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Nardelli, Matilde ORCID logo ORCID: <https://orcid.org/0000-0003-4582-1024> (2014) No end to the end: the desert as eschatology in late modernity. Tate Papers (22). ISSN 1753-9854

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No End to the End: The Desert as Eschatology in Late Modernity

Matilde Nardelli

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At the height of the Cold War, artists, writers and filmmakers in America turned to the desert as a space in which notions of ‘the end’ could be articulated. Unpacking the desert’s associations with nuclear apocalypse and environmental ruination, this paper explores works of art and film – by Jean Tinguely, Michelangelo Antonioni and Robert Smithson – in which the end is imagined to be immanent, repetitive and entropic.

- ¹ On revisiting one of his collections of short stories from the 1960s, in which deserts abound, the author J.G. Ballard noted that ‘Deserts possess a particular magic, since they have exhausted their own futures, and are thus free of time’.¹ According to this explanation, the appeal of the desert seems to be related primarily to time or, in fact, to the absence of it: deserts are attractive precisely because, Ballard suggests, they are ‘free of time’. Yet the crucial nuance in Ballard’s logic should not be missed, since such freedom has accrued to deserts because ‘they have exhausted their own futures’. In other words, what is evoked is not so much a state of being forever beyond or out of time, but the termination of a process, an end, if not *the* end. Deserts are ‘magic’ not because they were never in time but rather, it would seem, because they have been through it and have consumed it, have exited time or reached its end. Paradoxically, the desert’s freedom from time evoked by Ballard is, then, profoundly temporal. While seemingly negating temporality, the desert emerges as a space for articulating a specific kind of temporal concern, a concern about ‘the end’.
- ² The present article addresses the profound connection between the desert and the end in the cultural and artistic imagination after 1945, and in the 1960s and 1970s especially. At the height of the Cold War, and with the rise of modern environmental movements, the desert came to operate as an exemplary setting – be this an actual place on the map or a conceptual projection – through which the end was imagined or rehearsed. Or indeed, as Ballard’s quote suggests, it stood as a space already profoundly marked by the end – a place where the end might have already happened and, even, where it may continue to happen. In exploring the extent to which the desert provided a terrain for playing out the end, I wish not simply to suggest that the desert acted as an eschatology, but that the eschatological insight it manifested is typically modern or, indeed, late modern; for the desert disclosed a distinctively non-transcendent typology of the end that became increasingly current in the latter half of the twentieth century.

The end of the world after 1945

- ³ As the cultural historian Malcolm Bull, among others, has noted, the term ‘end’ can indicate either finality or terminality.² The conception of the end as immanent *terminus* has generally been rarer than the understanding of the end as purpose or *telos*, yet it is precisely this understanding of *terminus* as a non-transcendent event originating within the world itself that became increasingly imaginable and convincing

after the Second World War. Both the newly developed nuclear capacity and, if somewhat counter-intuitively, the momentum of post-war growth played a crucial part in this process.

⁴ The atomic bomb, as commentators had begun to consider in the 1950s, had brought a crucial innovation to eschatological ideas; it had made the narrative of the end historical, tied to human rather than divine or natural causation.³ 'The modern world, in which we live today, was born with the first atomic explosions', suggested the political philosopher Hannah Arendt in the introduction to her influential book *The Human Condition* (1958).⁴ Not without a sense of bitter irony, what defines the newly born and 'yet unknown', 'modern world' Arendt invoked is precisely the possibility of a human-borne end. If Arendt was thinking of such an end in terms of nuclear destruction above all, by the 1960s, as the cultural critic Frederick Buell has discussed, the notion of a human-caused apocalypse had been amplified and complicated by the risk of environmental apocalypse, which, as in the damage to habitat and population caused by atomic explosions, may indeed complement or be intertwined with nuclear apocalypse.⁵ Although concerns about humanity's impact on its surroundings had begun to emerge with large-scale industrialisation in the nineteenth century, it was only in the second half of the twentieth century, during the waxing and waning of the post-war boom, that they escalated to global, apocalyptic magnitude. By the late 1960s even non-sensationalist press such as the *New York Review of Books* and the *Washington Monthly* featured articles alarmingly titled 'Ecological Armageddon' or 'Can We Survive?', by well-respected professionals and academics.⁶

⁵ Such an understanding of environmental damage as a global, universal issue is crucially related to epistemic shifts towards notions of complexity and interconnection. From the 1940s, in fact, conceptual frameworks in a variety of scientific disciplines – from physics and biology to the novel field of information theory – started to be re-oriented towards the idea of complex, interconnected or open systems. A notable and influential early attempt to theorise and promote such re-orientation was that of biologist Ludwig Von Bertalanffy, who as early as 1945 had begun to outline the principles of a 'general system theory', which he went on to define as 'a general science of "wholeness"', capable of addressing problematics arising from the 'organized complexity' of 'sets of elements stand[ing] in interrelation'.⁷ It is in good part a consequence of such conceptual re-orientation that environmental preoccupations shifted from local or discrete issues – such as urban pollution or the protection of nature in selected areas – to more global and holistic questions of the ecosystem and its unprecedented, if not irreparable disruption. Indeed, an anthological volume published in 1973 underlined how, in the two or three decades after the war, the emphasis gradually shifted from conservation to ecology.⁸ Arguably, Earth Day, instituted on 22 April 1970, encapsulated in its very name this idea of a holistic, comprehensive approach to interconnected environmental issues.⁹ Biologist Barry Commoner, in the aforementioned article 'Can We Survive?', stressed precisely the complex interconnections of various systems which add up to ecology:

The environment makes up a huge, enormously complex living machine – an ecosystem – and every human activity depends on the integrity and proper functioning of that machine. Without the ecosystem's green plants, there would be no oxygen for smelters and furnaces, let alone to support human and animal life. Without the action of plants and animals in aquatic systems, there would be no pure water to supply agriculture, industry, and the cities. Without the biological processes that have gone on in the soil for thousands of years, there would be neither food crops, oil, nor coal. This machine is our biological capital, the basic apparatus on which our total productivity depends. If it is destroyed, agriculture and industry will come to naught; yet the greatest threats to the environmental system are due to agricultural and industrial activities. If the ecosystem is destroyed, man will go down with it; yet it is man who is destroying it.¹⁰

⁶ Diverging from customary buoyancy about the formidable growth and development of the post-war decades, articles such as this, together with widely read books including Rachel Carson's *Silent Spring* (1962), Paul Ehrlich's *The Population Bomb* (1968) and Commoner's own *The Closing Circle* (1971), contributed to raise alarm bells about the fate of the planet as a hospitable – or simply liveable – place for humanity, while seeking to generate a sense of urgency about impending environmental disaster.¹¹ In fact, as Buell has observed, the authority of at least some of these authors as 'prophets' of the new apocalypse was dented when their predictions did not quite come true.¹² Nevertheless, when compared with the fast, violent,

spectacular conflagration of an atomic apocalypse, ecological disaster (even, indeed, ecological disaster caused by nuclear explosion) opened the possibility of a slower, longer and altogether less spectacular end of the world, an end where, in fact, human causation and historical time were revealed to act with, as well as upon, natural causes and geological times. So, with the emergence of this new environmental consciousness, the end also became thinkable in a *longue durée*: as a threat that may be passed down to future generations if not, even, as a temporally dilated or continuous event, a phenomenon slowly yet relentlessly unfolding across different generations. In other words, the end became enduring.

⁷ Although he was not aiming to provide a historical account of these non-divine typologies of apocalypse, the critic Frank Kermode summed up their fundamental significance in his influential literary study *The Sense of an Ending* (1967). Coming to consider the 'sense of an ending' of the then current moment, he noted that if 'for us the End has perhaps lost its naïve imminence ... we may speak of it as immanent'.¹³ The changed or changing nature of the end in the late twentieth century, Kermode suggested, is succinctly yet crucially recapitulated in the shift from 'imminent' to 'immanent'. Rather than as an event marked by otherness – transcendent and yet-to-come – the end increasingly became thinkable, if not actually possible, as an occurrence that is ontologically and temporally continuous with the world and human history.

⁸ As either a geophysical or a conjectured reality, the desert was crucial to these newly developing scenarios of the end. On a multiplicity of levels the desert became a prominent landscape of both nuclear and environmental ends, and also, in fact, a landscape where the affinities and interconnections between these kinds of ends were made manifest. Actual deserts became privileged sites for the intensive nuclear testing programmes implemented during the Cold War, and documentary imagery of desert explosions such as those carried out at the Nevada Test Site became familiar to the wider public via the news and the press. Additionally, intertwining concerns about nuclear development and the environment also called upon the desert in other ways. Deserts may themselves be seen as threatened by such ends, places in need of protection from the damage inflicted by military or industrial development (as some legislation began to acknowledge over the course of the 1960s).¹⁴ Or, by contrast, deserts may be thought of as the landscapes left in the wake of nuclear explosions or other processes of environmental ruination and depletion, as in the spent, eerily 'silent spring' killed off by pesticides evoked by Carson in her denunciation of the chemical industry; or in Ballard's plethora of fictional dystopias (which may be sand-flooded, as in 'The Cage of Sand', devastated by nuclear weapons, as in 'The Terminal Beach', or desiccated, as in 'The Drought'); or, again, in filmmaker Werner Herzog's *Fata Morgana* (1971), a lyrical documentary on the Northern Sahara where the desert seems at once a place ruined by human intervention and a landscape bearing the marks of the ruin of the human (fig. 1).¹⁵



Fig.1
Werner Herzog
Fata Morgana 1971 (film still)

- ⁹ Spanning the real and the fictive, the associations between the end and the desert in the 1960s and 1970s were insistent and recurrent. In fact, it might conversely be said that it is precisely terminality that *makes* the desert of this period: the distinctive desert of what Arendt and Kermode referred to as the modern world – and which others since might have opted to describe as high or late modern – is indeed a late, terminal landscape, a space for and of the end. [16](#)

The nuclear desert, aesthetics and mediation

- ¹⁰ The intensive nuclear testing programmes implemented during the Cold War initiated what is possibly the most prominent configuration of the desert as a landscape of the end. As remote open spaces deserts became favourite locations for test explosions. Although a number of deserts, including for instance the Australian outback, were used to host explosions, it is the American deserts that became instantly recognisable worldwide as testing grounds. [17](#) Images and representations of nuclear tests, extensively produced and circulated, worked to invest the American desert with a new and distinctive valence of terminality (fig.2). This signification of the American desert as a landscape of the end differed in crucial respects from its image as a primeval space, prevalent up until the mid-twentieth century and popularised perhaps above all by the Western film genre. While the desert of the frontier had connotations of deadliness – as an inhospitable and dangerous wilderness, however sublimely beautiful – it was not associated with the temporal end of the world. On the contrary, this earlier desert designated a spatial limit, the place beyond which civilisation and the rule of law ended; it was not only unstable, shrinking as the frontier line moved, but it also stood as a space of beginnings. [18](#)
- ¹¹ By capturing or turning the desert into a picture, photography and cinema facilitated its aestheticisation over the course of the late nineteenth and early twentieth centuries, fostering the kind of appreciation promoted by scholars such as Nathaniel Shaler and John Van Dyke, and consolidated by the flourishing of artists' colonies across the Southwest. [19](#) But if the mid-twentieth-century implementation of nuclear testing programmes radically affected the perception of the desert as a 'natural aesthetic resource' (as Shaler had put it in 1898), the newly acquired connotation of terminality fostered, rather than suspended, the formal enjoyment of its landscape. [20](#)

- ¹² Nuclear testing programmes, such as those carried out at the iconic Nevada Test Site inaugurated in 1951, were greeted with both anxiety and fascination. On the one hand, fears about the nuclear programme generated a variety of responses, from the construction of bunkers, to investigative journalism on the effects of radiation on habitat and population, and grassroots protests at local, national and international level. On the other hand, as the photographer Peter Goin pointed out in the introductory essay to his photographic series *Nuclear Landscapes* (1991), testing became an 'aesthetics' in its own turn. This was particularly the case up to the mid-1960s, when, before the introduction of a partial test-ban treaty in 1963 that restricted testing to underground detonations, the literally more notable overground explosions would be regularly carried out. So, for instance, as Goin explained, 'the Las Vegas Chamber of Commerce promoted the nuclear testing program as a tourist attraction', providing 'maps and calendars to tourists detailing the best location and time for viewing the blast' and even instituting a 'Miss Atomic Blast Contest'. At the same time, glossy magazines offered recipes for an 'atomic cocktail' and tried to create a craze for the 'atomic hairdo'.²¹



Fig.2

Operation Teapot, TURK event, Nevada Test Site, 7 March 1955

Photo courtesy of National Nuclear Security Administration/Nevada Site Office

- ¹³ As well as being publicly announced for the most part, and possible tourist spectacles, test nuclear explosions were extensively documented, photographed and filmed. Indeed, it is as an image that the nuclear desert reached the wider public and entered the collective imagination. The US Department of Defense, for instance, regularly produced copiously illustrated reports aimed specifically at informing the lay public and defending the usefulness of an atomic arsenal and its testing. Titled firstly *The Effects of Atomic Weapons* (1950), and subsequently *The Effects of Nuclear Weapons*, these reports appeared in new, revised and updated editions throughout the 1960s and 1970s.²² Leafing through any of the editions one is faced with an exhaustive and exhausting taxonomy of explosions and, as the title promises, their effects. Even though the more spectacular overground explosions were banned after 1963, underground explosions continued, and these publications also systemically illustrated the extensive range of tests carried out to assess damage to man-made structures at varying distances from the 'ground zero' of detonations. Often arranged in sequences of 'before' and 'after', these reports meticulously illustrated damage to an extensive typology of buildings, transportation, and infrastructure, from factories to typical American suburban houses, school buses to aircraft, bridges to electricity poles (figs.3 and 4). Moreover, good portions of this officially produced imagery (in particular instances selected for their spectacular or curious qualities) would be even more widely publicised via mass-consumption media, from illustrated magazines such as *Life* to television.

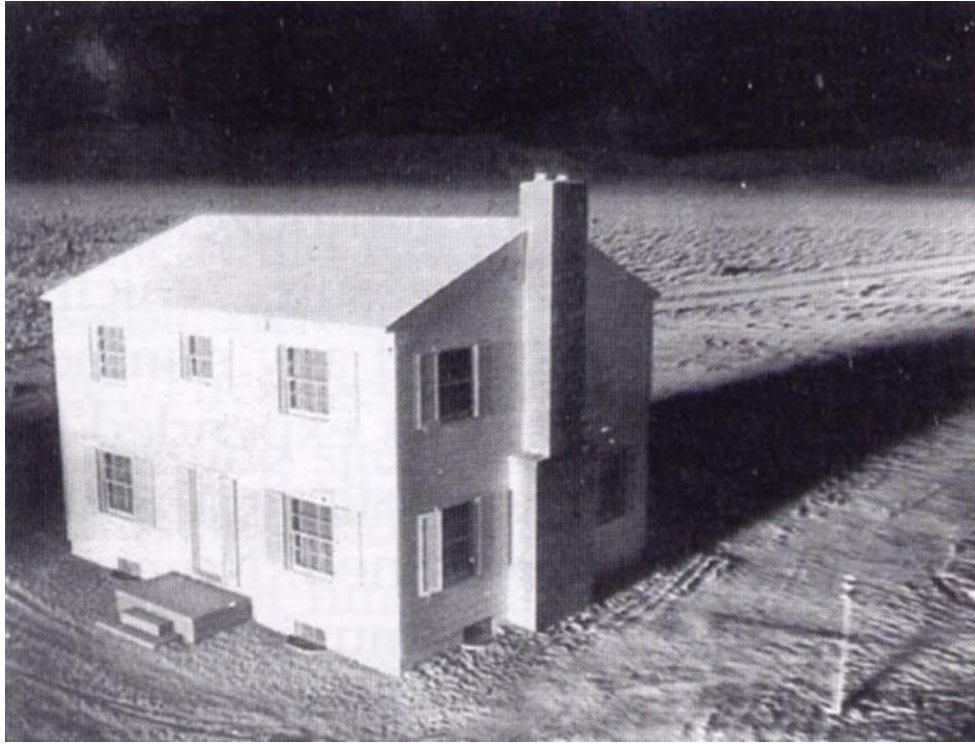


Fig.3

Photograph a house 3,500 feet from ground zero of Annie Test Shot, Nevada Test Site, 17 March 1953

Photo courtesy of National Nuclear Security Administration/Nevada Site Office

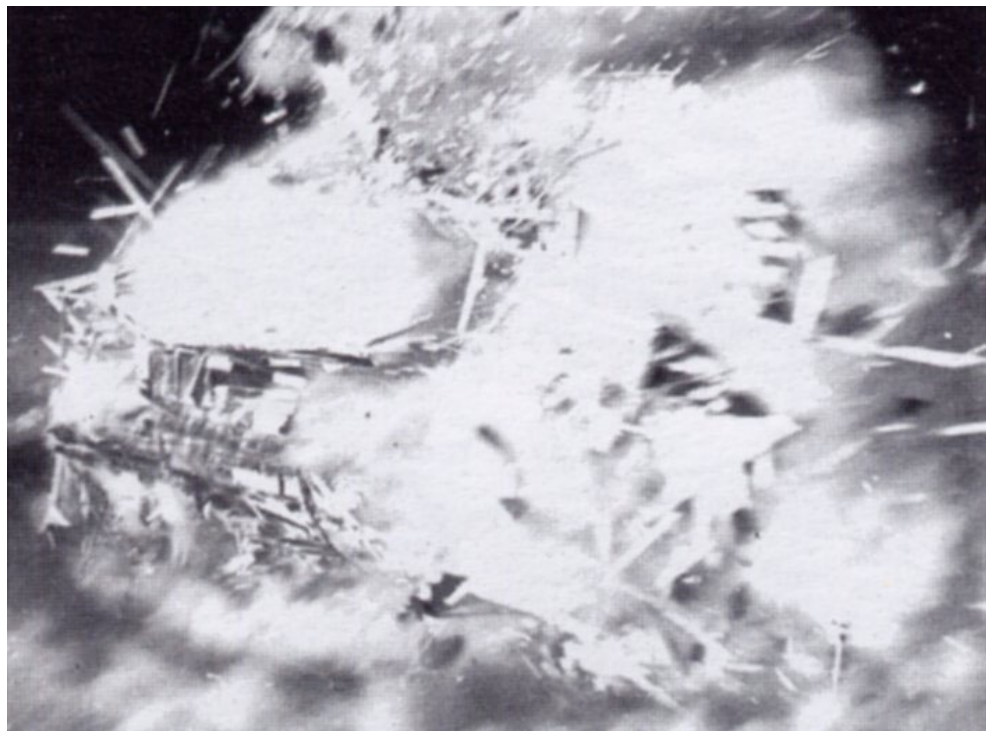


Fig.4

Photograph a house destroyed by Annie Test Shot, Nevada Test Site, 17 March 1953

Photo courtesy of National Nuclear Security Administration/Nevada Site Office

¹⁴ Architectural historian Alessandra Ponte has drawn attention to the aesthetics and aestheticisation of nuclear testing and its images, arguing that the desert site and the explosions complemented and enhanced each other's beauty.²³ Ponte quotes Edward Teller ('the father of the H bomb'), who in *Our Nuclear Future* (1958) wrote of the 'beautiful surroundings' – places of 'solitude' and 'sunshine' – where 'the testing of atomic explosives is usually carried out'.²⁴ 'At the end', Teller continued, 'the atomic explosion is always dwarfed by its setting. But the work that culminates in the detonation is rewarded by something quite different from a flash and a bang.'²⁵ Furthermore, delivered as an image (and therefore often carefully exposed, angled and framed), the nuclear explosion could be experienced purely as a beautiful image. Certainly, the photographic

or filmic image of the desert explosion, as one film scholar has commented of the footage of the Trinity Site test of July 1945, is spectacular largely because it is safe: it is an aesthetic experience purged of all the less pleasant aspects – such as heat, loud noise, earth tremors, radiation risk – of the differently aesthetic experience of the actual event, even from a presumably safe distance.²⁶

- ¹⁵ Swiss artist Jean Tinguely began to articulate a critique of the aesthetics of the nuclear desert, and the processes of mediation shaping such aesthetics, in a tongue-in-cheek performance carried out in the proximity of the Nevada Test Site on 21 March 1962. Emphatically titled *Study for an End of the World, No.2*, Tinguely's explosive performance overtly spelled out the terminal, apocalyptic connotations of the nuclear desert even as it also seemingly mocked them. By contrast with the military conflagrations to which it so obviously made reference, Tinguely's performance was a rather low-tech, DIY affair, involving the artist himself lighting some dynamite and home-made bombs to destroy a precarious and intricate assemblage of found objects, dolls, metal scraps and wires he had built. But however low-key this may seem, Tinguely's 'end of the world' was to be, from its conception, an event to be experienced through the mediation and the aesthetics of television. Commissioned by NBC for *David Brinkley's Journal*, the broadcast a couple of weeks later contributed to generate worldwide press attention for the explosive performance, charged as it was with symbolism of nuclear destruction by both the location and the historic juncture. Indeed, besides the generic Cold War context, Tinguely's action took place during the escalation of the Cuban Missile Crisis, and, coincidentally, three months before one of the last and most notable detonations of the overground programme, the blast that hollowed out the Sedan crater and released unexpectedly high amounts of radioactivity.²⁷ In its reliance on television, Tinguely's *Study for an End of the World, No.2* brings into relief the way in which the nuclear desert, and the connected possibility of nuclear apocalypse, were made at once more aesthetic (in the sense of beautiful) and less aesthetic (in the sense of something being fully available to the senses and experience) by mediation and mass media circulation. As curator Karl Pontus Hultén put it in a discussion of the artist's penchant for staging pyrotechnic performances in the 1960s: 'television offered the prospect of a new audience; people could now view the most enormous and spectacular explosions in complete safety'.²⁸ Furthermore, through its less than subtle parody, Tinguely's *Study* not only played with strategies of mediation and aestheticisation but played them out. In this way the work attracts attention to how, as a mass-mediated image, the nuclear desert was made not only spectacular and 'safe' (or at least less threatening) but also, at the same time, routine and mundane.
- ¹⁶ If visual records of nuclear testing are striking for their spectacular qualities, they are also notable for their relentlessness. Flicking through a publication such as *The Effects of Nuclear Weapons* (or looking at images of these nuclear operations on the internet), the sheer abundance of images produced and their iconographic repetitiousness is immediately evident. Ballard reflected on such insistence when, in the course of the commentary already cited at the start of this article, he talked of the spectacular yet 'endless newsreel clips of nuclear explosions that we saw on TV in the 1960s'.²⁹ As Ballard pointed out, the film director Stanley Kubrick had as early as 1963 'caught perfectly' both the 'carnival air' and the routine of these televised explosions in his acclaimed *Dr Strangelove: Or, How I Learnt to Stop Worrying and Love the Bomb*.³⁰ Rounding off the film's satire of the Cold War, the last scene is a montage of stock footage of mushroom clouds as would have then been circulated regularly on television, ironically set to Vera Lynn's song 'We'll Meet Again' (from the eponymous war-time British musical of 1943), which lays emphasis on both the repetitiousness of nuclear explosions themselves and how routine they had become via mass-media circulation. It was possibly with this closing sequence in mind that, a few years later, the Italian director Michelangelo Antonioni crystallised the spectacular relentlessness of the nuclear desert in the finale of his film *Zabriskie Point* (1970).

The end of *Zabriskie Point*

- ¹⁷ Shot on location in Los Angeles and the Mojave Desert, *Zabriskie Point* was the Italian director's first and only film on American soil. Fittingly for a film that, as Canadian artist Rodney Graham has quipped, was 'the bomb that almost sunk Michelangelo Antonioni's film career', *Zabriskie Point* famously ends with a grand explosion in the desert that destroys a mansion in the style of Frank Lloyd Wright (figs.5 and 6).³¹ For approximately two minutes the screen offers the viewer a spectacle of smoke, fire and flying debris that

culminates in an almost monochromatic red when the blast is finally shown in close up. In fact, the scene does not actually end with this close up, but continues for several more minutes in slow motion. To a soundtrack by Pink Floyd, the camera follows the seemingly anti-gravitational flight of the house's contents (breakfast cereals, a chicken, books, clothes) into an icy-blue sky, as furniture and household appliances disintegrate. While this scene is often read as an indictment of American consumer culture, its specific dynamics and iconography – comparable to Tinguely's *Study for an End of the World, No.2*, though more literal – undoubtedly make reference to desert operations, and in particular to the systemic practice of assessing the resistance of buildings and infrastructure. Furthermore, like Tinguely's, Antonioni's blast for his film was actually carried out near the Nevada Test Site, less than a hundred miles from it. The scale of the two events, however, was rather different, although the logistics and costs of Antonioni's scene came closer to those of an actual nuclear test than to Tinguely's altogether more DIY operation. The director insisted on a life-size rather than model-size replica of the house, and had the explosion filmed simultaneously by a battery of seventeen cameras, each placed at a different distance and angle from the blast. Trenches were prepared for sheltering the operators of the cameras closest to the blast, and petrol was mixed to the explosive to produce a mushroom-cloud effect. ³²



Fig.5
Michelangelo Antonioni
Zabriskie Point 1970 (film still)



Fig.6
Michelangelo Antonioni
Zabriskie Point 1970 (film still)

- ¹⁸ The end of *Dr Strangelove* might have been on Antonioni's mind when devising the end of his film, yet *Zabriskie Point* does not conclude with a series of different explosions, like Kubrick's film, but with a single dramatic explosion repeated from different viewpoints and distances about a dozen times. This formal strategy turns the violent, sudden instant of the blast into something both insistent and persistent, something that, through repetition and return, goes on for almost two minutes (or even five, if counting the further three minutes of objects exploding and flying off in slow motion which complete the scene). Even more pointedly than the use of stock footage in *Dr Strangelove*, such insistent repetition of the same explosion summons the relentlessness of testing itself, and of its mediatic diffusion – the spectacular yet 'endless' qualities, as Ballard put it, which both nuclear explosions and their images had by the 1960s. The cinematic repetition of the explosion offers an allegory of the repetitiousness and systemic intensity of desert testing on the one hand, and a literalisation of its mediatised reproduction, multiplication and recursiveness on the other.³³ In other words, it suggests that if repetition and endurance were attributes of desert testing itself, these attributes were reinforced – or even partly constituted – by its reproduction and diffusion through representational technologies. Furthermore, these attributes of repetition and endurance may also somehow be descriptive of the very end nuclear testing adumbrates and makes thinkable and, even, possible.
- ¹⁹ Playing on the special significance that accrues to it from being the film's finale, *Zabriskie Point's* mock nuclear explosion offers a peculiar kind of end. This is an end that unfolds through repetition or, in fact, that repeats. It is thus also an end which, at some level, seems to enact a paradoxical refusal or inability to end. This literal and insistent recurrence of the explosion in the film makes manifest something crucial about the type of end that desert testing promised or, conceptually and historically, came to stand for. Like an X-ray picture or an architectural section, the repetition of the explosion helps reveal the very skeleton or structure of the immanent end encapsulated by nuclear testing.
- ²⁰ To consider this structure it is necessary to go back to Kermode's *Sense of an Ending*, and his contention that, by the 1960s, a sense of the end had switched from imminence to immanence. As has been seen, a fundamental attribute of an end thus conceived is, by definition, non-transcendence. An immanent end is intrinsic to, and continuous with, the world. But Kermode placed emphasis on another somewhat paradoxical aspect of such an end: its endlessness. According to Kermode, this (late) modern conception of the end can still be seen to derive from traditional – divine or transcendent – apocalyptic narratives, but for the fact that it

radically disarticulates those narratives, selecting, instead, one moment from these fictions that comes to be indefinitely expanded. This moment is the *transitus*, the stage of transition or passage before revelation, final judgement and rebirth, which featured in medieval as well as New Testament apocalypses in the Christian tradition, and which, Kermode explained, is the 'historical ancestor' of the modern end. Stripped of its initial 'number associations [for example, the three and a half years of the Beast]', the interstitial period has not only been 'elevated into an "age" or *saeculum* in its own right' but moreover, indeed, into an age that 'has become endless' or, at least, is felt to be going on indefinitely.³⁴ The modern apocalypse Kermode described, then, unfolds through repetition and recurrence. It configures an end that expands and dilates because its narrative is truncated and perpetually caught in the turning point of crisis. Lacking resolution – the transcendent promise of renewal or of another beginning – the apocalypse specific to late modernity outlined by Kermode is one where the end endures. In fact, if in 1967 – when *The Sense of an Ending* was first published – Kermode had described this new perception of the end by drawing on literary sources (Samuel Beckett and Alain Robbe-Grillet especially), in a more recent epilogue he has laid emphasis on how, by and in the 1960s – with hot and cold wars, illustrious assassinations, and riots raging across the planet – the end was acutely felt to be relentlessly going on in the actual world as such.³⁵ This sense of perpetual crisis, Kermode has explained, 'register[s] the conviction that the end is immanent rather than imminent'.³⁶ Where an imminent end is yet to come, an immanent end is, in a fundamental way, already happening. By being inherent to the world, an immanent end is not only folded into the world, but also, because of this, something that remains or persists; an end, indeed, which paradoxically may repeat cumulatively or continue to happen without in fact ending.³⁷ If imminence is a promise or a threat, immanence is repetition.

²¹ It is this sense of the end that is encapsulated – less overtly in *Dr Strangelove* and Tinguely's *Study for an End of the World, No.2* – by the finale of *Zabriskie Point*. Amplified and yet fractured by Antonioni's strategy of repetition, the end of *Zabriskie Point* emphasises how the end of the world itself – or the prospect of it – was made both more and less absolute by nuclear testing. On the one hand, nuclear explosions made the most tragic and final possibilities for the world imaginable, in large part because they introduced the possibility of a historical, human-caused end, stripped of transcendent promise. Yet, on the other hand, nuclear testing contributed to multiply and relativise this seemingly more threatening or radical end. For not only was such testing, by definition, a trial rather than the real thing, it was also intensive and extensive, recurrent and turned into routine by mediatic diffusion. As the art historian Emily Eliza Scott has written of *Study for an End of the World, No.2*, 'Tinguely's project was a simulation of simulated ends carried out over and over again on a desert flat to the north, relayed, like its original, to the American public via television'.³⁸ If Tinguely's subtly titled *Study for an End* – rather than *the End – of the World*, or the closing series of explosions in *Dr Strangelove* began to outline this process of multiplication and relativisation of the end in post-war culture, *Zabriskie Point* spelled out the mechanics of the process itself, laying bare the alignment of the end with the repetition that motors it. As it draws on the nuclear desert – the desert of nuclear testing – for its halting finale, *Zabriskie Point* articulates effectively the immanence of the late modern end described by Kermode: without transcendent delivery, the end can only multiply and return, or indeed go on. At the same time, as the intensifying magnitude of the returning explosion, which is shown from progressively decreasing distances, also suggests, the end is not voided, reduced to meaninglessness by repetition, but rather it is made cumulative: repetition accumulates ends.

²² The grand finale of *Zabriskie Point*, then, is more than a fictional take on the most distinctively new – yet late – desert of the post-1945 world. At once spectacular and reflexive, its representation of the nuclear desert works to bring into relief the relentlessness and repetitiousness through which the aesthetics and the eschatological function of such a desert was constituted. To conclude, the discussion will shift away from more blatantly apocalyptic operations in the desert, and on to a contemporaneous, yet different, manifestation of the terminality of the desert. This is the desert of American artist Robert Smithson; a low-key and understated scenario of processes of environmental erosion and ruination, which also calls into play a different nuance of the immanence of the end in late modernity.

Endless end

- ²³ In 1972, about two years after he had completed the monumental coil that constitutes his earthwork *Spiral Jetty* 1970 in the north-eastern shore of the Great Salt Lake in Utah's Great Basin Desert, Smithson said:
- I'm not really interested in conceptual art because that seems to avoid physical mass. You're left mainly with an idea. Somehow to have something physical that generates ideas is more interesting to me than just an idea that might generate something physical.³⁹
- ²⁴ In many ways this is what Smithson's emphatically material coil of 'mud, salt crystals, rocks, water' – a coil set in the desert and, literally and elementally, made of the desert – had achieved by then, in his own practice and thought at least.⁴⁰ As the essay 'The Spiral Jetty', 1972 articulated the earthwork into words – the description '[m]ud, salt crystals, rocks, water' repeated for every point of the compass presses this through with particular force – it showed, perhaps most effectively, how Smithson conceptualised the 'physical mass' of the desert and translated its matter into idea (or, perhaps more precisely, into another kind of matter, the matter of language).⁴¹
- ²⁵ Smithson's thinking on the desert shifted emphasis away from nuclear spectacle and onto a subtle and complex invocation of processes of environmental degradation, which, however, eschews the urgency and the explanatory simplifications of so-called prophets of environmental apocalypse such as Carson, Ehrlich and Commoner. Indeed, while the environmental dimension of Smithson's oeuvre as a whole is undeniable, the artist himself was sceptical of 'our present-day' or 'modern-day ecologists'.⁴² In particular, as art historian Ron Graziani has argued, Smithson was critical of what he understood as a 'tendency' on the part of some of them 'to put man outside nature, so that what [man] does is fundamentally unnatural'.⁴³ In this respect, Smithson's fundamental contribution to the ecological debates of his time resided perhaps in trying to make manifest this perceived unsolvable contradiction at their core. So that where, for instance, Commoner might speak of man and the ecosystem as two distinct, separable entities, Smithson might rather point to their fundamental indiscernibility, and the crucial obstacle that this indiscernibility constitutes for any solution to environmental problems.⁴⁴
- ²⁶ As it problematises any clear-cut opposition between humanity and nature, Smithson's desert also crucially functions as a manifestation of an immanent end perhaps above all – but an immanent end on which the angle of perspective, unlike the examples discussed so far, is no longer anthropocentric. Key to Smithson's thinking, in this respect, is entropy, a notion by which he was fascinated, and that by the 1960s had also become a kind of buzzword for many besides him. Originally developed in nineteenth-century thermodynamics, the concept of entropy had re-acquired currency in culture at large in the course of the 1950s, revamped in particular by its application in the nascent fields of information theory and cybernetics.⁴⁵ But if cybernetics turned entropy into a measure of disorder or 'noise' in a communication system, the term's original thermodynamic definition as an index of energy degradation and dissipation – and, therefore, as an index of a system wearing down and dying – remained the ultimate sense of the concept.⁴⁶ Even the founder of cybernetics Norbert Wiener, enthusiastic as he was that the science of communication systems he championed promised that the amount of entropy in such systems could be managed, capitulated *vis à vis* the (thermodynamic) entropy of the planet as a whole, whose inevitable increase he simply accepted. As Wiener wistfully put it in 1950, humanity's endeavours can only be 'a local and temporary fight against the Niagara of increasing entropy', which is a 'compelling' and 'persuasive' '*memento mori*' that communicates to us 'the very true sense in which we are shipwrecked passengers on a doomed planet'.⁴⁷ Indeed, the father of cybernetics' apocalyptic feeling that the power to control entropy eludes humankind on the global level indicates that, while the nineteenth-century concept had certainly been updated for the 'information age' in the second half of the twentieth, the term had also absorbed some of the period's pervasive 'sense of an ending' in the process, and may, more often than not, function as a kind of indicator of the end.
- ²⁷ Both the new, cybernetic understanding of entropy and the re-interpretation of thermodynamic entropy in a more overtly terminal key found in Wiener were almost didactically exposed by the writer Thomas Pynchon in his short story 'Entropy' (1960), which was to provide the core ideas for his more famous *The Crying of Lot 49* (1966).⁴⁸ Set in two separate flats within the same building, Pynchon's novella uses the one below to

illustrate cybernetic entropy – and the regulation, or lack thereof, of the transmission of information – and the one above for thermodynamic entropy. Ultimately it is the latter that not only ‘wins’, but that, shown to apply to the world or the solar system as a whole, whose gradual loss of energy and eventual ‘heat death’ it announces, is invested with apocalyptic connotations. Similarly, Smithson, who read and quoted Wiener in writings and interviews, drew on the updated cybernetic understanding of entropy, yet more fundamentally saw it as a kind of prophet of the end by referring the concept back to its thermodynamic origin. So, for Smithson, the sun is not so much a ‘giver of life’ but ‘a portent of entropy’, for even in the enormity of its energy there is indication of this energy’s inevitable dissipation. And thus, as he once explained, it was precisely as an example of ‘entropic footage’ that he decided to open the film *Spiral Jetty* (1970) – which, together with the 1972 essay, can be seen as one part of what is in fact a tri-folded work – with stock footage of the sun or, more precisely, with a close-up on a still of the sun and its flares: a ‘frozen’ image that may serve as a kind of memento of cosmic cooling.

²⁸ But if Smithson’s fascination with entropy reflected the apocalyptic anxieties of the post-war decades, it also offered an alternative interpretation of these concerns than the one offered by the imagination of nuclear or ecological catastrophe. Although entropy – and the kind of slow, geological entropy that interested Smithson in particular – could speak of environmental ruination, it did so in a different way than books such as Carson’s and Ehrlich’s. Entropy evoked an end which, while clearly immanent, called into play a complex and ultimately irreducible interaction of human and non-human causes. In this respect, its appeal lay in how it both problematised the oversimplified dichotomies and counteracted the transcendentalism of nature which Smithson detected in much contemporaneous ecological discourse.⁴⁹ Furthermore, entropy conjured an end that might exceed humanity itself, because within such a temporally expanded stage, humanity becomes merely one of the actors rather than the absolute protagonist.⁵⁰

²⁹ For Smithson, the end spelled by entropy was paradigmatically manifest in the desert – a spent and consumed space in which anthropogenic processes of intervention on, and ruination of, the landscape were irreducibly intertwined with geological and other non-anthropogenic processes. Smithson had begun to bring these dynamics into relief with his spiral earthwork, which he had conceived as a construction ‘physical enough to be able to withstand’ its own site, while also, from the start, being ‘intimately involved’ with the site itself, and with what he saw as the ‘climate changes and natural disturbances’ arising from it, such as changing water levels. As scientists who had begun to turn their attention to measuring the greenhouse effect and climate change in the 1960s might have suggested, the patterns of precipitation and drought responsible for the fluctuations of the lake’s water levels might, in their turn, be a human-caused phenomenon as well as a so-called natural one. Smithson’s ‘Spiral Jetty’ essay further articulated this complex interaction by describing the site of the earthwork as a landscape where human operations of exploitation and devastation not simply acted alongside but, in fact, were even thwarted or hampered by dynamics of geological and atmospheric erosion and destruction. The desert presented by Smithson in this text is a space that has been partly ruined by humanity in its attempts to extract oil, which left the site littered with ‘two dilapidated shacks’, ‘a tired group of oil rigs’, ‘pumps coated with black stickiness’ and ‘a hut mounted on pilings’.⁵¹ Yet, in a similar way to Herzog’s desert in *Fata Morgana*, or the fictional deserts of Ballard from which Smithson was directly inspired, this ruination by man seems, at the same time, to speak of the ruination of man. The site, Smithson wrote, ‘gave evidence of a succession of man-made systems mired in abandoned hopes’.⁵²

³⁰ While sketching out this complex and ultimately indiscernible interaction of the human and the natural – pointing to how humanity is not external to but part of nature – Smithson’s consideration of geological and atmospheric processes also situates environmental depletion within a time-scale far in excess of human and historical time. Shifting the emphasis from questions of causation to questions of perspective, what *Spiral Jetty* and, more broadly, Smithson’s desert offer is a telescoped view of the end. Unfolding in a time frame and at a pace that may even make it humanly imperceptible – or only perceivable as repetition, cyclicity, and endlessness – this is an end which, though clearly immanent, is also a less anthropocentric event than the end conceptualised by Kermode, or configured by the nuclear desert. Perhaps, while it may well be in great part caused by humanity itself, it is a non-anthropocentric end which may continue to unfold long after humanity has gone. In an often quoted passage from ‘The Spiral Jetty’, the desert at Rozel Point is

described, paradoxically, as a 'world of modern prehistory', where all the 'industry', 'technology' and 'machines' of modernity lie 'lost in those expansive deposits of sand and mud', 'rusted in the corrosive salt air'.⁵³ This is a desert that let Smithson imagine how the end may continue well after the end of the human, whose modernity has become but a prehistory. Arguably, what drives Smithson's interpretation and articulation of the desert is not the attempt to excuse humanity from culpability *vis à vis* environmental ruination, but, rather, to begin to outline a more complex, expanded and non-anthropocentrically immanent view of such a process.

1. J.G. Ballard, *The Atrocity Exhibition*, 1970, revised edition, San Francisco 1990, p.82.
2. Malcolm Bull, 'On Making Ends Meet', in Malcolm Bull (ed.), *Apocalypse Theory and the Ends of the World*, Oxford 1995, pp.1–17.
3. See Perry Miller, 'The End of the World' 1951 in *Errand into the Wilderness*, Cambridge 1956, pp.217–39.
4. Hannah Arendt, *The Human Condition*, 1958, Chicago 1970, p.6.
5. Frederick Buell, 'A Short History of Environmental Apocalypse', in Stefan Skirmshire (ed.), *Future Ethics Climate Change and Apocalyptic Imagination*, London 2010, pp.13–36. See also Frederick Buell, *From Apocalypse to Way of Life: Environmental Crisis in the American Century*, New York 2003.
6. See Robert Heilbroner, 'Ecological Armageddon', *New York Review of Books*, no.14, 23 April 1970, pp.3–4, 6–9, and Barry Commoner, 'Can We Survive?', *Washington Monthly*, no.1, December 1969, pp.12–2'. Both articles are reprinted in Carroll Pursell (ed.), *From Conservation to Ecology: The Development of Environmental Concern*, New York 1973, pp.106–15 and 79–89.
7. Ludwig von Bertalanffy, *General System Theory: Foundations, Development, Applications*, 1968, London 1971, pp.36, 33, 37. In the preface for this collection of papers, written over four decades and first published in the US in 1968, the Austrian-born biologist explained that 'systems theory is a broad view which far transcends technological problems'. It represents 'a reorientation that has become necessary in science in general and in the gamut of disciplines from physics and biology to the behavioural and social sciences and to philosophy', where the increasing complexity of structures requires a holistic approach, consideration of the organised whole (pp.xi–xii). Other important figures who played a role in this conceptual re-orientation include the psychiatrist William Ross Ashby, whose *Introduction to Cybernetics* (1956) aimed to promote the interdisciplinary application of the discipline's conception of systems, and the physicist Ilya Prigogine, whose research into complex, open systems, started in the 1940s, led to a Nobel Prize for Chemistry in 1977 (see, for example, Paul Glansdorff and Ilya Prigogine, *Thermodynamical Theory of Structure, Stability and Fluctuations*, New York 1971).
8. See Pursell 1973, where the trajectory of 'the development of environmental concern' is brought into relief by the juxtaposition of earlier articles, such as Stephen Raushenbush's 'Conservation in 1952' (pp.58–68; first published in *The Annals of the American Academy of Political and Social Science* in May 1952) and later essays such as Commoner's 'Can We Survive?' (1969). For more recent assessments of environmental concerns and environmentalism in America in particular, see, in addition to Buell 2003, Robert Gottlieb, *Forcing the Spring: The Transformation of the American Environmental Movement*, Washington 1993.
9. See 'Earth Day: The History of a Movement', <http://www.earthday.org/earth-day-history-movement/>, accessed 12 April 2014. This sense of a holistic approach to the environment is also spelled out in the very title of one of the major publications of the ecological movement, *Whole Earth Catalog*, which started publication in 1968. See <http://www.wholeearth.com/index.php#>, accessed 12 April 2014.
10. Commoner, 'Can We Survive?', in Pursell 1973, p.80.

11. Rachel Carson, *Silent Spring*, Cambridge 1962 warned of the damaging effects of pesticides; Paul Ehrlich, *The Population Bomb*, New York 1968 considered the risk of overpopulation and resource depletion; Barry Commoner, *The Closing Circle: Confronting the Environmental Crisis*, New York 1971 addressed the problem of disruptions to the 'ecosphere' caused by rapid industrial development and growth.
12. Buell 2010, pp.15, 21.
13. Frank Kermode, *The Sense of an Ending*, 1967, Oxford 2000, p.6.
14. See James Morton Turner, 'The Politics of Modern Wilderness', in Michael Lewis (ed.), *American Wilderness: A New History*, Oxford 2007, pp.243–61.
15. J.G. Ballard, 'The Cage of Sand', 1961 in *The Voices of Time*, 1963, London 1992; 'The Terminal Beach' 1964 in *The Terminal Beach*, London 1964; and *The Drought*, London 1965.
16. For delineations of 'late modernity' see in particular Antony Giddens, *The Consequences of Modernity*, Cambridge 1990 and Zygmunt Bauman, *Liquid Modernity*, Cambridge 2000. The representations of the desert as a mystical or mythological space that also flourish in this period – as in Pier Paolo Pasolini's films, Alejandro Jodorowski's film *El Topo* (1970) and in Bill Viola's video *Chott-el-Djerid* 1979 among others – may be seen as not distinctively late modern because they consciously minimise signs of contemporariness on the one hand, and emphatically re-elaborate recognised orientalist and frontierist motifs on the other. Yet, to some extent, even this pursuit of established iconographies in order to present the desert as a timeless and ahistorical space paradoxically belies the late modern desert; it points to it by denial or absence.
17. For a general background on atomic testing during the Cold War see among others Howard Ball, *Justice Downwind: America's Atomic Testing Program in the 1950s*, New York 1986, and John L. Symonds, *A History of British Atomic Tests in Australia*, Canberra 1985.
18. See, for example, Frederick Jackson Turner's canonical 'frontier' text, 'The Significance of the Frontier in American History', 1893, in *The Frontier in American History*, New York 1921, pp.1–38. For a study of the role of the desert in the production of American cultural identity see Catrin Gersdorf, *The Poetics and Politics of the Desert: Landscape and the Construction of America*, Amsterdam 2009.
19. For an overview of such developments see David Teague, *The Southwest in American Literature and Art: The Rise of the Desert Aesthetic*, Tucson 1997, and Peter Reyner Banham, *Scenes in America Deserta* London 1982. Both these books address John C. Van Dyke's influential *The Desert: Further Studies in Natural Appearance*, first published in 1901 (see pp.126–44 and pp.157–8 respectively). Teague also discusses Nathaniel Shaler, 'The Landscape as a Means of Culture', first published in *Atlantic Monthly* in 1898, which, like Van Dyke's text, argued for the need to treat the American landscape as 'an aesthetic resource rather than an economic resource' to be 'consumed' (see Teague 1997, pp.112–13). For a consideration of the important role of photography and cinema see Edward Buscombe, 'Inventing Monument Valley: Nineteenth-Century Landscape Photography and the Western Film', in Patrice Petro (ed.), *Fugitive Images: From Photography to Video*, Bloomington 1995, pp.87–108.
20. See Joseph Wood Krutch, *The Desert Year*, New York 1951, and Aldous Huxley, 'The Desert' (1954), in *Adonis and the Alphabet and Other Essays*, 1956, London 1975, pp.73–86. These texts are indicative of the rapidly shifting perceptions of the desert in the 1950s.
21. Peter Goin, *Nuclear Landscapes*, Baltimore 1991, pp.3–27. See also *Nevada National Security Site History*, http://www.nv.doe.gov/library/factsheets/DOENV_1024.pdf, accessed 12 June 2014.
22. Samuel Glasstone and others (eds.), *The Effects of Atomic Weapons*, New York 1950; Samuel Glasstone and Philip J. Dolan (eds.), *The Effects of Nuclear Weapons*, Washington 1957. Revised editions were also published in 1962, 1964 and 1977.

23. Alessandra Ponte, 'Desert Testing', *Lotus International*, no.114, 2002, pp.56–79.
24. Edward Teller and Albert L. Latter, *Our Nuclear Future: Facts, Dangers and Opportunities*, New York 1958, p.80, cited in Ponte 2002, p.79.
25. Ibid.
26. H  l  ne Puisseux, *L'Apocalypse nucl  aire et son cinema*, Paris 1987, pp.18–20.
27. For a more detailed account and analysis of Tinguely's performance see Emily Eliza Scott, 'Elsewhere: Desert Ends', in Philipp Kaiser and Miwon Kwon (eds.), *Ends of the Earth: Land Art to 1974*, New York 2012, pp.66–85. See also Pamela M. Lee, *Chronophobia: On Time in the Art of the 1960s*, Cambridge 2004, pp.84–153, and K.G. Pontus Hult  n, *Jean Tinguely – M  ta*, 1972, trans. by Mary Whittall, London 1975, pp.232–40.
28. Pontus Hult  n 1975, p.238. Tinguely had set off a self-destructing assemblage in the Sculpture Garden c New York's Museum of Modern Art in 1960, called *Homage to New York*. He also orchestrated another apocalyptic blast – *Study for an End of the World, No.1* – in 1961 in the Louisiana Museum of Modern Art outside Copenhagen, and exploded a phallic-looking rocket outside Milan's cathedral in 1970, called *La Vittoria (Victory)*.
29. Ballard, *The Atrocity Exhibition*, p.9.
30. Ibid.
31. Rodney Graham, 'Softcore: More Solo Guitar Music for the Sex Scene, *Zabriskie Point*', artist's notes for live performance on 8 March 2001, Galerie Micheline Sz wajcer, http://www.gms.be/index.php?content=previous_main&id_exhibition=95, accessed 12 June 2014.
32. For detailed information about the blast see Sandro Lai's documentary *Michelangelo Antonioni: lo sguardo che ha cambiato il cinema* (2001) and the film's review in *Bianco e Nero*, vol.31, no.5/6, 1 May 1970, pp.29–48. The detonating appliances and furniture were filmed separately with a high-speed camera to achieve the slow-motion appearance.
33. It could also be noted that this is a repetition that allows – or, in fact, works through – difference: while the same explosion is shown via cinematic mediation and the reproducibility of the cinematic image, each instance of the event is also slightly different, captured from a different camera and in a different position.
34. Kermode 2000, pp.28, 101.
35. Ibid., p.181.
36. Ibid.
37. The idea that the late twentieth-century apocalypse lacks a redemptive or utopian element, and that the end may have become a banal, if not repetitive, event has been further articulated by postmodern thinkers such as Jacques Derrida, Jean-Fran  ois Lyotard and Jean Baudrillard. See Martin Jay, 'The Apocalyptic Imagination and the Inability to Mourn', in *Force Fields: Exercises in Cultural Criticism*, New York 1993, pp.84–98, and Krishna Kumar, 'Apocalypse, Millennium and Utopia Today' in *Bull* 1995, pp.200–24.
38. Scott 2012, p.83.
39. Robert Smithson and Gianni Pettena, 'Conversation in Salt Lake City' 1972, in Jack Flam (ed.), *Robert Smithson: The Collected Writings*, Berkeley 1996, pp.298–9.
40. Robert Smithson, 'The Spiral Jetty', 1972 in Flam 1996, p.149.
41. In fact, for his essay 'A Sedimentation of the Mind: Earth Projects', first published in *Artforum* in September 1968 (see Flam 1996 pp.100–13), Smithson was already thinking about the desert conceptually. At one point he says that 'the desert is less "nature" than a concept' (p.109). Conversely, Smithson was also reflecting on the materiality of words: in a 1972 note to the press release for his show at Dwan Gallery in New York in June 1967, he wrote: 'My sense of language is that it is matter and not

- ideas'. See Robert Smithson, 'Language to Be Looked at and/or Things to Be Read' (1967) in Flam 1996, p.61.
42. See Robert Smithson, 'Frederick Law Olmsted and the Dialectical Landscape', 1973 in Flam 1996, pp. 157–71.
43. Quoted in Ron Graziani, *Robert Smithson and the American Landscape*, Cambridge 2004, p.168.
44. Smithson, 'Frederick Law Olmsted and the Dialectical Landscape', in Flam 1996, p.164.
45. See, for example, Bruce Clarke and Linda Dalrymple Henderson (eds.), *From Energy to Information: Representation in Science, Technology, Art and Literature*, Stanford 2002, in particular Bruce Clarke, 'From Thermodynamics to Virtuality', pp.17–33. See also Matilde Nardelli, "'The Sprawl of Entropy": Cinema, Waste, and Obsolescence in the 1960s and 1970s', *NECSUS European Journal of Media Studies*, autumn 2013, <http://www.necsus-ejms.org/the-sprawl-of-entropy-cinema-waste-and-obsolescence-in-the-1960s-and-1970s/>, accessed 13 June 2014.
46. The cybernetic conceptualisation of entropy also relied on the statistical formulation of the term in thermodynamics elaborated by James Clerk Maxwell and Ludwig Boltzmann in the 1870s, which described entropy as the index of disorder of a system. In thermodynamic terms, where energy is measured as heat, and where it is known that heat tends to distribute evenly across a system, a condition of maximum entropy could be read as a state of 'disorder' where high-energy and low-energy molecules have thoroughly 'mixed'.
47. Norbert Wiener, *The Human Use of Human Beings: Cybernetics and Society*, 1950, revised edition, London 1954, p.134.
48. See Thomas Pynchon, 'Entropy' (1960) in *Slow Learner: Early Stories*, London 1985 and *The Crying of Lot 49*, Philadelphia 1966.
49. See Smithson, 'Frederick Law Olmsted and the Dialectical Landscape', in Flam 1996, pp.161, 163. For a nuanced and informative analysis of this see Graziani 2004.
50. See, for example, Robert Smithson and Alison Sky, 'Entropy Made Visible', 1973 in Flam 1996, pp.301–9.
51. Smithson, 'The Spiral Jetty', in Flam 1996, p.146.
52. Ibid.
53. Ibid.

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Matilde Nardelli is a teaching fellow in the History of Art Department at University College London.

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