

Article

The Times of Caring in a Nuclear World: Sculpture, Contamination and Stillness

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Abstract: Care takes time. Caring, whether with, for, or about a living being or entity that is more-than-human, disrupts expectations of how a linear, human time should progress. To practice care for the contaminated, the lands, waters, and animate life altered by human industry, is to extend that indeterminacy into distant, deeper time. Aesthetic representation of the affective and ethical dimensions of care, in this extreme, offers an experience that can transfer the arguments about nuclear contamination into more nuanced and sensed responses and contributes to current thinking about care in the arts worlds. I was commissioned to make a sculpture exhibition in 2020 as part of an anthropological study into the future of the Sellafield nuclear site in West Cumbria, UK. The exhibition, 'x = 2140. In the coming 120 years, how can humans decide to dismantle, remember and repair the lands called *Sellafield?*', consisted of three sculptural 'fonts' which engaged with ideas of knowledge production, nuclear technologies, and the affective dimensions of care about/for/with the contaminated lands and waters. This article presents my intentions for the sculptures in their context of a nuclear-dependent locale: to engage with the experience of nuclear futures without adversarial positioning; to explore the agential qualities of the more-than-human; and to create a stillness expressive of the relationality of the human and the contaminated through which one could fathom what care might feel like. These intentions are alongside theories of time, aesthetics, and care across disciplines: care and relational ethics, science and technology studies, and nuclear culture.



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1. Introduction

Care takes time. Caring with another might take both out of the flux of the everyday and into a realm that feels timeless. To care may be like a practice with indeterminate ends. The acts of caring might not be reciprocated equally, but an exchange is being made. Attention and tenderness might be given. To care, in situations of its absence, may be an act of resistance. Caring with, or for, or about a living being or entity that is more-than-human disrupts expectations of how human time should progress.¹ The human must adjust to other times. To care for the contaminated, the lands, waters, and animate life altered by human nuclear industries extends this adjustment into distant, deep time.

This article presents my exhibition of three sculptures through the lenses of time and of care. The exhibition, 'x = 2140. In the coming 120 years, how can humans decide to dismantle, remember and repair the lands called *Sellafield?*', was commissioned by the social anthropologist Petra Tjitske Kalshoven of the Beam nuclear and social research network at The University of Manchester (Heim 2020). The commission was part of the Beam project, 'Sellafield Site Futures' (Kalshoven and Taylor 2020), on the decommissioning of the site which questioned how its future might be fashioned after most of the nuclear materials were stored or buried and the buildings and industrial activity removed.² The exhibition was to respond to three semi-public workshops in West Cumbria that brought together nuclear scientists from The University of Manchester and from Sellafield, along with engineers, managers, artists, philosophers, anti-nuclear activists, and social scientists.³

Two strands from those workshops informed the exhibition. First was that all the usual procedures for decision-making are inadequate now and over the timescales that nuclear decommissioning involves, whether those procedures are based on scientific data, on cost-benefit analyses, or on political or corporate interests. Even the ethical deliberations of philosophy and the most inclusive and democratic of public consultations are likely to fall short in some way as unpredictable conditions and events take hold over time. Multiple forms of knowledge will be necessary to expand the possibilities for adequate decisions. These could include those of human aesthetic experience as well as the knowledges of the more-than-human.

The second workshop strand was learning that it will be impossible to remove the radioactive materials in some areas. Beneath the concrete, under the rubble, in the sediments, soils, and watercourses are radioactive residues and wastes that cannot be uncovered or moved, that cannot be stored away from human contact, that will continue to migrate, to become 'fugitive' over time.⁴ Whatever technological forms of storage and sequestration may be devised, whatever remediations may be attempted, these will never be complete; unpredictability and indeterminacy will continue, in proximity to the human. New forms of how to live with these residues will have to be figured.

'x = 2140', the exhibition, was intended to provoke reflections on the production of nuclear knowledge and an affective response about the contaminants that will be migrating through the sediments and waters. I used the device of a font for the three sculptures as representative of an alternative form of knowledge production and decision-making, one not constrained by industrial time. Two of the sculptures were structured by representations of scientific and technological knowledge. The third intended to show a different kind of knowledge through a more archaic structure holding and exposing a layer of the sediments themselves. In the making of that piece, a somatic sense resembling care towards the sediments emerged which changed my ideas of what the sculpture was expressing and my interpretations of it.

The premises underlying this article are that a work of art could offer a moment which might arrest the usual sense of time and allow for an event, or altered movement, or phase of undecidability in which perceptions may change. Too, that aesthetic practices are part of the processes which maintain or undermine different "distributions of the forms that structure common experience and visibility" (Rancière 2011, p. 10). Bringing the production and maintenance of knowledge into question, introducing contaminated material into the sensible realm, and introducing the possibilities of care into the nuclear worlds were the alterations in the structures of experience intended by the sculptures. But specific to nuclear locations, such as that of West Cumbria, is a familiarity with the presence of nuclear materials. The distribution was not so much to include the nuclear as if in a context where it was not a part as it was to introduce new ways of perceiving and considering that presence while acknowledging and investigating the indeterminacy between the extremes of potential hazards and the ordinary functions of everyday life that are lived with in nuclear contexts.

"With the concept of 'life' you can understand very different, even opposed things: life is the deployment of a power, whether biological, historical or ontological, but it is also inversely, ordinary life, in opposition to the exceptional character of political action, the work of art, etc. To speak in terms of the distribution of the sensible is to consider a certain knotting together, a certain distribution of these different 'lives'". (Rancière 2011, p. 14)

Nuclear things are not always exceptional, nor always banal (Hecht 2012). The existential consequences of human error and the ordinary configurations of the political and scientific production of knowledge knot together in ambiguous and shifting ways in everyday life. An exceptional dimension of the work of art is to make available the varied qualities of this knotting, the chance to view it in unfamiliar ways, such as ethically, sensually, and emotively.

Care for or with contaminated entities that pose a threat to the continuance of life is hard to fathom. Conceptually, care may offer a critical device to disclose absences in current thinking about the meanings of wastes and how to live with them. To propose that care for toxic wastes can be brought into the political is an argument beginning to be made academically, but how to do this remains open. A work of art may be one way, not to set guidance, but to bring into play the forms of experience—*affective, tangible, reasoned*—that may broaden the understanding needed. The gallery offers contemplation and review. The qualities of aesthetic imagination, of exploring, trying out new perspectives, seeing oneself in new relations to the object can bring about new knowledge (Brady 2003). Too, art allows for contradiction, disturbance, discomfort, and a refusal for absolute resolution, which may reconfigure the sensible.

This article describes the exhibition and its contexts. In the sections that follow, to define the terms used, I set out the concepts of time by Elizabeth Grosz that inform my practices (Grosz 2004, 2008, 2011). Grosz draws together the geological, the human, and the aesthetic, which are relevant for this special issue. I then outline ideas about human care, with reference to recent inter-disciplinary writing that introduces care as a potential approach to toxic and nuclear wastes. Focusing on the exhibition itself, I set out its geographical and industrial contexts before a description of the sculptures. My intentions for the sculptures to convey a stillness, an ‘*untimeliness*’, align with the affective qualities of “*abyssal intimacy*” described by Astrid Schrader as a way that aesthetic experience may bring nuclear matter into the purview of care, into a possible caring-about, without defining the actions it might entail (Schrader 2015). Finally, I contextualise the exhibition as relating both to the aesthetic field of nuclear culture and to works that engage with human care.

2. Working Definitions: Time and Care

‘Time’ as a concept was not thematised in the exhibition but did underscore it. Multiple conceptions of time operate across the civil–military nuclear industries. Nuclear realms call up the deep time of the hundreds of thousands of years for radioactive waste to decay. Nuclear sciences measure and test materials and processes in timescales imperceptibly fast, such as the appearance and disappearance of sub-atomic energies and particles; and unmeasurably long, such as the testing of materials and metals in an algorithm of time to determine their effectiveness against radiation exposures over thousands of years. The rationales for the continuance of the civil–military nuclear industries and institutions are based on notions of linear, flat, calculable time. The future that is projected will unfold in ways predictable from the present. Or if not predictable, if a miscalculation produces adverse results, the onward, inevitable development of technologies will be able to compensate for any deviation (Kasperski and Storm 2020).

The experience of art can be in contradistinction to those times, even as differing and intertwining experiences of time may be made perceptible in a work. Philosopher Elizabeth Grosz’s ontology of time allows for the experience of living beings, for the forces of material and geological change, and for the potential for artistic and political efforts to create a future (Grosz 2004). Time is an evanescence, neither purely abstract nor purely present, a continuous becoming. “We can think it only when we are jarred out of our immersion in its continuity, when something untimely disrupts our expectations . . . We can think it only in passing moments, through ruptures, nicks, cuts, in instances of dislocation . . . ” (Grosz 2004, p. 5). These untimely ruptures flow from causal connections in the past, but generate unpredictability and “ . . . unforeseeable transformation in the present and future. Events erupt onto the systems which aim to contain them, inciting change, upheaval, and asystemicity into their order” (Grosz 2004, p. 8).

For Grosz, aesthetic practice is inherent in life itself, in its excesses, exuberance, and in the futurity of sexual selection. Art involves the forces of the earth, the geological and metabolic, the forces with which the human must adapt to survive. Art is an opening up between the corporeal, the living, and the incorporeal, “the forces beyond the control of

life that animate and extend life beyond itself" (Grosz 2008, p. 23). Those forces enable the "productive explosion of the arts from the provocations posed by the forces of the earth with the forces of living bodies . . . [which extract from chaos something] not so much useful as intensifying, a performance, a refrain, an organisation of colour or movement that eventually, transformed, enables and induces art" (Grosz 2008, pp. 2–3). "[Art] teaches us how to live with imponderable and unmasterable forces and to make them sources of affirmation" (Grosz 2011, p. 190).

Grosz's ontology is supportive for this article in its drawing together of the long durational scale of evolutionary change with the immediacy and intensities of an art event. But Grosz's ontology does not propose to address the ethical dimensions of the fracturing of the present and the future caused by exposure to nuclear wastes and residues, deferring that to the potential of the arts and political movements themselves to create a possible event, an irruption in the order of systems.

'Care' is normative, descriptive of a moral good to be desired or attained through differing kinds of relations between humans and through social and collective configurations, with the concept extending to include human relations with other living beings and environments.⁵ Here, I offer a working outline for the concept and how it is entering the discourses on toxic wastes; what it means in an arts context follows in the sections below.

How care is manifested varies considerably, depending on the contexts through which needs are made apparent; on the physical and temporal distance between those engaged in a caring relation; on how it may be mediated through social, medical, and technological provision; and on whether there can be the direct connection of human touch, sight, and movement. Care is guided by normative principles, but is not a pre-defined set of rules. Rather, it is "a fluid and adaptable ethico-political set of practices and potentialities . . . [that] can act as a grammar to enunciate problems and make connections deemed irrelevant by expert apparatuses" (Tironi and Rodríguez-Giralta 2017, p. 89).

Distinctions are drawn between kinds of caring. Caring 'about' and 'for' are likened to compassionate or sympathetic associations at a distance, not as an active engagement; they can be seen as transitory opinions. Conversely, they can refer to an initial stage of beginning to care or to a caring within the limitations of one's time and abilities. Caring 'for' another may also imply a particular form of relation, one of providing the means to address the needs of those in receipt of care. To care 'with' implies a relationality more complex, acknowledging the reciprocities and the responsibilities involved. Care theories extend across disciplines and practices, each modifying its meaning, how it might be practiced, and how 'good' care might be judged. The questions addressed include: how does care alter over time? What are the power relations between the people with whom caring practices are made? How might caring for another, itself, be an act of politicised resistance in response to background violence and an absence of care? Too, this current interest in care may be superficial, derived from a need to feel comforted, benevolent; care is in danger of being hollowed-out, self-centred, and commercialised.

A definition of care in 1993 from political science and women's studies by Joan Tronto and Berenice Fischer continues to be a valid beginning: "On the most general level, we suggest that caring be viewed as a species activity that includes everything that we do to maintain, continue, and repair our 'world' so that we can live in it as well as possible" (Tronto 1993, p. 103). Tronto's original elements of care were attentiveness, responsibility, competence, and responsiveness, to which was added plurality, communication, trust, respect, and solidarity as caring-with (Tronto 2013).

Maria Puig de la Bellacasa, who theorises care from the perspectives of science and technology studies, extends Tronto's definition to reinforce a speculative ethics for a future caring with the more-than-human (Puig de la Bellacasa 2017). Puig de la Bellacasa more firmly situates care as not only a human activity, but as being within the relational contexts of environments:

"[Care includes] *everything that we do* to maintain, continue and repair "our world" so that we can live in it as well as possible. That world includes our bodies, our

selves, and our environment, *all of which we seek to interweave in a complex, life-sustaining web*". (Puig de la Bellacasa 2017, p. 3. *emphasis in original*)

To care "signifies an affective state, a material vital doing, and an ethico-political obligation" (Puig de la Bellacasa 2011, p. 89). That is, it is ethical, affective, and practiced.

Puig de la Bellacasa and others have developed ideas of care with the more-than-human as a turn away from human exceptionalism; agency is distributed throughout the inter-related worlds of culture and nature. Anthropologists Vincent Duclos and Tomás Sánchez Criado write: "What if care had never been just human, originating from the imaginary of the hearth, with its connotations of warmth, dialogue, and attentiveness? What would it mean to approach care as an experimentation with effects, systems, and things that not only are difficult to assimilate to the human, but that may also undermine the possibility of speaking of the human as a discrete category?" (Duclos and Criado 2019, pp. 4–5).

The diverse fields of care are underscored by concepts of justice, equality, and solidarity, with a view of ethics as relational and contingent. Relational ethics hold that life and reality are composed of relations; the relational precedes, sets the possibilities for, the individual being. The ethical is experienced through an interdependence with others, including the more-than-human.

In contrast, ethical thinking from within nuclear industrial complexes is characterised by consequentialist logics, assessing the measured consequences of actions against a set of rules or limits. These ethics support the needs of nuclear institutions. Ethicist of technology, Behnam Taebi, finds that consequentialism cannot adequately grasp the long duration and the full relational consequences of the industries (Taebi and Roeser 2015).

A relational ethic offers resistance to that consequentialism. However, relationality itself runs into difficulty when considering nuclear waste. The other with whom one might share relations cannot be seen, sensed, or touched; the value of that unseen other is known only through technological mediations (Yusoff 2013). Relationality requires, as well, consideration of the internal qualities of relations, the not-visible and not-sensed, as they intertwine with the material and corporeal (Yusoff 2013).

This complicates the question of how to care for, or with, or about nuclear wastes. Modes of human caring involve touch, movement, time together, responsiveness to variations in capabilities, and mutual, if unequal, receptivity to emotional and physical energies. Toxic materials get buried, isolated, dumped in depositories, watercourses, and landfills in order to sequester them from the human, to make them disappear. Some filter through living bodies. Some, such as nuclear wastes, are classified, sorted, and stored out of sight, while remembering what it is and where it is becomes an existential task (Kasperski and Storm 2020). The materials, active if not alive, will leach, permeate, migrate, alter in composition, and do the unpredictable and unthinkable over the decades or hundreds of thousands of years. Waste "creeps into the future" (Gabrys 2009, p. 667).⁶

Ideas of care are developing in relation to toxic wastes. Sociologist Sebastian Ureta offers three practical strands: the maintenance and repair needed to keep the infrastructures working through which waste is produced, mobilized, and stored; the recognition that waste is not going away and so needs human knowledge and curiosity in regarding the needs of an other, while refusing to objectify the materials; and, third, to see caring as a kind of power, one that demands attention be given to those—human and other—who can be harmed by the assemblage that is waste. This means unsettling and undoing the existing practices of managing waste which are necessary and which can replicate the systems and logics that created the wastes (Ureta 2016, p. 5).

More specifically addressing nuclear wastes, Kasperski and Storm find:

"... that care is a practice that resides in the historical time of living beings, and to merge it with a view towards eternity—that is, to propose the perspective of eternal care—is to accentuate an ongoing interdependence of historical and geological temporalities. To insist on caring for waste as a political practice, a manifold of temporal understandings and their implications are key. Nuclear

waste is simultaneously toxic legacy and future fantasy, claiming present power relations and uneven geographies, as well as pointing to the generations and species that will inherit this anthropogenic wound or scar on their bodies and landscapes". (Kasperski and Storm 2020, p. 705)

The work of bio-remediation and that towards the uncovering of unrecorded mistakes of the past in order to ensure that decommissioning happens without explosive harm indicate, to me, more than a professional concern. Rather, they reflect a responsiveness with the materials and the constructions that hold them; a recognition of the interdependencies of the living and the non-living; and the long duration of technological care. What Kasperski and Storm are describing is not a plan of action, not a definition of care, but a change in perception and political practices that may alter how wastes are understood. To introduce the idea of 'care' can jar with the usual nuclear discourses. It describes a territory not yet mapped, one of urgency and multiple temporalities, one of different distributions of complex relations to which the arts may bring substance.

3. 'x = 2140' in Its Places: The Geography, the Industry

'Sellafield' refers to the nuclear industrial site in West Cumbria, England; to Sellafield Ltd., the operating company; and, conventionally, to both the geographical area historically named Sellafield and the agglomeration of nuclear-based military, governmental, industrial, technological, and scientific institutions that operate in the area. The site lies next to the Irish Sea where the land slopes down from the Lake District fells (Figure 1).



Figure 1. Sellafield site, West Cumbria, England, UK. Image by Wallace Heim.

This civil–military nuclear complex has adapted to changing UK and global nuclear and economic forces since its opening in 1947 as the Windscale Piles for the production of weapons-grade plutonium. The 3-day fire at the reactor building Windscale No. 1 Pile in October 1957 continues to be an exemplar of a nuclear failure, of the legends of the heroism of the workers and scientists, and of the uncontained spread of nuclear material. Too, it instantiated public resistance to military-nuclear production, which continues. The world's first commercial-sized nuclear power station, Calder Hall, opened in 1956, generating electricity until its closure in 2003.

Sellafield's subsequent functions have included the re-processing of spent nuclear fuels to isolate plutonium and uranium for other uses and the storage of plutonium and other nuclear materials transported from domestic and global sources. There is more plutonium stored at Sellafield than anywhere else on earth.⁷ Sellafield is subject to sanctions for discharges of contaminated materials; the historical discharges of contaminated materials into the sea and across land continue to be contentious.

Reprocessing is scheduled to end in 2022 as Sellafield turns to full-time decommissioning. The decommissioning refers only to the fenced area of the industrial site, around two square miles. This will involve the removal, disposal, and storage of the buildings and nuclear materials and potentially the remediation of the land towards a more ecologically benign condition. The site could be fashioned into an 'ecological', or 'green', nuclear heritage destination. All these plans assume a future predicated on the ability of science and technologies to respond adequately to the upheavals of war, economic and political change, and the coming climatic instabilities.

Sellafield provides financial stability for much of the local population and a reliable tax base in an area that would otherwise economically wither. There are endemic class hierarchies, economic and educational imbalances, multiple inequalities and deprivations, and little ethnic or racial diversity in the area. Sellafield directly funds cultural, educational, and social services.

The sculpture commission was funded by the UK Energy Research Centre and was to be completed within 4 months. The exhibition was shown at the Florence Arts Centre in Egremont, a few miles from Sellafield. It is a community arts centre which, to my understanding, is not directly funded by Sellafield Ltd. The audience for this exhibition could be expected to be participants from the workshops, people involved in the civil-military nuclear industries, academics, scientists, and the local arts community.

The commission was directed towards a specific situation, but I did not want the sculptures subsumed into a direct politicisation of the civil-military nuclear industries. The Sellafield situation does not cleave neatly into factions. Complicity, security, resistance, and intractability move through the industrial and social contexts. Nor did I want to fetishize or reify nuclear matter itself, particularly for an audience that works and lives with it. Formally, I did not want to involve direct public engagement. I did not want the artwork to function as a means of soliciting opinions from the public through participatory or consultative methods. It would not be possible to give assurances that those ideas would be credited by Sellafield Ltd. and the Nuclear Decommissioning Authority (NDA), and it seemed to me to be an offence to the public to solicit them as a work of art. Too, I did not want to project any proposals for what the future landscape might be, if a remediated landscape was possible. Extrapolations on the future of nuclear sites could be in danger of replicating the future-projections by the public relations machines of government and industries. A critique of the corporate re-branding would be obvious and ineffectual.

4. The Three Fonts: Knowledge and Care

The three sculptures were variations of a font. I see fonts in a more archaic sense than ecclesiastical; that is, as a thing that holds transformative material, potential energy. Historically, that material is oil or water. Fonts are objects associated with many different layers of meaning and kinds of knowledge. Their surrounds and pedestals can be embellished with carvings and representations of contemporaneous trades and crafts and of the people who hold the scientific and spiritual knowledges of the day. They can prompt solitary reflection and also be a focus for communal gathering. Fonts are devices for acknowledging the past, both its benefits and its failures. They mark the present and celebrate the relations that matter most. They offer a focus to performative declarations of a potentially better future. They are meant to be touched. A font can be attended as a way to come to a decision, possibly incorporating intuitive, indirect, or metaphysical forms of knowledge. However, fonts do not, in themselves, provide an answer.

The sculptures incorporate materials, surfaces, and shapes that are easily recognisable as belonging to Sellafield, the landscape, the nuclear installation, and the scientific milieu in which it operates. They overtly represent different kinds of knowledge. The transformative materials in the wells include a dosimeter for measuring radiation exposure to the human body; plant seeds for a future landscape; and the sediments that will need to be watched for tens of thousands of years.

On Font No. 1, the bowl shape imitates that of the Windscale Advanced Gas-Cooled Reactor, the iconic Sellafield 'Golf Ball' structure (Figure 2). The blue timber piece is indicative of the haphazard and near derelict appearance of many structures at Sellafield and is painted in an approximation of Klein blue.⁸ On the top of the font, the clay panels map: (1) global nuclear sites that relate to Sellafield through remediation work, accidents, leaks, bomb tests, and the mining of uranium; (2) the watersheds that support Sellafield; and (3) the animal tracks that may have crossed the land and may do so again in the future (Figure 3). The magnified images are of cement showing the presence of bacteria. These images are part of experiments into the role of bacteria in low-level radioactive waste disposal by Natalie Byrd in the Department of Earth and Environmental Sciences, The University of Manchester.⁹



Figure 2. Font No. 1. Image by Wallace Heim.

On Knowledge Font, the grey objects below the grasses are the shapes of the devices that have stored nuclear knowledge for the past 70 years (Figure 4). The copper tubes are an indication of the metals that are planned to be used to keep living beings safe against buried nuclear materials. Throughout both fonts are black shapes, indicative of the secrets that pervade civil–military nuclear complexes.

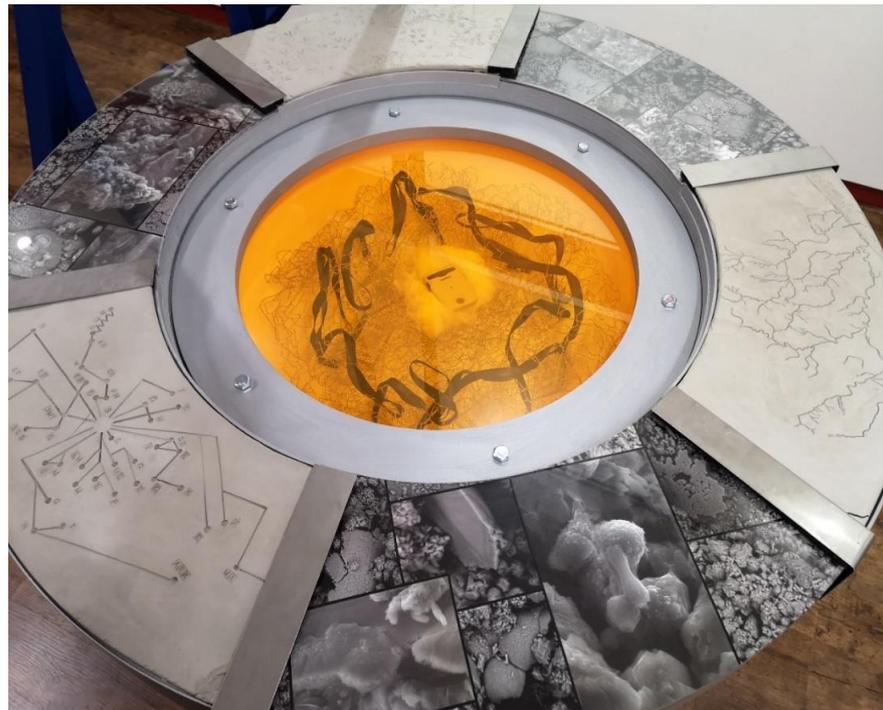


Figure 3. Font No. 1. *Detail.* Image by Wallace Heim.



Figure 4. Knowledge Font. Image by Wallace Heim.

The third sculpture, *Future Font*, at first, was to represent only the proximity of the sediment and the human, separated by a fence, a ubiquitous feature of the Sellafield site. It lacks the theatrical contrivances of the other fonts; the materials are what they are—steel, oak, slate, shell, lead (Figure 5).



Figure 5. *Future Font*. Image by Wallace Heim.

The containing bowl is an oval, oak basket, a craft indigenous to Cumbria. The sediment is from a quarry close to the Sellafield boundary, of a similar colour and texture to that under the site's buildings. It is 'non-active', not radioactive, and is used in laboratory experiments at The University of Manchester on how to treat contaminants while they are in-situ, employing a process called biomineralization, and was provided by Callum Robinson (Figure 6).¹⁰

The sculpture itself did not change from the maquette. I intended to produce a sense of exposure, but more, a stillness, a cessation of the managerial time of the nuclear industries and of the ratcheting calculations towards warfare. In that forced hesitation, I was attempting to call up a strangeness. The sediment was to seem as if it was both waste and not-waste, as if it was dangerous matter which had found a safe place, although in a jarring context. I had intended to confuse the swaddling cradle of birth and the basket of death and burial. These are objects made for transitions at life's extremes, while humans are touching, holding, and washing.



Figure 6. Future Font. *Detail.* Image by Wallace Heim.

What surprised me was that as I sculpted the lead lining and the surface finishes of broken shells and salt, the somatic experience brought associations with human care. My hands retrieved a memory of caring for an infant, or for an ill relative, laying them down and watching their faces for signs of change. The well of this font would allow the sediment to rest rather than be buried. There was, too, a foreboding of death, but not of the scary, explosive-nuclear-doom kind. My perception of what I was doing changed, from that of displaying the sediment in a provocative way, to a feeling for it. My imagination allowed for a feeling of my own vulnerability in the presence of the, symbolically, dangerous sediment and the uncertainty over the level of radiation that might be fugitive in it. What also was felt, or projected, was that the sediment might share in a vulnerability, as matter resting, stilled, in an extreme state of exposure. Vulnerability is not exclusively a condition of the 'cared for' between humans but can also be felt by the one who might proffer care, in a complex and often uneven relation. The sculpture confused my relation to the sediment. I did not expect it to offer care for me, but my care for the sediment might include a sense of shared, but not equivalent, vulnerabilities.

I was not advocating the above-ground storage of nuclear materials any more than burial. I was asking what happens if remediation and repair are inherently inadequate and futile? What other human forms of knowing are needed, and can they be felt, even momentarily, in the context of a gallery? Care might encompass some of those knowledges and emotions, but what would it mean to care for the contaminated? (Figure 7).



Figure 7. Future Font *detail*. Image by Wallace Heim.

5. The Stillness and an “Abyssal Intimacy”

Grosz’s ‘nick’ of time describes the intentions for any artwork to offer a rupture in the experience of time, bringing about a change in perception, a movement towards a different future. My somatic experience, activating memories of care, did not change the work itself, but changed how I interpret it, the values that I express, now, in describing it. I intended a stillness, not a prescription of action. In reading subsequent to the exhibition, I have found that Astrid Schrader’s connection between art, care, “abyssal intimacy”, and the nuclear helps, in part, to elucidate my revised intentions for the viewer’s experience and to flesh-out Grosz’s theories as to how a variation of experience of time in an aesthetic context may bring about a wider change in perceptions (Schrader 2015).

Schrader’s philosophical work crosses biological temporalities, responsibility and agency in scientific knowledge production, and care for microbial life. In ‘Abyssal intimacies and temporalities of care’, Schrader questions how to begin to care about non-human animals, rather than how to perform or ‘do’ care. Thinking through the writing by Hugh Raffles on the paintings by Cornelia Hesse-Honegger of insects damaged by radiation, Schrader shows how art can make an opening to these other beings, and to the temporalities that afford the possibility to begin to care.¹¹

Schrader develops her version of “abyssal intimacy” as a break in time in which the human can experience facing the wholly other in a bottomless, groundless, infinite relation. It is the enfolding in perception of the extreme of the other’s animate life, without human self-identification forced upon it. There is an affective state to this moment, one in which the self and other are as if face-to-face. Drawing on Heidegger and Derrida, there is death within life, a fundamental passivity, a non-power that loosens knowledge’s link to power and certainty. In this abyss, knowledge becomes open to becoming affected by another.

Schrader finds in Hesse-Honegger’s practice an intimate, observational knowledge-making, the slow time spent fascinated by the other organism, allowing its being to unfold. This knowledge-making and the ethical regard for the other are “out of time”. “Abyssal intimacy then describes simultaneously a mode of engagement and a new kind of relationship between humans and other animals that is neither continuous nor discontinuous, but rather marks a time-out-of-joint; it retains a secret that unhinges the present” (Schrader 2015, p. 673).

The hesitation of abyssal intimacy, as experienced through art, for Schrader, suggests a notion of care that is not elicited by empirical information or harmonic connections:

“To be moved straight into motion—in time—erases the necessary and undeniable passivity (a vulnerability due to mortality) within the ‘self’ that enables us to become affected in the first place . . . To think such abyssal intimacy (with care) that keeps the viewer suspended in a zone of indeterminacy, hesitating, slowing down, not exactly knowing what to do, confused, listening intensely to what might still be hidden before and behind the painting, but also desiring to act with passion, requires a different logic of time, a different deconstruction of the metaphysics of (humanist) self-presence—different from the privilege of futurity or the teleology of a gathering and its demand for immediate or direct action. These paintings move us, but they do not necessarily move us *in* time, they do not prompt us to immediate (re-)action, literal movement, as if we already knew in advance what would be the right things to do, about low-dose radiation exposure, for example. Both the aesthetic affect and the political affect are tied to the power of indeterminacy (Rancière 2011, pp. 18–19). Caring requires decisions, but not without experiencing the ‘ordeal of the undecidable’ (Derrida 1992, p. 24)”. (Schrader 2015, p. 673)¹²

Schrader is concerned with how to begin to bring the harmed and altered insect into the purview of human care. She addresses how art may shift the affective range of the human from centring on the self to the hetero-affective, the fluid field of affect that encompasses and spreads across different entities in the diverse ways that each can recognise according to their capabilities and needs.

The promises and limitations of care are many while the need for it is pressing. But I return to the importance of how to begin to care before the maps of what to do are drawn. As Schrader shows, this involves changes in habits, perceptions, and identities, changes which are inherent in experiencing art and in the capabilities of the human imagination.

Sculpture offers objects for the imagination. Philosopher Emily Brady outlines forms of imagination as “intimate aesthetic experience”, bridging the experience of the arts with that of natural entities (Brady 2003). There is an “exploring” of an object as perceived. The “projective” power of imagination involves an intentional seeing of the object as another thing. It is a way of trying out new perspectives of it. This can involve projecting oneself into the object or somatically imagining what it is like to be that object. The third mode of imaginative activity is “ampliative”, amplifying what is given in perception, having a special curiosity in response to the object, and contextualising it from new standpoints. Brady’s fourth mode is “revelatory”, stretching imagination to its limits, giving way to a kind of new knowledge about the world (Brady 2003, pp. 154–58).

The basket afforded the chance to imagine what care for the contaminated might feel like. One can argue rationally that the land to be remediated is composed of living entities, even if they are not visible without technological interventions, and that these deserve care. An adjoining argument is whether the entities can be harmed by nuclear toxicities, whether the harm resembles that endured by humans or not. A toxic situation can be addressed by the self-interest for human safety or a judgment of justice for the communities affected. However, care also requires something different: feelings for, or with, even the apparently inanimate. The possibility that I want to raise is that care may be a response that allows the human to more fully comprehend both the lands and the materials that must remain isolated. Care may be a sensible response to the nuclear materials themselves over the long duration of their existence. Aesthetic experience is necessary for this to begin.

6. Aesthetics of the Nuclear and of Care

Nuclear wastes are both geological forces and human artefact, both material and incorporeal. Returning to Grosz, aesthetic practice is inherent to life itself and to the survival of human life. Nuclear wastes may be seen as forces existing beyond the human control of life. They may, as Grosz suggests, be among the geological and metabolic forces

that enable and induce art that, even if momentarily, teaches humans how to live with those forces.

Viewing aesthetics as the principles and methods underlying works of art and as the sensed responses made available, the exhibition is an attempt to intersect an aesthetics of the nuclear with an aesthetics of care, and offers one possibility of whether, through this, humans may teach themselves how to live.

'x = 2140' has affinities with the body of works engaging with nuclear situations, most significantly curated by Ele Carpenter in her series of international 'Nuclear Cultures' exhibitions (Carpenter 2016)¹³. Nuclear material cultures can be understood both as technological infrastructures and aesthetic practices, the aesthetics shifting from a "sublime atomic spectacle to a lived experience of the uncanny nature of radiation" (Carpenter 2016, p. 009). There are diverse sets of principles supporting the works; they may be collected together more by the nuclear subject matter than by a shared aesthetic. These are artists that, through diverse artistic practices, expose the undeclared, unseen aspects of nuclear industries; historicise and offer to judgment the bombings, tests, and leaks; conceptualise the long duration of wastes visually and sonically; exhibit radioactive matter as artistic material; and hold out the hopes that justice may be found for those communities and lands affected. The works are not without political content or intent, even as the field has shifted from overt polemic to investigations of the indeterminacies of lived experience. The political is being configured, or brought into the sensible, in multiple, inventive ways and, in some practices, in independent but associated research with nuclear sciences and organisations.

As to a possible aesthetic of care, artists are inventing ways to choreograph and perform gestures of care between humans. Examples include Rosemary Lee's dance work *Common Dance* and *On Taking Care: Symposium* and the sculptures of Elena Cologni that invite the public to move their bodies into and with them in ways that configure a 'caring' gesture.¹⁴ James Thompson develops an aesthetics of care from performance and applied theatre (Thompson 2015). Thompson finds that everyday acts of caring have a virtuosity to them, a sensory, crafted quality. His care aesthetic is value-based and activist-oriented: it is performative; it recognises interdependency; it involves the learning and potential discomfort involved in rehearsing new social relations; it moves towards an attentiveness to the conditions of another (Thompson 2015, pp. 433–36).

In the gallery context, current attention to care, too, is extending into the institutional realm: how does a gallery or arts organisation care for or with the artists and the lands that support it? For example, the Barn multi-arts centre, Banchory, Scotland, is incorporating care for the environment, the community, and artists throughout its programme and work practices. Inverleith House, the Royal Botanic Garden, Edinburgh, is becoming 'Climate House', a gallery focusing on climate change, influenced by ideas of care for the environment. Inverleith House is in partnership with the Serpentine Galleries, London, which have a continuing programme of art and ecology talks and exhibitions, some of which feature 'care'.¹⁵

Returning to the art works themselves, these versions of a care aesthetic retain the ethical dimensions and gestures gleaned from human care practices. From my experience in making *Future Font*, those gestures have representational and affective power, even when extended to the inanimate. They are a somatic force to which a viewer may relate and then extend notions of care. While I argue for this and for an ethics of care, I also want to argue for arts that may interrogate, confuse, and put into the wrong place at the wrong time those principles of care; for arts that can acknowledge the contradictions inherent in what care means; as well as for those arts that utilise care as a form of resistance in situations of oppression or of environmental collapse. What those arts may look and feel like will be very different to those that are fostering gestures and habits of care. In addition, ideas of care may provide critical devices for assessing works that do not thematise care directly, extending the influence of care theories into other aesthetic practices.

The gallery can separate the human from an object; the physical human touch that is associated with care does not happen. However, it may allow for imagination, projection, metaphoric transits, new affective fields, and other experiences that may intensify and expand what is considered 'care' and those who might be included. The aesthetics are being invented, as they are with nuclear culture. Care is troubling, not simply palliative. It offers a fluid, principled, but not pre-defined critical force and, as such, is a method for producing new ecological knowledge.

7. Conclusions

This article describes one sculpture exhibition in West Cumbria concerned with how decisions about the decommissioning of a nuclear site can be made; which knowledges are allowed, which are neglected; and what secrets cannot be told. Among the untold are the affective, emotive, and imaginative conditions of living with any migrating, fugitive wastes for an endless future. The future, though, is not ordained, but set into being by events in the present. The sculptural pieces were derived from shapes and surfaces from the Sellafield site and from ideas of a font as a device for thinking about the future without any answer given. Emerging more intuitively than analytically from the sculpture-making process were notions of care. The heart of the work, though, is not the concepts, but the affective conditions brought about by a stillness, an out-of-time-ness allowing for a discomfort, a vulnerability, an intimacy with the residues and wastes of human industry that might open the possibility of how to begin to care with them.

'x = 2140. In the coming 120 years, how can humans decide to dismantle, remember and repair the lands called *Sellafield?*': I might re-title the exhibition. 'Repair', if it means restoration to a previous state is impossible. If it means to bring an area into a condition that could support flourishing life, then it *pairs-up* culture and technology with politics, with a reconfiguration of the past and present, and possibly with insights for making a future gleaned from staring into a font.

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Notes

- ¹ 'More-than-human' was coined by the philosopher David Abram in *The Spell of the Sensuous: Perception and Language in a More-than-Human World* (1996) to signify earthly life, the realm that includes human life and culture, but exceeds them. It indicates the human world is situated within, sustained by, permeated by and interdependent with more-than-human worlds. Too, it can indicate the sensibilities of other living beings that exceed those of the human. The term has become common across disciplines.
- ² Kalshoven's field work is on the social and industrial cultures of the Sellafield nuclear site in England. The Beam nuclear and social research network is hosted by The University of Manchester's Dalton Nuclear Institute and the School of Social Sciences. <https://www.mub.eps.manchester.ac.uk/thebeam/tag/petra-tjitske-kalshoven/> (accessed on 23 August 2021).
Sellafield Site Futures project website: <https://www.mub.eps.manchester.ac.uk/thebeam/2019/10/10/sellafield-site-futures/> (accessed on 23 August 2021).
The decommissioning and clean-up of the Sellafield Nuclear Licensed Site is overseen by the Nuclear Decommissioning Authority, a non-departmental government body: <https://www.gov.uk/government/organisations/nuclear-decommissioning-authority/about>.
See also the government website for Sellafield Ltd.: <https://www.gov.uk/government/organisations/sellafield-ltd> (accessed on 23 August 2021).
The International Atomic Energy Association definition is: "Decommissioning refers to the administrative and technical actions taken to remove all or some of the regulatory controls from an authorized facility so the facility and its site can be reused. Decommissioning includes activities such as planning, physical and radiological characterization, facility and site decontamination, dismantling, and materials management." <https://www.iaea.org/topics/decommissioning#:~:text=Decommissioning%20refers%20to%20the%20administrative,its%20site%20can%20be%20reused> (accessed on 10 September 2021).

- 3 I am grateful for the generous sharing of knowledge by people at the workshops. The exhibition and this article express my views only.
- 4 The term ‘fugitive’ to describe the migrating wastes was used by scientists at the Sellafield Site Futures workshops. The term ‘waste’ is the prevalent term used for what remains after industrial processes, matter out of place, to be removed and stored, or to be re-processed into commercial materials. ‘Residue’, which is occasionally used in the social science literatures, implies a different concept, of matter that lingers, its value indeterminate, it might not be able to be buried or removed.
- 5 The field of care ethics is diverse and extensively argued. I refer below to Puig de la Bellacasa as she consolidates care theories that address the more-than-human and the production of knowledge through science and technology. The beginning of care as a relational ethics is attributed to the publication of *In a Difference Voice* by Carol Gilligan (1982). Early theories were developed by feminist writers, notably by Nel Noddings, *Caring: A Feminine Approach to Ethics and Moral Education* (1984); and Joan Tronto, *Moral boundaries: a political argument for an ethic of care* (1993). In the field of feminist science studies, see Hilary Rose, *Love, Power and Knowledge: Towards a Feminist Transformation of the Sciences* (1994). More recent publications, favouring philosophy, include: Virginia Held, *The Ethics of Care: Personal, Political and Global* (2007); Michael Slote, *The Ethics of Care and Empathy* (2009); Elena Pulcini, *Care of the World. Fear, Responsibility and Justice in the Global Age* (2013); Fabienne Brugère, *Care Ethics. The introduction of care as a political category* (2019); Sandra Laugier, *Politics of the Ordinary: Care, Ethics, and Forms of Life* (2020); The Care Collective, *The Care Manifesto. The Politics of Interdependence. The Politics of Compassion* (2020).
- 6 Jennifer Gabrys writes on media, culture, technology and environment.
- 7 Estimates are that 140 tonnes of plutonium are stored at Sellafield, referenced in a variety of websites from differing perspectives. See: <https://climatenewsnetwork.net/uks-plutonium-stockpile-is-an-embarrassing-risk/> (accessed on 15 September 2021); https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/791046/Progress_on_Plutonium.pdf (accessed on 10 September 2021); <https://www.nature.com/articles/s41529-020-00132-7> (accessed on 10 September 2021). Historically, plutonium and other wastes have been discharged to the Irish Sea. The amounts and constituents of the discharges that rest on the sea bed are not known publicly.
- 8 In the late 1950’s Yves Klein wrote to the International Conference for the Detection of Nuclear Explosions and other dignitaries including the Pope, the Dalai Lama, UNESCO, the League of Peace, offering to paint all atomic and thermo-nuclear warheads in Klein blue, so that their existence could not be concealed. (Carpenter 2016, pp. 176–78).
- 9 The images were provided by Natalie Byrd, PhD student (2020), Department of Earth and Environmental Sciences, The University of Manchester, who writes:
“These are images taken of a cement using a scanning electron microscope (SEM). The main features than can be seen on the surface of the cement are various different types of crystals, or polymorphs, of calcium carbonate (CaCO₃)—the same mineral that makes up chalk! This particular piece of cement had been part of an experiment investigating the impact of biological reactions on low level radioactive wastes disposed of within the Low Level Waste Repository facility (West Cumbria, UK). Understanding these biological reactions is a fundamental part in understanding how radioactive waste will behave over time inside a repository. Indeed, the role of bacteria is increasingly acknowledged as being a significant aspect of radioactive waste disposal. The cement in these images played a key role in controlling the solution chemistry of the experiments, particularly the pH. It is also possible that the cement is providing a ‘home’ for bacteria in the experiment, by giving them a surface on which they can form biofilms – but this is still under investigation!” (personal communication).
- 10 The sediment in Future Font was provided by Callum Robinson, PhD student (2020), Department of Earth and Environmental Sciences, The University of Manchester, who writes:
“Collecting sediment samples directly from the Sellafield site is often challenging as collection can only be made during campaigns of borehole drilling or site excavation, both of which happen infrequently, we therefore require a more reliable source of sediment that is analogous to the sediment found underneath Sellafield. An aggregate and gravel quarry close to the site boundary is used as a source of non-active sediment for laboratory experiments. We are collecting sediment to investigate various treatment techniques for the removal of radioactive contaminants from the Sellafield subsurface, we intend to assess the potential of treating the contaminants in situ (within the subsurface), employing a process called bio-mineralisation, which utilizes the indigenous microbial and bacterial communities within the soil beneath Sellafield to produce minerals which can retain the contaminants and prevent them from migrating across the site, maintaining the stewardship of the site in the medium to long term. In the laboratory we use the sediment to set up systems that mimic the geology and hydrology that underlies Sellafield, to study the ability of various treatment methods to retain contaminants, with the aim of delivering an optimised in situ treatment strategy to Sellafield” (personal communication).
- 11 Schrader’s analysis of Hesse-Honegger’s work derives from a discussion on care with her students following a reading of the chapter by Hugh Raffles on Hesse-Honegger. See: Raffles, Hugh. 2010. *Insectopedia*. New York: Pantheon.
- 12 Schrader is referencing: Derrida, Jacques. 1992. Force of law: The ‘mystical foundation of authority’. In Cornell, Drusilla, Michel Rosenfeld and David Grey Carlson, eds. *Deconstruction and the Possibility of Justice*. New York: Routledge. pp. 3–67.
- 13 See: <https://nuclear.artscatalyst.org/> for the Nuclear Cultures’ international exhibitions, discussions and blogs (accessed on 23 August 2021).

- ¹⁴ Rosemary Lee, *Common Dance*. 2009. and *On Taking Care: Symposium*. 2012 <https://www.artsadmin.co.uk/project/on-taking-care/> (accessed on 23 August 2021); Elena Cologni <https://elenacogni.com/> (accessed on 23 August 2021).
- ¹⁵ The Barn, Banchory, Scotland: <https://www.thebarnarts.co.uk/> (accessed on 23 August 2021). Inverleith House, Royal Botanic Garden Edinburgh: <https://www.rbge.org.uk/media-centre/press-releases/current/new-vision-for-inverleith-house-revealed/> (accessed on 23 August 2021). Serpentine Galleries: <https://www.serpentinegalleries.org/art-and-ideas/> (accessed on 23 August 2021).

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