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Black Gold: Digitally-Simulated Environments and the Material Aesthetics of Oil

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ABSTRACT

Sensory embeddedness (with an emphasis on environmental interdependency) has played an important part in ecological art practice. In the emergence of process- or systems-based art, and its indebtedness to early cybernetics, there is a focus on the interplay between artwork and spectator and the world or *umwelt* that emerges from their co-existence. This article will examine how this emphasis on embeddedness has translated into digital and new media aesthetics using John Gerrard's digital simulation, *Western Flag (Spindletop, Texas) 2017*, as an example. I argue that this genre of ecological digital art can be situated as a bodily practice within the wider framework of an environmental narrative. Moreover, there is an integral performativity in new media artworks that can contribute to a deeper understanding of the anthropogenically-driven environmental crisis.

KEYWORDS

digital and new media art; eco-digital art; ecological art and activism; petrocultures

On 10 January 1901, a wildcatter named Anthony F. Lucas (originally Antun Lučić) drilled into a salt dome formation on Spindletop Hill, Texas. The ensuing oil eruption has since become notable as the environmental event that augured the petroleum age. For nine days, the Lucas Gusher emitted an estimated 100,000 barrels a day, reaching a height of forty feet, before finally brought under control. In the following rush to harness the outpouring of oil, Spindletop and the adjacent town of Beaumont boomed from a population of 8,000 to 60,000. Over 1,500 oil companies were chartered within the year. By 1903, over four-hundred wells had been drilled in the area and the landscape had changed beyond recognition (fig. 1). The region was decimated as oil exploitation trumped social, environmental and civic concerns. In the aftermath, the visual iconography of the event (captured in photographs and reprinted in postcards) reinforced in the public mindset the bountiful image of the oil gusher (fig. 2). Over one-hundred years later, Irish media artist John Gerrard created a digitised simulation of the site (fig. 3). The two events, the eruption of the Lucas Gusher and its digitised simulation, entitled *Western Flag (Spindletop, Texas) 2017* (hereafter *Western Flag*) bookend a century where oil has surpassed coal to become the pervasive behemoth of our fossil fuel-driven society. This article will examine the oil spill and its material and aesthetic networks not as a history but as an oil-saturated and all-encompassing environmental narrative that counters traditional framing devices.



Fig. 1 Spindletop Boiler Avenue (1903). Image Courtesy of Tyrrell Historical Library



Fig. 2 Lucas Gusher (1901).
Image Courtesy of Tyrrell
Historical Library



Fig. 3 John Gerrard, *Western Flag*
(*Spindletop, Texas*) 2017. Digital
Simulation, 2017. Image Courtesy
of the Artist, Thomas Dane
Gallery, London and Simon
Preston Gallery, NY

Gerrard uses the digital moving image to create an environment that echoes the original Spindletop but also operates as its own world. It is an artwork that prompts questions about the exploitation of fossil fuels and the impending catastrophic impact of anthropogenic climate change. The work was broadcast on television and online as well as exhibited on a large screen in the courtyard of Somerset House in London. The recent material turn in humanities scholarship has argued against the supposed virtuality of digital culture in favour of its materiality (Bennett; Latour). Although the oil itself seems visually absent from this simulation, there are the material traces that remain embedded in the landscape. What is evident is how *Western Flag* operates from the place

of what artist and geographer Trevor Paglen calls “machine vision” where “digital images are fundamentally machine-readable regardless of a human subject” (para. 8). This phenomenon of digital imagery “allows for the automation of vision on an enormous scale and, along with it, the exercise of power on dramatically larger and smaller scales than have ever been possible” (thenewinquiry.com, para. 8). Just as Paglen points out that computer generated imagery can operate outside of human vision in ways that traditional photography could not, *Western Flag* runs algorithmically whether the observer is involved or not. What is left of a landscape is the silent enactment of a century of oil exploitation and its impact on the environment and its inhabitants. On the one hand, it is a faithful rendering of the site, but it is also invented, with a flag marking the mediated version. But in removing the human experience from the landscape *Western Flag* leaves us with the non-human actors and their agency, as Jane Bennett argues, “things, too, are vital players in the world, existents in excess of their association with human meanings, habits or projects” (4). The embodied performance of these non-human actors forms the main thrust of this artwork, which reflects the energy dynamics of oil and digital culture more broadly. The visibility of non-human actors in networks of energy, such as that of oil, is a crucial part of the renegotiation of hierarchies of power that is active in contemporary cultural discourse.

For World Earth Day 2017, Gerrard’s CGI-simulated rendering of Spindletop was broadcast intermittently on Channel 4 (and live streamed on their website) and as an LED wall installation at Somerset House in London. The simulation consists of a *tabula rasa* landscape with a flag of black smoke around which the viewpoint rotates. The installation makes use of military and computer gaming technologies to parallel the real-time environmental changes in the Texan landscape. [1] Firstly, the site is surveyed (in this case, using drone technology) to create a comprehensive photographic archive. The photographic data is then transferred to a 3D model and the environment is reconstructed as a virtual, and temporal, world using game engine technology. The result is a piece of software that issues continuous instructions for the creation of a frame-by-frame simulation of the real Spindletop. It a live *enaction* of Spindletop, as reviewer Ben Eastham writes, where “every image is both unique and instantly discarded, meaning that the work is closer in spirit to the live interpretation of a score than the transmission of pre-recorded information” (181). It is not intended as a representation but as a live interpretation of a landscape.

The use of gaming technology and photography gives the artwork a sense of time passing and its effect on the objects within the landscape, something that is evident in other works by the artist (*Smoke Tree II*, 2006, *Dust Storm*, Dalhart, Texas 2007 and *Dust Storm*, Manter, Kansas, 2007). As Gerrard has noted “one aspect of the virtual, or real-time 3D medium that has always fascinated me is the extent to which the temporal becomes a sculptural element within it” (in Gerrard and Groom 123). The simulation can be seen at different times of the day and night in a slow panning shot around a barren and desolate landscape. *Western Flag* draws our attention to the site as the locus for not just the emergence of Texas Oil and the resulting American expansion but an environment that has endured catastrophe. Whereas contemporaneous images

[1] Werner Poetzelberger worked as producer on the project. Other contributors include the programmer, Helmut Bressler, and modelers Max Loegler and Philipp Marcks. Unigine, a cross-platform gaming engine, was used, and installation development was overseen by Jakob Illera at Inseq Design.

of the Lucas gusher showed figures dwarfed by the scale of the eruption, the landscape in *Western Flag* has no human presence. The activities that brought thousands of prospectors to the region with oil-harvesting technology, such as the derricks (fig. 1), have long disappeared. The remnants of oil fires and spills that were collected in the images, and which served as popular postcards at the time, now shadow a landscape that has been laid to waste. In *Western Flag* it is as if the past has had such an all-consuming impact on the present that they both collapse into this arrested version of time. The environment now resembles a scorched earth landscape, but the impression left by the artwork is not that of a redemptive beginning; the landscape it depicts is an endpoint, a ground zero.

Poisoned or decimated landscapes have previously been represented in art (emerging from apocalyptic narratives), some depicting the boomtowns of American capitalism (such as David Hanson's photographic series *Atomic City*). Others use the moment of crisis itself. One example is artist HeHe's recreation of the Deepwater Horizon oil spill in miniature, *Is There a Horizon in the Deep Water* (2011). This disaster occurred on 20 April 2010 when the oil rig exploded due to an uncontrollable blowout, not unlike historical oil spills such as the Lucas Gusher. But tied in with the notion of the apocalypse is redemption; after all, the word itself means rebirth, and the idea of redemption is notably absent in these sites. In contrast, these spaces are laid bare. *Western Flag* is a wasteland; the palette is flat and sombre, and the flagpole is staked in the centre, demarcating a land that lies devoid of value (at least in human terms). Out of the pole, seven plumes of smoke steadily poison the air, perhaps referring to the Seven Sisters, the common moniker for the seven oil companies that control global oil production and distribution.

The flag, too, is a simulated object. The black smoke that columns from seven nozzles creates the impression of a nebulous plume, an object that suggests, on the one hand, grieving or mourning, and, on the other, a burned flag: a violent act for the which the surrounding terrain could arguably become so like the landscapes that have been exploited in the intervening century. The flag is an attempt to make the carbon dioxide emissions that suffuse the history of the site more tangible in the mind of the spectator. The smoke points to the invisible matter that pervaded the environment. John Gerrard commented in the press release that "one of the greatest legacies of the 20th century is not just population explosion or better living standards but vastly raised carbon dioxide levels in the atmosphere" (para. 2). He follows by saying that a "new flag attempts to give this invisible gas, this international risk, an image, a way to represent itself (para. 2)." The proliferation and, indeed, the impact of carbon dioxide since the oil strike at Spindletop is concentrated in the elusive smoke that spirals out of the nozzles and is strengthened or weakened with the prevailing winds. The material interaction between toxins and bodies and the impact rendered by exposure is evident in *Western Flag*. The digital simulation, as a virtual object, mirrors the assumed immateriality of unseen components such as the buildup of carbon dioxide in the atmosphere.

According to Peter Galison and Caroline A. Jones, visual representations of oil disasters tend to fall into two categories. Firstly, there are the visceral close-ups of "pathetic oil-drenched creatures (seagulls, pelicans, turtles, dolphins),

safe in human hands” and, secondly, the satellite photographs of oil on the sea surface “reminding us that such distanced tragedy is the very stuff of the sublime” (49). The first is distinct in its materiality, the oil-soaked animal overcome by the toxic fluid that has played such a huge part in the global domination of one species. The tragedy of the oil-covered animal is countered by the sublime beauty of the satellite photography that makes up the second category. But with the Deepwater Horizon oil spill, mentioned above, came a new imaginary, according to Galison and Jones, one established by the footage taken by the BP underwater camera, which directly captured the oil gushing from the pipeline:

Of all the spill images, those provided by this camera were the only ones to be unprecedented, installing in our techno-imaginary the live feed of oil billowing from BP’s broken wellhead to form its own imagistic ‘gusher’, defeating all the technical verbiage (‘static kill’, ‘top kill’, ‘side kill’, ‘blowout protector’) and proving so incendiary that it took considerable effort by Representative Ed Markey (D-MA) to pry it from BP’s proprietary control. (49)

The continuous footage emerging for the live feed provided the spectator with an ongoing sense of an affective “intra-action” (to use Karen Barad’s terminology) due, in a large part, to the live actualisation of the events. In the case of new media, it is the impact of the algorithmically generated moving image that has transfixed the contemporary observer of environmental disasters. There has been a change in the temporality from real time to time that is encoded through computerisation, what Paul Virilio defines as machine vision where “one of the most crucial aspects of the development of new technologies of digital imagery” is the “relative fusion/confusion of the factual ... and the virtual; the ascendancy of the ‘reality effect’ over the reality principle” (60). The rise of the reality effect is clearly evident in the conflation of aerial photography and real-time technology used to portray Spindletop. The assumption of authenticity is relayed through the technology in what Virilio calls the emerging “*automation of perception*” which delegates the “analysis of objective reality to a machine” (59, emphasis in original).

The visual iconography of oil gushers can be one of uncontainable abundance: the flourishing that was tied in with the fulsome image of oil as sustaining economic development. In 1901, spectators came to view the Lucas gusher in the thousands to marvel at the event. Kathryn Morse points out that contemporaneous media focused on the scale of the gusher and “captured oil’s serendipitous abundance, power, and naturalness” (125). It was seen as a gift that reinforced the determinate narrative of Western expansion. It heralded an era of petromodernity that Stephanie LeMenager has described as having since “enveloped the Euro-American imagination to the extent that ‘oil’ has become implicitly synonymous with the world, in a large, Heideggerian sense of the human enframing and revealing of earth, thus the earth we know” (68). The social and cultural implication of a century of exorbitant oil consumption has meant that the material aesthetics of oil generally fall into two categories: abundance and devastation. In both categories, the sheer immensity of the scale is evident from the Lumière Brothers’ film *Oil Wells of Baku: Close View* (1896) to the recent pervasive seepage of imagery into everyday social living

conditions. LeMenager writes that “the human body has become, in the wealthier parts of the world, a petroleum *natureculture*, to use Bruno Latour’s term for the inevitable intermixture of the self-generating (organic) and the made” (69). It is pervasive and all-encompassing because “it has supported overlapping media environments to which there is no apparent ‘outside’ that might be materialized through imagination and affect as palpable hope” (70). Many contemporary cultural representations of oil depict environmental devastation and the ties to neo-capitalist infrastructures that underpin it. Timothy Mitchell has noted out that the “leading industrialized countries” also happen to be oil states and that, if the “energy they derive from oil” was absent, “current forms of political and economic life would not exist” (400).

Oil narratives have been framed in such binary terms (abundance and devastation). What has been omitted in these stories is the more nuanced role of the embodied spectator in oil’s infrastructure. Not just the body of those immersed in an oil-ridden society, that LeMenager points out, but by those engaged in the consumption of the oil spectacle. Many contemporary cultural representations of oil depict environmental devastation and the ties to neo-capitalist infrastructures that underpin it. The use of oil is not only endemic in the tools we use in our everyday lives (such as the proliferation of plastics) but it is the energy without which, if fears regarding the end of fossil fuels are realised, contemporary ways of living would collapse. Societal dependence on oil means that, in many ways, the environmental catastrophes that result in excavation and use have been overlooked. On the case of the Deepwater Horizon oil spill, Janet Stewart has written that “oil, in terms of its production and consumption, can be best grasped as the central node of a particular ‘assemblage’, which overlaps clearly with the two ‘great alloplastic and anthropomorphic assemblages’ that Deleuze and Guattari [...] identify in *A Thousand Plateaus*: the war machine and the state apparatus” (371). Oil, plastics, human and non-human bodies, and the social, cultural and economic structures that envelop them have become uneasy bedfellows in the newly demarcated Anthropocene. [2]

[2] The term denotes the move from the Earth’s previous geological epoch, the Holocene, to a new, human-generated era.

Contemporary visual representations of oil blowouts further earlier late-nineteenth and early- twentieth messages of oil as a metaphor for abundance. But current digital and new media work (with its emphasis on embeddedness, which in turn highlights the corporeal materiality of the human body) leads to a focus on the institutional and structural dynamics of oil. Work such as Australian artist Jon McCormack’s *Fifty Sisters* (2012), which comprises images of algorithmically generated plant forms derived from oil company logos, illustrate this viewpoint of oil stemming from and built into social and environmental structures. Many themes emerge in the field of digital and new media art, most prominently interactivity, virtuality and situatedness, which are all crucial spatial components in registering human/environment intersections [3]. With computer-generated imagery, such as *Western Flag*, there is an opportunity to focus on the temporality inherent in new media artworks rather than the interactivity (which as Lev Manovich has argued in *The Language of New Media* is too broad to be meaningful). The temporal dimension of new media artworks foreground (if those artworks are ecologically driven and environmentally minded) material non-human narratives. In this regard, Bruno Latour defines *geostories* as histories where earth agency reemerges and takes on

[3] Simon Penny makes the point in “Towards a Performative Aesthetics of Interactivity” that our experience of digital environments is founded in our “embodied experience in the world” (78). The interactivity of computational arts is built on a history of science and technology that emerged with the early cybernetics’ movement of the 1940s and the attempt to mimic natural process.

“all the characteristics of a full-fledged actor” (3). Latour distinguishes between matter as object (and shows relative disdain for reductive materialism) and a materiality that counters the current trend “deanimating the agencies we encounter at each step” (14). We should not be apologists for attempting to narrate non-human actors but should strive to find new ways of articulating and celebrating (or at least acknowledging) the difference between, as well as familial relations with other agents. Rather than trying to reconcile with nature, Latour argues, the “crucial political task” is to “distribute agency as far and in as differentiated a way as possible” (15). Media art plays a crucial part in this new aesthetic built upon material agency. *Western Flag* is a time-based digital artwork that links ecological materiality and the ecocentric narration of non-human nature. It could be argued that artworks that seem to place temporality over interactivity, such as Gerrard’s, expose natural life cycles and non-human narratives and are, by definition, geostories.

The flag of black smoke at the centre of the artwork and around which the viewpoint pans is a symbol of power and geographical specificity; something that counters the hegemonic powers underpinning petrocultures. The pervasive materiality of oil and non-specificity of the infrastructure surrounding and processing it have since been overwhelmed by the flood of plastic pollution. The dynamic between oil as a substance itself, oil working in the networks of energy that proliferate, and oil as begetter of plastic illustrates just how pervasive it is in our contemporary culture. In *Western Flag*, Gerrard deals with the aftermath of that process and the remains of an industry that overwhelmed the community or landscape from which it originated. The immaterial dimension of the artwork is evident in the digital coding of the landscape and the positioning of the flagpole as a reminder of the structural undercurrent that plays a role in facilitating these energy systems. But the temporal aspect of the artwork tethers the viewer to the landscape in real time. Not unlike phenology, temporal computer-generated imagery like *Western Flag* track the impact of the passing of time and its effects on material actors. This relationship relates to the natural rhythmic time in the body of the observer, an awareness that is cognizant of the dynamic of the moving image.

A difference between *Western Flag* and other computational applications is that the framing of the environment takes precedence over the interactivity of the user or spectator. One of the challenges for visual aesthetics that is thrown up by gaming technology is the seemingly permanent blow to traditional artistic perspective. The result is a fracturing, William Uricchio argues, in the “long regime of three-point perspective and its reification of an underlying understanding of subject-object relations” (26). Traditional perspective – as illuminated by the Heideggerian position of the “world conceived and grasped as picture” – emerges through the human as subject (129). Uricchio points to algorithmically enabled applications, such as Google Street View and the now discontinued Photosynth, as evidence of the dismantling of three-point perspective and, in its place, an algorithmic “intervention in the subject-object relationship” (30). The result is a total and temporal environment that breaks with traditional notions of framing.

Gerrard’s artwork is neither an attempt to capture an accurate representation of a landscape nor an apocalyptic vision of the future. LeMenager discusses

the use of screens displaying natural environments to hide ecological eyesores in relation to the 1930 Olmsted and Bartholomew plan to regenerate Los Angeles. She describes them as “attempts at a faux ‘atmosphericity’ that covers the sights and sounds of industries producing biochemical effluents already building toward the smog crisis” (69). In many ways, *Western Flag* counters that narrative of concealment; the environment displayed is Spindletop in real time in all its harrowing emptiness. But filmic representations of oil have generally followed the path of depicting oil as immense and boundless with a sublime quality that engenders admiration in the observer. LeMenager argues that the filmic depiction of an oil gusher (as seen from the perspective of a 13-year-old male narrator) in the film *There Will Be Blood* (2007) sees “industrial-scale pollution and waste translate into arousal and premature ejaculation” (74). [4] And many depictions of oil gushers have traditionally been a revelatory abundance. In *Western Flag*, however, there is an absence of life affirmation in a decimated landscape. For LeMenager, *There Will be Blood* “gives too much sensory information, as if it mourns not only its earlier industrial setting, petroleum ‘made by hand’ ... but also the film medium itself, its dream of a virtuality in which body effects break free of actual, situated matter” (81). She argues that “digital technologies promise to liberate the physical bases of film from petroleum” (81). In many ways (if oil is the utopia that our petroculture has fetishised) *Western Flag* is illustrative of the attempts at increasing dematerialisation – by an increasing reliance on the digital technology LeMenager mentions above – through its use of a digital, rather than material, environment (81).

[4] LeMenager discusses the novel *Oil!* by Upton Sinclair (1927), which formed the basis for the film *There Will be Blood* (2007).

Creating a geostory, or an authentic narrative engaging non-human agents, means approaching representation from an ecocentric standpoint. The spatial and temporal innovations that gaming (and, in particular, VR) technologies offer means that the way spectators perceive an environment can be more dynamic, interdependent and (to use Donna Haraway’s phrase) *tentacular*. These are not virtual entities, if such a thing exists, but active and embodied agents engaged in an interaction with the site as an aesthetic object. As such, it fits into Haraway’s description of the tentacular as a model for interacting, learning and creating:

The tentacular are not disembodied figures; they are cnidarians, spiders, finery beings like humans and raccoons, squid, jellyfish, neural extravaganzas, fibrous entities, flagellated beings, myofibril braids, matted and felted microbial and fungal tangles, probing creepers, swelling roots, reaching and climbing tendrilled ones. The tentacular are also nets and networks, it critters, in and out of clouds. Tentacularity is about life lived along lines – and such a wealth of lines – not at points, not in spheres. (32)

We can tentacularly explore not just the material fallout of ecological wastelands such as Spindletop but the networks that make up that narrative. Outlining the tentacular in *Western Flag* is an acknowledgement of the interdependence involved in the history of the site and the embodied experience of the spectator.

Gerrard's work is designed to make manifest the toxicity that has rendered contemporary environmental spaces a wasteland. The work complicates the polarising narrative of material versus digital. This is achieved using gaming technology designed to be interactive and yet there is a passivity in how the viewer experiences *Western Flag*. The post-boom site in the work is strewn with the abandoned machinery of the petroleum age. The wide panning shot leads us to perceive the environment as a gaming space. The uncanny beauty of the exhausted landscape emerges because of the media used to capture the site. As I mentioned earlier, this is Spindletop as a mediated gaming space. The 360° degree panorama serves to remind us that this is another type of space, a digital environment that has the potential to narrate the legacy of big oil on a global platform. The slow movement around the flag is unnerving for the viewer (perhaps suggestive of drone surveillance) as the piece moves through the daily patterns of sunrise and sunset: when the sun sets in Spindletop, Texas, the CGI environment is also obscured. The gods-eye viewpoint of *Western Flag* also differs from the general environment in gaming that is often experienced through an avatar. So, why is *Western Flag* such an important piece in both the field of digital and new media art and in artistic representations of climate change? There are two reasons: firstly, it challenges traditional anthropocentric notions of scale and, secondly, it contests the inherent performativity of interactive digital art. As Simon Penny has argued, “the lesson of performativity is that the doing of the action by the subject in the context of the work is what constitutes the experience of the work. It is less the destination, or chain of destinations, and more the temporal process which constitutes the experience” (83).

Nature and art aesthetics have traditionally parted ways in the spatial and temporal dynamics of perception; to be enveloped in a natural environment offers a different experience than the appreciation of an artwork. The innovations that gaming (and, especially, VR) technology offer users means that the way spectators perceive an art object can be more dynamic and can break down the traditional delineation between subject and object (as pointed out by Uricchio). But there is a differentiation to be made between, firstly, an increased focus on the interaction between artwork and spectator such as we see in durational artworks, including the dynamics of time-based “three-dimensional work” as defined by Donald Judd, and, secondly, traditional approaches to painting and sculpture that have focused on the dynamism of the art object itself. [5] Michael Fried's 1967 *Artforum* article “Art and Objecthood” famously criticises minimalist time-based artworks and the emergence of a “theatrical effect or quality – a kind of stage presence” of minimalist sculpture that he describes as “literalist art” (155). For Fried, theatricality is not art but a gimmick. One could argue that the same criticism has been leveled at new media art because the improvements happening in VR technology—for example, most recently engineers of the VR system Oculus Rift have overcome the residual motion sickness that plagued earlier models of VR headsets through an improved version known as Crescent Bay—has allowed users to immerse themselves more readily in digital environments. These improvements have had a profound impact on the use of digital technology by established artists. [6]

[5] Three-dimensional work is effective, according to Donald Judd, because “actual space is intrinsically more powerful and specific than paint on a flat surface” (184).

[6] Artists Jeff Koons, Marina Abramović and Olafur Eliasson premiered digital artworks designed exclusively for a VR platform in autumn 2017.

Technology is redefining the parameters of what an environment is. It is interesting that, when given opportunities linked to VR (i.e., unlimited spatial and temporal boundaries), Gerrard chose to mimic the real-life version of Spindletop. The artwork is unsettling in its similarity to Spindletop yet it reemerges in a world where the horizon could be endless. Indeed, Gerrard created an artwork in 2005, *One Thousand Year Dawn (Marvel)*, where the cycle of the sun moved so slowly that one-thousand years would be required for it to rise. As we know, the way we understand an artwork is as much about the encounter and the subjective experience of the viewer as it is about the piece itself. In many ways, artworks are human perceptions of the environment, but *Western Flag* has allowed the environment to operate independently of human intervention. This new and digital landscape that Gerrard has created is not a static painting; it continues to move and evolve with the passing of time (by virtue of an algorithm) that runs day and night whether there is interaction with the viewer or not.

Artwork for the Anthropocene

Since atmospheric scientist and Nobel laureate, Paul Crutzen popularised the term in 2001 for our (arguably) new geological epoch, the Anthropocene has emerged as one of the quintessential concepts signifying climate change. The framing of humanity as a geological force is challenging as it upends our traditional understanding of human agency. Theorists have engaged with the concept of the Anthropocene as a new model for thinking about the scale upon which humanity operates. Dipesh Chakrabarty has pointed out that “to call human beings geological agents is to scale up our imagination” (206). Bruno Latour, moreover, has noted this difficulty, suggesting that people do not have the “mental and emotional repertoire” to comprehend “such a vast scale of events” (1). How can an artwork capture or generate an appropriate response to the Anthropocene? In the same way that the pop art of Andy Warhol encapsulated the commodification of Middle America, should we have an artistic response to the environmental crisis that is engulfing us? And how do we begin to think about the gradations of responsibility wrapped up in that notion of a “we?”

One of the key points that has emerged in environmental discourse is the merging of art and science. There has been an increase in the use of scientific data and research in artistic practice. The idea of the artist/scientist has become prevalent as environmental issues, such as climate change, plastic pollution and mass extinction, have been at the forefront of cultural and environmental discourse and debates. Photography and photo-based artworks rely on harvesting real data with which to work. This type of practice considers how real events, situations and places are represented. In the era of the Anthropocene, the need for the arts to facilitate dissemination of information about, and foster debates around, climate is more pressing. With the rise of the citizen scientist (albeit sometimes countering the negative fake news narratives that are prevalent in the Trump era), there is argument that scientific data is perhaps not as objective as initially assumed. In many ways, contemporary Anthropocene narratives reaffirm an already established rhetoric of domination of the earth.

This is not an examination of Gerrard's simulation as representation only, but one that acknowledges the situatedness of the artwork with a network of agents that do not correspond to the subject/object relationship. That means that the historical context of the artwork (within the Anthropocene and the increasing merger of art and science) is important to exploring how the totalising environment of a digital simulation and the interaction of material in and out of the human body is represented in new media art and, more particularly, in *Western Flag*. The material interchange between bodies plays a crucial part in how artists depict environmental crisis such as oil spills. New media art is well placed to tell the story of how the atmospheric material that makes up our climate impacts the human body because the structure of the relationship between digital and material culture challenges traditional notions of corporeality. The importance of how natural environments and non-human animals are represented is crucial to how we engage with, and respond to, environmental crisis today.

Simulation and interaction are the trademarks of digital, rather than analogue, technology. The nature of computer-generated imagery is inherently performative and interactive. And yet interactivity is tied to bodily autonomy and agency. This dependency suggests other questions such as how is bodily matter performed? Forms of digital and new media art (particularly those involving gaming technology) and matter can often intersect through interaction. These entanglements of body and environment have made the art process in the age of the Anthropocene one of research responding to questions that arise from living in an age of environmental crisis. In many ways, digital aesthetics can renew the concept of materiality as it focuses on (digital) art-as-process rather than end product. Sean Cubitt has argued that "for the algorithmists, the engineering is inseparable from the art, in that sense extending the trajectory from Russian and Bauhaus constructivism ... rather than the anti-realist avant-garde of the autonomous signifier" (82). The spatial aesthetics of digital culture is infused with the idea of bio-regenerative networks populated by techno/biological life forms. The extension of this aesthetic into the field of environmental studies borders on the serendipitous.

[7] Passivity as opposed to action is something that has been addressed by Jacques Rancière as a crucial (dis)junction between the artwork and the spectator. The aesthetic experience has a "political effect" in the sense that, rather than "the framing of a collective body" that is proposed in theatre studies, the spectator should be aware of the multiplication of connections and disconnections that reframe the relation between bodies, the world they live in and the way in which they are "equipped" to adapt to it (72).

There is an advantage to understanding petroculture as a networked assemblage rather than as a binary narrative predicated on ideas of abundance or apocalypse. As Mitchell has pointed out, following oil relations connects "energy and politics, materials and ideas, humans and non-humans, calculations and the objects of calculation, representations and forms of violence, and the present and the future" (422). Oil narratives encompass the various non-human (and non-historical) actors that make up its emergence as the ultimate geological influence on the earth. With Gerrard's *Western Flag*, the spectator is not as agential as is the case in much computer-generated game play. Although the tools are there to allow the spectator to become more embedded in the environment (such as the real time progression or environmental narrative) the response is to passively watch the unfolding events. The effect is not direct action, as is seen in many new media artworks, but a collective experience that still emphasises singularity or "being together apart," as Rancière describes. [7] It is the recognition of our inability to escape our environment that allows for "new modes of political construction of common objects and new possibilities of collective enunciation" (Rancière 72).

In the case of *Western Flag* the dis-identification that is required for the spectator to understand his relationality to the material before him is in the positioning of the artwork in both Somerset House in London and its live broadcast on television. There is an emphasis in this article on what phenomena lie at the intersection between climate-related art, digital practice and the degree to which a spectator is able to interact with an artwork. The impact of the material interchanges between body and environment is a crucial part of digital art practice as it decentres and fractures (as Uricchio has noted) the subject-object relationship. It is perhaps no surprise that our bodies naturally respond to digital environments fleshing out the spaces in the same way we would a material space. Eco-digital art practice, such as that informing *Western Flag*, reveals that there is a dynamic and evolving environmental discourse emerging in artistic practices that centres on the human sensorium, its environment and digital technology.

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