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Report

Discipline and Difference

An Event Report on Silent Spring: Chemical, Biological and Technological Visions of the Post-1945 Environment

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In the spring and summer of 2013 the University of York and Birkbeck, University of London, hosted two workshops on the relevance of Rachel Carson's book Silent Spring to interdisciplinary research. Over the course of the workshops several themes emerged, many of which pertained to the question of interdisciplinarity and its relationship with the concept of ecology. Here, the organisers reflect on these themes, and return to some of the ideas offered by the project's delegates and speakers.

In 1962 the American writer and marine biologist Rachel Carson published her groundbreaking text *Silent Spring*. One of the first works to convey successfully the environmental effects of pesticides, *Silent Spring* is often credited with spearheading the modern environmental movement. Carson

illustrated her warnings about the hazards of under-researched chemicals through her depiction of the environment as a complex web of interconnected elements. As she writes:

> For each of us, as for the robin in Michigan, or the salmon in the Miramichi, this is a problem of ecology, of interrelationships, of interdependence. We poison the caddis flies in a stream and the salmon runs dwindle and die. … We spray our elms and the following springs are silent of robin song.[1]

What Carson describes is not simply *a* problem of ecology, but *the* problem of ecology. As demonstrated by the pesticides that pervade every single link in the food chain, it is never truly possible to isolate one element from another. It is somewhat ironic, then, that ecological study is often founded on notions of difference. Surrounded by a number of vast and complex ecosystems, the ecologist must determine what differentiates each component of the natural world so that it may be categorised and codified accordingly. While taxonomies are essential to human understanding, they are also antithetical to the concept of an ecosystem. This predicament contributes to what Peter Taylor has called the 'unruly complexity' of ecology.[2] There is, of course, an unruly complexity to all disciplines: no academic subject is entirely self-sufficient, and none provide a complete picture of the world. Yet because of its investment in the relationships between organisms and their environment, the study of ecology lends itself to approaches that challenge disciplinary and methodological boundaries.[3] Rachel Carson's recognition of this is clear throughout *Silent Spring*, where her research method echoes the interconnected ecological networks she describes.

Carson's polemic moves energetically between the registers of scientific research and popular journalism, juxtaposing chemical diagrams with excerpts of romantic poetry as she elaborates, in her powerful phraseology, 'the intricate web of life whose interwoven strands lead from microbes to man'.[4] Carson related her concerns about chemicals to the threat of nuclear war, and traced the imbrications of destructive and creative processes. When we decided to hold a pair of workshops on *Silent Spring* in the spring and summer of 2013, we were keen to capture some of this borderless energy, as well as the intellectual flexibility with which Carson marshals both her sources and her conclusions. While we were aware of a number of events within the UK scientific community responding specifically to the legacies of Carson's interventions for the study of chemistry, biology and ecology, we felt strongly that her writing also had much to offer to the humanities.[5] Her work poses a counter-narrative to C. P. Snow's enduring notion of the 'two cultures', and points instead to the longstanding interrelations between the humanities and the sciences.[6] Equally, Carson's vision of connectivity contrasts with the persistent nature/culture divide, as critiqued by Timothy Morton in *Ecology Without Nature*.[7] Yet we were also aware that designing the two workshops would be fraught with potential problems. To what degree does ecology relate to other areas such as Chemistry, Zoology, Geography and Environmental Science, not to mention subjects in the humanities: Art, Literature, Philosophy? Each discipline, like each biological species or genus, allows for concentrated study but also limits the researcher. Disciplines develop their own methods, discourses, vocabularies and perspectives over time. In the context of a university they occupy different departments and are funded by different bodies. Although subjects, like species, are bound to overlap, institutional and intellectual frameworks imply that they are separate.

In attempting to be truly interdisciplinary, the study of ecology must be willing and able to incorporate a number of disparate perspectives, each with their own insights and mediums of communication. The physical world can be translated into academic discourse in a variety of ways, as evidenced by the journals *Cultural Geographies, Environmental Humanities, Ecology and Society* and *ISLE (Interdisciplinary Studies in Literature and the Environment)*. These publications all advertise their interdisciplinary status as part of their academic mission, and appear to acknowledge the need to create a more comprehensive analysis of a conglomerate subject. An average issue of *ISLE*, for example, will contain academic articles alongside poetry and creative prose. The format of the journal, with its mixture of styles and approaches, also poses questions about form, genre and media. What does a poem say that a research article does not? Is a graph as valid as a photograph, and if so, are they interchangeable? Considering how and in what forms disciplines speak to one another has become an intrinsic element of ecological study.

To this end, in designing our workshops we invited speakers and delegates from a range of departments: Fine Art, Sociology, Science Communication, Art History, and English Literature. Attendees, however, were overwhelmingly from arts and humanities departments. We expect that there are multiple reasons for this concentration, from the mundane (our networks and contacts are predominantly arts and humanities-based) to the subtle (we 'speak the language' of the arts and humanities, employing discursive vocabularies familiar to researchers within these disciplines). At the same time, we were conscious that the current enthusiasm for interdisciplinarity sometimes reflects constrained funding agendas and a desire to streamline academic departments for cost-cutting purposes. This was a concern that reappeared during workshop discussion, particularly during the York roundtable. We became aware that there are different ways of making connections between disciplines, and that some might involve greater levels of compromise than others.

The first workshop at the University of York sought to establish the parameters of the project by bringing together a diverse array of researchers whose work intersects with ecological issues, in order to start identifying some common strands. Specifically, it sought to address the role of visual representation in its various forms as a mediator for interdisciplinary exchange. The day began with a paper entitled 'Greens vs. Science' from Alice Bell, a Research Fellow at the Centre for Science and Technology Policy Research, University of Sussex, who writes widely on eco-activism and climate change.[8] Bell reflected on the importance of Carson's book for communities of environmental protest today, exploring the ways in which elements of the green movement have been represented in the popular press as divorced from scientific reality. *Silent Spring* offers a model for how ecological consciousness and scientific research can combine, and achieve widespread impact, without loss of rigour.[9] While there might currently be a perceived divide between 'bright greens' – those who embrace technology – and 'deep greens', Bell cited recent interventions by Mark Henderson and Stephen Yearly to outline a far more hopeful vision of the future in which 'greens' and scientists recognise their common ground.[10]

Carson's impact can also be traced in sensationalist and spectacular glossy Hollywood movies, from 1970s science fiction to ecological disaster films of the last two decades. David Kirby, whose research examines the representation of science in film, addressed how the environmental consciousness engendered by *Silent Spring* has shaped a host of fantastic

responses in film and television. His talk, 'Eco-Activism, Hollywood Style: The Role of Popular Films in Raising Environmental Awareness', considered the role of scientific consultants in disaster films such as *No Blade of Grass* (1970), *The Omega Man* (1971), *The China Syndrome* (1979) and *The Day After Tomorrow* (2004).[11] Kirby described scientists who consult on Hollywood films as entering into a 'Faustian pact' through which they function as Dickensian 'ghosts of Christmas future', alerting the public to the bleak future that awaits them if they do not pay attention to environmental issues, but often compromising their research in the process.[12] He argued that if the science behind the spectacle is considered invalid, it may detract from the film's impact on environmental awareness – but, on the other hand, as George Monbiot wrote in defence of *The Day After Tomorrow*, 'movies, of course, are all about dramatic effects, and a film about the slow-rolling, complex transformations induced by climate change would be about as gripping as a speech by Geoff Hoon'.[13]

The challenge of representing environmental change was a recurrent point of discussion across both workshops, underpinning the other papers given at York by Isabella Streffen, Benjamin Madden, Fabienne Collignon, Jo Applin and Hannah Boast. Streffen is an artist whose work engages with military technologies of surveillance and tracking.[14] Her paper 'The Underlying Horror of the English Countryside' (a version of which is published in this issue of *Dandelion*) explored Carson's repeated invocation of the aerial perspective in *Silent Spring*, correlating it with the roving eye of the military spy-plane and its involvement in wider networks of Cold War technologies.[15] As historian Priscilla Murphy notes, 'Cold War anxiety had bought with it worries about environmental threats from radioactive fallout from atomic bomb testing, and many ... including Carson herself, drew explicit parallels between the dangers of fallout and the hazards of pesticidal chemicals.'[16] Streffen lingered on the moments in *Silent Spring* where Carson links chemical spraying with nuclear fallout from missile testing, and equates the insidious damage effected by pollution with the threat of nuclear war posed by the conflict between East and West. Artists who draw on military technologies in their practices, Streffen observed, face a number of questions: are they able to reflect critically on these processes and tools, or do they inevitably become part of the institutions they study? How do artists temper the possibility of contamination, and the taint of association, when working in a self-consciously interdisciplinary mode? Is reflexivity enough to ward against complicity? Streffen suggested that humour might be one tool in an artist's arsenal when tackling these challenges. In her installation *Fylingdales in Winter* (2012), the iconic globular forms of the RAF Fylingdales early warning missile defence system, planted in the British landscape during the 1960s to warn America in the event of Soviet attack, are transmogrified into two boiled eggs swimming in milk. A satellite becomes a sausage in a little paper tutu. Again, Carson provides a model: research combined with a little bit of artistic licence.

The papers that followed continued to investigate the wider Cold War context of *Silent Spring*, taking temporal and geographic approaches that expanded our frame of reference beyond the immediate circumstances of Carson's book.[17] Benjamin Madden's paper, entitled '"Of What Disaster is This the Imminence": "The Auroras of Autumn" and the Christian Apocalypse', presented Wallace Stevens' 1948 poem as 'bringing home' the nuclear threat through its investment in the domestic and commonplace. Madden argued that Stevens' emphasis on the ordinary resists the spectacle of nuclear warfare by materialising what was at stake at the dawn of the nuclear age: the stability of everyday life. His paper suggested that by rendering concrete an invisible

threat, the poem countervails the eschatological metaphors that recur in representations of the atomic bomb. Nuclear discourse abounds with literary and religious imagery: Madden noted, for example, that the first U.S. nuclear test was christened Trinity by J. Robert Oppenheimer in an allusion to John Donne's 'Batter my heart, three-person'd God.'[18]

Collignon's paper took an even longer view of the Cold War atmosphere that impressed itself so decisively on Carson's book. In 'Nuclear (South) Polarity', Collignon looked to polar exploration narratives such as Richard Byrd's *Little America: Aerial Exploration in the Antarctic and the Flight to the South Pole* (1931) to trace the metaphorical convergence of the 'Heroic Age of Antarctic Exploration' with the Cold War military-industrial complex. Just as Madden detected auguries of nuclear threats that had yet to take place when 'The Auroras of Autumn' was written, Collignon proposed that these representations of glacial spaces anticipated the later, more metaphorical freeze in political relations between East and West. Her paper found in the gadgetry and technology of the first Polar explorers evidence of cyborg-like fusions of flesh and machine, which, she argued, prefigured the militarised systems that would ultimately lead to ICBM rocket bodies hurtling through the air. *Silent Spring* emerged into a world shaped by the cybernetic vision of integrated systems, but Carson questioned the ends to which such technologies were used, challenging the prevailing ideological emphasis on borders and divisions over connections and interrelation.

The last two papers saw a return to some of the specific themes and ideas explored by Carson in *Silent Spring*, addressing their impact on literary and visual production as well as their implications for ecological analysis. Hannah Boast's paper 'Thinking Through Environments from a Liquid Perspective' drew on Carson's attentiveness to the role of rivers and water-cycles, in both the creation of life and the dispersal of toxins and chemicals, to address the central role played by water in recent Palestinian literature. Focusing on the Palestinian poet Mourid Barghouti's memoir *I Saw Ramallah* (2004), Boast argued that the text counters the rigid geographies of the nation state with a more fluid vision of community.[19] Her paper explored the way Barghouti, like Carson, uses the motif of water as an embodiment of interconnectedness, offering a different way of thinking about the relationship between individual and environment. Engaging with David Farrier's work on *I Saw Ramallah*'s 'liquid vision', Boast's paper also touched on the ramifications of Carson's text for postcolonial theory's conflicted relationship with ecology.[20] As T. J. Demos notes in his introduction to a special issue of the journal *Third Text* on Eco-Aesthetics, 'environmentalism's preservationist celebration of wilderness, leading at times towards an eco-nationalism, has typically opposed the focus of postcolonialism on hybridity, migration and cross-culturation.'[21] In taking *Silent Spring* as our model for the workshops, we understood that we were looking back to a polemic constructed within the Cold War climate that spoke specifically to North American concerns and often appealed to an individualistic ideology of land ownership.[22] Within the current field of ecological studies, these focal points need complicating through connections with post-colonial theory. Boast's paper thus spoke to one element of ecological hybridity that our workshops could have addressed in greater depth.

Remaining with this watery theme, Jo Applin's paper '"The Horrible Global Mess this Little World is in": Lee Bontecou's Plastic Flora and Fauna', considered the impact of environmentalism on the plastic sculptures the American artist Lee Bontecou made of fish and flowers during the mid-late 1960s.[23] Applin positioned Bontecou's ferocious-looking aquatic creatures, with

their serrated spines and teeth, together with the mutated forms of her vacuum-packed flowers as harbingers of the environmental disaster Carson warned against, and of which Bontecou herself was keenly aware.[24] Indeed, Bontecou's studies of fish and plants can almost be mapped directly onto Carson's vivid accounts of fish dying as a result of the contamination of waterways with chemicals and pesticides.[25] Moreover, this ecological toxicity impacted in a very real way on Bontecou's practice through the materials – plastics, Styrofoam, synthetic polymers and fibreglass – that became widely available for artistic use during the 1960s and early 1970s, and which often resulted in an awareness of chemical toxicity on a very personal level.[26] Applin showed how Bontecou's use of new plastics and industrially derived methods manifests a tension between the excitement of these new developments and a recognition of the damage they were causing to the environment, often invisible to the naked eye.

Indeed, the challenges and compromises involved in representing slow-acting environmental damage were discursive threads that connected both the York and Birkbeck workshops. Rob Nixon articulates this representational impasse in his book *Slow Violence and the Environmentalism of the Poor*, in which he states:

> Violence is customarily conceived as an event or action that is immediate in time, explosive and spectacular in space, and as erupting into instant sensational visibility. We need, I believe, to engage a different kind of violence, a violence that is neither spectacular nor instantaneous, but rather incremental and accretive, its calamitous repercussions playing out across a range of temporal scales. In so doing, we also need to engage the representational, narrative, and strategic challenges posed by the relative invisibility of slow violence.[27]

Nixon explains: 'climate change, the thawing cryosphere, toxic drift, biomagnification, deforestation, the radioactive aftermaths of wars, acidifying oceans, and a host of other slowly unfolding environmental catastrophes present formidable representational obstacles that can hinder our efforts to mobilize and act decisively.'[28] In her opening paper at the Birkbeck workshop, Jessica Rapson discussed the concept of 'slow violence' in her paper '"Closely Allied Structures": Ecocriticism, Genocide, and Representation in the wake of the Holocaust', which drew attention to the parallels between the ideologies and technologies of environmental control and those of genocide. As Rapson reminded us, Carson comments in *Silent Spring* on the 'irony' that the discovery of organic phosphate insecticides in late-1930s Germany was quickly seized upon by the Nazis, who 'recognized the value of these same chemicals as new and devastating weapons in man's war against his own kind'.[29] Rapson's paper brought discourses of eco-criticism, human rights and memory studies to bear on intersecting forms of historical violence – for example, the deforestation required to build Buchenwald – and emphasised Carson's relevance for a contemporary consideration of the relationship between natural disaster and fascism.

The concept of slow violence also underpinned Emily Candela's *Disaster Series* of composited digital videos, described by the artist as 'anti-climactic animated catastrophes'.[30] Like Rapson, Candela is interested in the way historical memory shapes current practices of conceptualising violence. The *Disaster Series* evokes the catastrophic imagery of 19th-century Romantic landscape painting, transforming the frozen spectacle of the static image into an extended moment of entropic dissipation. Candela presented 'Disaster Series' alongside her 'krustapseudicals', which are featured in this issue.

Playfully referencing the scientific language of cosmetics advertising, these edible crystals trouble the distinction between the natural and the artificial, particularly as it relates to human attempts to arrest the march of time. Experiments such as Candela's *Disaster Series* underwrite Jennifer Gabrys and Kathryn Yusoff's assertion that 'it is possible that creative practice and climate science projects may – through the suspension of the usual terms of encounter – stimulate new processes of inquiry, political engagement, realignment, redistribution, and imagining of the collective experience of climate change'.[31] At the same time, by using deliberately lo-fi processes (on close inspection, it becomes apparent that the Casper David Friedrich-esque environment of one film from the *Disaster Series* is actually a bathtub), such experiments also play out ecological degradation on the micro-level.[32]

The theme of representation and its challenges also informed Amy Cutler's paper, 'Technology and "Tongues in Trees": Modern British Poetry and Late Twentieth Century Forestry', which provocatively juxtaposed recent poetry by Caroline Bergvall, Anthony Barnett, and Ciaran Carson with the language of contemporary forestry practices such as aerial surveys, iterative programming, and the Community Forest plantations. Cutler considered the way new technologies of forest management modify the literary trope of the talking tree. Here, the consideration of how to represent environmental change was augmented by questions surrounding voice, anthropomorphism, and taxonomy. In the poetry reading that closed the workshop, Cutler read from her work *Nostalgia Forest*. Combining text from Paul Ricoeur's *Memory, History, Forgetting* with dendrochronological diagrams, *Nostalgia Forest* explores what is gained and lost in practices of scientific abstraction.

Cutler's multifaceted work underlined what seemed to be a shared preoccupation among delegates: the failure of the concept of scholarly distance to account adequately for the multiple levels on which researchers engage with their topics, whether political, ethical, or affective. These and other issues around research practice were explored in detail during our two focus groups, one led by John Wills on 'Researching Silent Spring' and the other led by George Ttoouli on 'The Importance of Fieldwork for Writers'. Wills shared his experience of working with the Rachel Carson papers at Yale University's Beinecke Library. Wills' reflections on his discoveries in the archive developed into a generative discussion about the differing expectations and demands disciplines bring to the scene of archival work. Participants discussed the way Carson's strategy for balancing the roles of scientist and popular writer sheds light on our own experiences of negotiating the divide between science and the humanities in our research. Wills told us that an early draft of *Silent Spring* included the rhetorical device of an environmental doomsday – a fictitious deadline that Carson later decided to withdraw, asking, 'must cataclysm be so sudden?'[33] Carson confronted the demands of slow violence as a writer concerned with bringing scientific research to a wider public. In the context of these competing challenges, we considered whether Carson is best described as a populariser of science, or as a thinker who offered an alternative model of scientific communication.

George Ttoouli's workshop considered the different resonances of the term 'fieldwork' in the context of the varying terms for research practices that draw on more than one discipline: interdisciplinary, cross-disciplinary, and trans-disciplinary. Ttoouli suggested that disciplinary interloping involves a double motion: trespassing across boundaries inevitably unsettles one's own epistemological assumptions. He explored the rewards and pitfalls of such activities by sharing his experience of taking creative writing students on walks

themed around woodland ecology, poetry, architecture and visual art, as well as bringing experts in fields such as physics, chemistry and law to the students. There is a danger, Ttoouli observed at the time of this project, of reducing disciplines 'to mere metaphors for poetic practice, learning and subject matter', or vice versa: using creative writing as nothing more than a communication tool. The aim, instead, should be to de-familiarise space and reconfigure students' modes of attention in new, hybridised methodologies without leaning on traditional epistemology and attached disciplinary prejudices and hierarchies. When the two focus groups reconvened to share ideas, a number of key concerns emerged: the danger of reifying fieldwork as a practice, the relatively young age of mono-disciplinarity, and the contested jurisdiction of the archive.

The day closed with poetry readings from Cutler, Ttoouli, and Mendoza, a Northumbrian poet who introduced us to her experience as an insect librarian between poems ranging across questions of identity, memory and place. Works by all three poets feature in this issue of *Dandelion*. We chose to end the day with this series of readings not just because of the rich legacy and widespread current practice of literary engagement with ecological issues, but also to underline the hybridity that we hoped to achieve with the *Silent Spring* project.[34] The two workshops, with their mixture of speakers and delegates from a range of disciplines, can be said to have manifested, in an admittedly modest way, what Taylor identifies as the 'unruly complexity' of current ecological thought, reflecting its diverse manifestations. We were acutely aware that the range of the workshops, particularly in terms of their disciplinary affiliations, could have been far greater, and involved closer relationships with practicing scientists. At the same time, we remained conscious throughout of the danger that our workshops might invoke 'interdisciplinarity' too glibly, or that its much-vaunted benefits might be chimerical. The potential pitfalls of interdisciplinary working emerged as a particular concern during the discussion section of the York workshop, where Siân Beynon-Jones, who helped to lead the roundtable section, spoke eloquently about the difficulty of communicating in any real depth between the sciences and the humanities, particularly in light of the specialisations maintained by much contemporary academic research. Speaking from personal experience as a molecular geneticist who transferred to sociology after her BSc, Beynon-Jones emphasised the challenge of continuing conversations across disciplinary boundaries. Boundaries are, after all, important for bestowing focus and clarity on a body of work, despite the appeal of finding shared interests between subjects.

Yet while an ecologically informed concept of unruly interrelation might reverberate with negative connotations of diluted energies or miscommunication, the two *Silent Spring* workshops, we hope, also demonstrated the rewards of communication between disciplines. As we reflected on the process of organising the workshops and participating in the ensuing discussions, we concluded that 'unruly complexity' might offer an alternative model to interdisciplinarity, in that it usefully retains a sense of the problems involved in cross-discipline exchange, particularly between the sciences and humanities. Our discussions at the workshops sought to disrupt the commodification and consumption of 'interdisciplinary work' as an easily packaged route to 'impactful' research. The ideas, discussions, readings and presentations that formed the two *Silent Spring* workshops may not have always cohered seamlessly, but they showed that there is still space for some 'unruly complexity' in academia – and, by extension, elsewhere.

Notes

1 Rachel Carson, *Silent Spring* (1962; London: Penguin Books, 2001), p. 169.

2 See Peter J. Taylor, *Unruly Complexity: Ecology Interpretation and Engagement* (London: University of Chicago Press, 2005).

3 Ecology is defined by the Oxford English Dictionary as 'The branch of biology that deals with the relationships between living organisms and their environment'.

4 Carson, *Silent Spring*, p. 74.

5 In October 2012 the Royal Society for Chemistry and the Institute of Environmental Sciences in London held a conference entitled *The Legacy of Rachel Carson* which addressed the impact of *Silent Spring* from the perspective of Environmental Earth and Chemical Sciences. In March 2013 the Department of Zoology at Oxford University organized an event that addressed the impact of Carson alongside that of Ruth Harrison's *Animal Machines*. Throughout 2012, a range of US-based events and talks celebrating the 50th anniversary of *Silent Spring* took place, many of which reflected the interdisciplinary aspect of Carson's text.

6 In his polemical 1959 lecture, Snow traced what he saw as a lack of contact between scientists and humanists (and by extension between nature and culture), lamenting that 'there seems to be no place where the two cultures meet'. C. P. Snow, *The Two Cultures* (1959; Cambridge: Cambridge University Press, 1993), p. 16.

7 Morton argues that 'putting something called Nature on a pedestal and admiring it from afar does for the environment what patriarchy does for the figure of Woman. It is a parodical act of sadistic admiration'. Timothy Morton, *Ecology Without Nature: Rethinking Environmental Aesthetics* (Cambridge, MA: Harvard University Press, 2007), p. 5.

8 Alice Bell writes regularly for the *Guardian* and other publications on environmental issues and also regularly blogs at her site *Through the Looking Glass*. www.alicerosebell.wordpress.com Accessed February 2013.

9 Alice Bell, 'Greens vs. Science', conference paper, University of York, March 2013.

10 Bell cited Mark Henderson, *The Geek Manifesto: Why Science Matters* (London: Bantam Press, 2012) and Stephen Yearly's current work for the *Genomics Forum*. www.genomicsnetworks.ac.uk/forum/ Accessed October 2013.

11 See also David Kirby, *Lab Coats in Hollywood: Science, Scientists and Cinema* (Cambridge, MA and London: The MIT Press, 2011).

12 David Kirby, 'Eco Activism, Hollywood Style: The Role of Popular Films in Raising Environmental Awareness', conference paper, University of York, March 2013.

13 George Monbiot, 'Born Yesterday' [Review of *The Day After Tomorrow*], *The Guardian*, 14 May 2004. http://www.monbiot.com/2004/05/14/born-yesterday/ Accessed September 2013.

14 One of Streffen's current projects is the *Dronologies* website, which 'aims to assemble information and research about Unmanned Aerial Vehicles'. www.dronology.com Accessed October 2013.

15 Carson, 'Chapter 10: Indiscriminately from the Skies' in *Silent Spring*, pp. 142-157

16 Priscilla Murphy, *What A Book Can Do: The Publication and Reception of Silent Spring* (Amherst and Boston: University of Massachusetts Press, 2007), p. 10.

17 The impact of *Silent Spring* has been well documented elsewhere, and we wanted both workshops to reflect the overarching and underpinning ramifications of Carson's book, as well as building on the study of its more direct cultural impacts. See Murphy, *What A Book Can Do*, and also Mark H. Lytle, *The Gentle Subversive: Rachel Carson, Silent Spring and the Rise of the Environmental Movement* (Oxford: Oxford University Press, 2007).

18 Benjamin Madden, '"Of What Disaster is This the Imminence": "The Auroras of Autumn" and the Christian Apocalypse', conference paper, University of York, March 2013.

19 See Mourid Barghouti, *I Saw Ramallah* (London: Bloomsbury, 2004).

20 See David Farrier, 'Washing Words: The Politics of Water in Mourid Barghouti's *I Saw Ramallah', The Journal of Commonwealth Literature,* 48:2 (2013), pp. 187-199.

21 T. J. Demos, 'Contemporary Art and the Politics of Ecology,' *Third Text* 27.1 (2013), p. 6.

22 In *Silent Spring* Carson repeatedly appeals to consumer rights and to the enjoyment of nature as a right of US citizens.

[23] The paper developed from Jo Applin's longstanding engagement with the work of Lee Bontecou: see also Jo Applin, 'Threatening, and Possibly Functioning Objects', in *Eccentric Objects: Rethinking Sculpture in 1960s America* (New Haven and London: Yale University Press, 2012), pp. 13-41.

[24] See also Elizabeth Sussman, 'Silent Spring', in *Lee Bontecou: Vacuum-Formed Sculptures and Related Drawings*, exh. cat. (New York: Knoedler & Company, 2007), pp. 7-19.

[25] In her chapter 'Rivers of Death' Carson dwells on 'the question of interactions between chemicals, a question that becomes particularly urgent when they enter the marine environment where so many different materials are subject to mixing and transport'. Carson, *Silent Spring*, p. 141.

[26] Many artists in the US and Europe became ill after inhaling the fumes created by these new materials, and had to stop working with them.

[27] Rob Nixon, *Slow Violence and the Environmentalism of the Poor* (Cambridge, MA and London: Harvard University Press, 2011), p. 2.

[28] Ibid.

[29] Jessica Rapson, 'Closely Allied Structures', conference paper, Birkbeck College, University of London, May 2013. For more on this history see also Esther Leslie, 'Nazi Rainbows', in *Synthetic Worlds: Nature, Art and the Chemical Industry* (London: Reaktion Books, 2005), pp. 167-192.

[30] See Emily Candela, *Disaster Series* 2006-2007, http://www.emilycandela.co.uk/#/disaster-series/4540542658. Accessed October 2013.

[31] Jennifer Gabrys and Kathryn Yusoff, 'Arts, Sciences and Climate Change: Practices and Politics at the Threshold', *Science as Culture* 21.1 (2012), p. 16.

[32] Throughout *Silent Spring* Carson evokes the subterranean effects of pesticides and chemicals on the environment, 'unseen and as yet largely unknown'. Carson, *Silent Spring*, p. 141.

[33] John Wills, 'Researching Silent Spring', conference focus group, Birkbeck, University of London, May 2013.

[34] For other examples of this see John Burnside ed., *Wild Reckoning: An Anthology Provoked by Rachel Carson's Silent Spring* (London: Calouste Gulbenkian Foundation, 2004).