Researcher: Dave Griffiths

Name of participant:

Role of participant:

Email of participant:

Participant ID code:

YES / NO

- ☐☐ I confirm I have read the information sheet dated 23 May 2016, have had the opportunity to ask questions about the project, and had these answered satisfactorily
- ☐☐ I agree my interview will be sound-recorded and transcripts will be edited as content for publication
- ☐☐ I give permission to be photographed for inclusion in the publication
- ☐☐ I understand that at my request copies of interview transcript and/or photographs can be made available
- ☐☐ I understand that my contribution will be acknowledged in the printed artwork
- ☐☐ I wish to remain anonymous [pseudonym will be used]
- ☐☐ I confirm that verbal statements or archive material I provide will not breach security protocols and endanger people or the natural environment, now or in the future
- ☐☐ I understand that my participation is voluntary, and no payment or gift will be provided to me
- ☐☐ I permit the non-commercial use of my contribution (verbal, archive material) in the creation of an artwork for public exhibition and access through libraries and other archives
- ☐☐ I understand that my contribution to this microfilm-based artwork may be re-translated and reproduced with errors by unknown future humans.
- ☐☐ I understand I am free to withdraw consent verbally or in writing at any time without giving any reason
- ☐☐ I agree to take part in the above research project.

Name of participant	Date	Signature
Name of Researcher	Date	Signature

To be signed and dated in presence of the participant. Once this has been signed, the participant will receive a copy of their signed and dated consent form and information sheet by email.