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*Jane Bennett's thesis in Vibrant Matter argues that we need to find ways to acknowledge and engage with the agency of all factors that create ecologies and environments, including non-human actants. This essay argues that Richard Misrach and Kate Orff's project Petrochemical America signals some important strategies that are useful for developing visual political ecologies and understanding non-human actants, including the non-living. Although some of the images are typical scenes of environmental devastation, human and social links are made to foster the understanding that we are looking at an image of ecology rather than nature ravaged. In addition to the titles of images, captions and overall contextualisation of the project, Kate Orff's team SCAPE produce a series of diagrams called Throughlines that situate the subject of petrochemical creation and its impact in the Mississippi River corridor. The cumulative impact of Misrach's photographic approach, combined with the effective and systematic linking of his images to other forms of relevant information by Kate Orff, produces an understanding of environment as not only inextricably linked to human activity and habitation, but which also contains differing agencies constituting a broader ecology.*

Keywords: Art, Documentary, Political Ecology, Richard Misrach, Kate Orff

The past few years have seen an unprecedented resurgence of photography exhibitions engaging with the environment and environmental disasters.<sup>i</sup> This has been matched by an explosion of publishing on art and ecology that features photography, notably David Buckland's (ed.) *Burning Ice: Art and Climate Change* and *Art and Ecology Now* by Andrew Brown together with numerous artists' monographs.<sup>ii</sup> Photography and environmentalism, of course, is not a new phenomenon and photography has been often used in the protection of wildernesses. As Finis Dunaway has recounted in his book *Natural Visions*, photography can be a powerful tool that mobilizes both local and national populations to protect wildernesses through creating awareness of threats, creating value, fostering a sense of wonder and campaigning for protection. Such activities have been successful when specific locatable places known for their beauty or their unique wildlife habitat have been identified and defended. However, the modern environmental movement, which frequently cites Rachel Carson's book *Silent Spring* as its starting point (Cox and Pezzullo 39; Weintraub 14; Buell xi), faces more complex challenges as environmentalism fundamentally accepts the interrelationship of human and nature, and believes that thought and action needs to move beyond the protection of wilderness (Dunaway 195-6). Instead, our dwelling or working places, or spaces of enjoyment, leisure and wonder are at risk from toxins, climate change (including increased sea acidification, rising sea levels, drought, flooding and increasingly changeable weather patterns) and other threats. Such phenomena are challenging to visualize and have multifaceted and widespread causes (Peeples 374; Doyle). Economic models, such as capitalism and neo-liberal capitalism, are also seen as points of pressure because unbridled economic growth creates increasing demands for resources (Klein; Meadows, Randers and Meadows). Social formations, such as the Green movement or other groups concerned with

environmental justice aim to engage with these issues whilst acknowledging and attempting to change how these pressures are experienced unequally geographically, socially and racially (Cox and Pezzullo 42-46). How we understand the relationship between the human and environment has therefore been changing and new theoretical areas and debates about ecology have had a significant impact on the production of art. The awareness of complex interlocking problems has prompted artists and photographers to find compelling ways to propose new ways of living, of decreasing our environmental impact and of raising awareness of the myriad complex issues that constitute environmentalism today (Weintraub; Barbican Art Gallery; Brown).

The knowledge that art, and photography in particular, are known for being carbon intensive in many stages of manufacturing and consumption, creates anxieties about the purpose of environmental or eco art (Hughes loc. 228-252; Miles 2; and Weintraub 43-50). Indeed, such anxieties prompt questions such as, whether art will create some change and whether the results are worth the resources required for production. The hope that art and photography will contribute to positive change in society is frequently articulated (Miles 2; Brown 15; Weintraub), although few empirical studies on the impact of art exist. Nonetheless, Jennifer Peeples, in her analysis of Edward Burtynsky's oeuvre, has argued that it is possible for art photography to create attitudinal change (380), encourage reflection on consumptive habits (including reflection on the complicity of viewers in the devastation that they view (388)), and bring about the feeling that positive change is possible (387). Further, photographs can determine which "crises and catastrophes we pay attention to" (Sontag 105) and Ferreira, Boholm and Löfstedt have argued that photographs can increase knowledge of "the fragility of life-systems in face of different kinds of hazards" (283). Some commentators, in light of these anxieties ask whether such awareness will successfully avert the disastrous consequences of more than a two degree Celsius change in temperature, and has led many to express optimism in technology to help avert disaster, otherwise known as Bright Green Environmentalism or Ecological Modernisation (Hughes Loc. 730; Buell 45-49).

Anxieties about the effectiveness of the art photograph are undeniably connected to the highly ambiguous presentation of many books and projects (Peeples 376-377; Schuster 195). Photographs are notoriously ambiguous objects to pin an exact meaning to, although many theorists emphasize the importance of context for the generation of meaning (Walker 54-56; Wells, *Thinking About Photography* 70-71). Accompanying information in the form of an introduction, artist's statement or individual captions for images are usually instructive for ascribing meaning, although the role in regard to future action or anticipated effect on the audience can still be undefined; this is particularly prevalent in art monographs or exhibitions where little explicit attention is given to directing behavioural changes or encouraging campaigning or other political actions. Artworks in galleries or artist's monographs, of course, do acquire aesthetic meanings and situate the resulting images as "art" or as products from the artist's vision and imagination. Writers such as Andrew Brown, however, have assigned a lot of photography in his book to the category of "Re/View," which is defined by the photographers' motive to:

... represent the world as they see it, in all its splendour and horror. They consciously adopt the role of witness, observing the processes of nature and the activities of humankind from a position of relative detachment in order to provide testimony or evidence of their effects. ... Like investigative reporters, they document, reflect and comment on the myriad changes, both global and local, that are affecting the environment in which we live and on which we depend. (18)

Although Brown notes that many of the artists that he includes in his volume could have been inserted into a number of different categories (15), the photograph for Brown has specific values: "... it is no coincidence that many of the artists ... [in "Re/View"] use photography, considered by some to be the most objective of all the art forms and thus the most appropriate with which to document the external world truthfully and honestly" (18). Whilst Brown acknowledges that the artworks included in this section include highly subjective responses to their subjects and situations, the role of "documenting," "witnessing" and "testimony" stand in contrast to other sections of the book, notably, "Re/Form," "Re/Act" and "Re/Create," where artists experiment with alternative models of living and engaging with the environment. The photograph in the context of art and ecology, then, is seen as a tool for witnessing the changes to our planet, environment and weather systems, but is less dynamic in proposing a vision for the future.<sup>iii</sup>

Julie Doyle has explored this issue in relation to photography and climate change from a more theoretical perspective. Doyle notes that "photographs of melting glaciers function as powerful and persuasive signs of the visible impacts of climate change upon the landscape" (279) that have "persuasive force" (280). Using Roland Barthes' famous claim from *Camera Lucida* that what is seen in the photograph means "the thing has been there" (80), Doyle demonstrates how the photographs of glacier retreat are essential to climate change campaigning because they prove that this phenomena is happening because it is demonstrated by the referential force of the photograph; this also helps explain the important documentary function of such imagery within environmental discourse. In addition to that, however, Doyle, again using Barthes, notes the *pastness* of the photograph as the temporality of the image represents "what has been" (280). Doyle claims that such realizations are "catastrophic in the context of climate change campaigning, which necessitated action to prevent climate change *before its effects could be seen*" (280; emphasis in the original). Comparing before and after photographs of collapsing and retreating glaciers Doyle concludes that photographs

... say what is, but in doing so they render climate change as a past event, captured and contained by the photographic medium. They call upon the viewer to acknowledge the negative impact of climate change through visual evidence of a changed landscape, yet they do little to enable the viewer to do anything about this... [The photographs] remain bound by their own temporal limitations. (293)

Doyle further claims that future scenarios need credible realities and “photography cannot visualize the future as a present threat” (294). Doyle notes that these future realities can be represented through other means such as visual data (294).

The limitation of the photograph to represent only the past has been challenged by Eugenie Shinkle. In the analysis of Pieter Hugo’s *Permanent Error* (2009-10), which depicts workers processing recycling materials without adequate protection in a devastated landscape, and Ian Teh’s *Tainted Landscapes* (2007-8), which depicts various ravaged landscapes, Shinkle proposes that the photographs are able to

... increasingly participate in generating, transforming and disseminating perceptions of technologically-produced environmental risk, posing environmental catastrophe as a globally shared social and political reality. Such work shapes the perception of global risk in the present by giving visible and palpable form to an unknowable future. (29)

Building her argument upon notions of risk society, as developed by Ulrich Beck and Anthony Giddens, together with an understanding of how human perception can tell whether a landscape offers the potential for shelter and sustenance, Shinkle notes that photographs have affective abilities that extend beyond purely rational engagements with images. Potential future environments, as prompted or suggested by viewing these photographs, “are rendered both visible and palpable” (36). The photographs, then, act

... not simply as documents of the present, but as apprehensions of the future. ... [T]he work of Teh and Hugo inscribes the possible consequences of our collective activity into the here and now of human living. Its intent is not to control or predict the future, but simply to confront us with the fact of its latency in the present – and thus, perhaps to equip us with the kind of emotional and political commitment that will allow us to meet its challenges with equanimity. (37)

Significantly, the photographic bodies of work that Shinkle examines are visually compelling, “straight” photographs that utilise little by way of contextualising information. They are therefore less effective at demonstrating the connections to the social material relations that lead to the creation of such environments and are typical of much contemporary photography in that the meanings of the images are left deliberately ambiguous. Viewers who have both advanced knowledge of the production, dissemination and disposal of commodities and the requisite knowledge to read photography in an art context are more likely to share Shinkle’s interpretation of Teh’s and Hugo’s images. Indeed, Joshua Schuster has produced a compelling materialist reading of Edward Burtynsky’s oeuvre through similar formal readings (Schuster). Both Shinkle’s and Schuster’s arguments are compelling but their propositions ultimately rests upon the reading of the image in formally innovative ways; more significantly it potentially overlooks the unequal experience of pollution geographically, racially and socially, inequalities which are likely to persist in the future.

This essay, then, wishes to challenge both Brown's and Doyle's assessment of photography as being mainly or exclusively a vehicle for reflection and for witnessing the past. Whilst their observations and theoretical thrust have both weight and credibility, their statements and arguments overlook the photograph's continuing ability to speak to the present and to help viewers imagine the future. Shinkle's proposition then, of photographs giving "palpable form to an unknowable future" (29) is useful, but more attention needs to be made to the social, historical and material context of the ecologies imaged. In contrast to the existing debates about photography's intrinsic connection to representations of the past and in failing to help us imagine the future, I would like to challenge the proposition that photographs are intrinsically limited to representing the past. I will examine Richard Misrach and Kate Orff's book *Petrochemical America*, which will enable a discussion around the social, material and economic aspects of petroleum to be examined in relation to notions of political ecology, specifically Jane Bennett's theoretical propositions from *Vibrant Matter*. By borrowing Bennett's thesis (details of which will follow) the photograph and its other accompanying materials can be said to become "vibrant" objects that have the potential to engage us, and other vibrant objects, in complex relationships. Furthermore, the artists seem to have begun to acknowledge not just the important social, historical and economic relationships that are contributing to environmental, social and ecological decline, they also seem to be tacitly noting that the various elements of the environment, including the enormous array of petrochemical products, as well as living and non-living matter, are actants in themselves. Importantly, their book contains a *Glossary of Terms & Solutions for a Post-Petrochemical Culture* (Orff), which facilitates the connections between images of contemporary Western degraded environments, to the complex social and economic reality of the present, and to differing futures.

## **Ecologies**

The term "ecology" has a complex history, although many theories of ecology stress interdependence between humans and nature or between different types of living organisms. Of interest here are notions of political ecology, which emphasises ecology as "power laden rather than politically inert" (Robbins 13). Although the types of studies and methodologies within political ecology are very varied there is a shared interest in the "condition of the environment and the people who live and work within in it" (Robbins 13). Paul Robbins has undertaken analysis of political ecology and found that there are five main narratives: degradation and marginalisation (with marginalised people often blamed for the degradation); conservation and control (which can sometimes be pernicious, especially when it affects indigenous or local populations); environmental conflict and exclusion; environmental subjects and identity (which examines political identities and connections to livelihoods); political objects and actors, where "political and economic systems are shown to be underpinned and affected by the non-human actors with which they are intertwined" (22). Many political ecology case studies and theories contest the value and practices of neoliberal capital and how this impacts on local communities. Malcolm Miles further argues that political ecologies see "the development advocated by global capital ... [as] the problem, not the solution" and that technologies advocating progress "are not always appropriate" (44).

Jane Bennett's political ecology is interested in non-human actors. It therefore takes into account not just human and non-human lives, but also accounts for the non-sentient and non-living. Bennett's thesis uses philosophy and political theory to argue that objects are not inert but are vibrant, that is, that they can form "lively powers of material formations" (vii). She maintains that in many cultural practices where we see matter as inert, we see the world open to exploitation, as something that we can act upon. Indeed, "[t]he figure of an intrinsically inanimate matter may be one of the impediments to the emergence of more ecological and more materially sustainable modes of production and consumption" (ix). Her point, then, is to "encourage more intelligent, and sustainable engagements with lively matter and lively things" (viii). Bennett draws upon Spinoza who proposed that substances are all made of the same matter (xi) and that each thing strives to persist in its being (*conatus*), including objects. Bennett, drawing upon Deleuze and Guattari, sees human activity within an assemblage where agency becomes "distributed across an ontologically heterogeneous field" (Bennett 23). Indeed, the emphasis is very much upon the word *actant*, which stresses the potential influence of any object, whether it is animate or inanimate; actant is used in preference to agency or actor, which stresses human influence and determination (Latour 303). Thinking about how such ideas have the potential to influence politics, or even a polity, Bennett argues, "all material bodies are potential members of the public" which potentially enables humans to "discern more fully the extent of the... power [that other actants have] over me... [and] how ... these nonhumans [might] contribute to its solution" (Bennett 103).

Bennett is not attempting to deny materialism, but to complicate the existing picture surrounding materialism, arguing that "... American materialism, which requires buying ever-increasing numbers of products purchased in ever-shorter cycles, is *antimateriality*. The sheer volume of commodities, and the hyperconsumptive necessity of junking them to make room for new ones, conceals the vitality of matter" (5). Further, Bennett sees structural ways of understanding humans in context, or understanding agency against a socio-political backdrop, as limiting our understanding of assemblages because within traditional materialist accounts the "structures, surroundings and context make a difference to outcomes, but they are not quite [treated as] vibrant matter" (29); all that is non-human in our environment, then, does not have agentic impact within these analyses. Bennett proposes that "vital materialism would run parallel to a historical materialism focussed more exclusively on economic and social structures of human power" (62). Indeed, such propositions seem to be having an impact within political ecology as Paul Robbins has noted how non-human actants can have impact on the accumulation of power and capital (238).

Environmentalism, for Bennett, still positions the human as the apex of a hierarchical relationship between human, animal and environment and she is attempting to redress this with her thesis. Bennett notes that environmentalism as it stands will find it difficult to comprehend elements of the ecosystem as members. Indeed, vital materiality has the potential to draw attention to the "complex entanglements of humans and nonhumans" (112). Bennett certainly believes that environmentalism needs to "engage more strategically with a trenchant materiality that is us as it vies

with us in agentic assemblages” (111). Although Robbins has noted that such arguments about objects are obvious and that political ecology should not start with the urge to demonstrate “such banalities” (241), Bennett is making the point that nature is neither purposive nor blind and instead vibrant matter interrupts “both the teleological organicism of some ecologists and the machine image of nature governing many of their opponents” (112).

This essay specifically argues that implicit in Richard Misrach and Kate Orff’s book *Petrochemical America* is an understanding of the material agents deriving from the petrochemical industry and material agents from ecosystems. I am not arguing that Misrach and Orff work knowingly within a “vibrant matter” framework, but that their work can be read as producing vibrant materialities that produces an understanding of ecology as agentic assemblages that include human and other actants; indeed, it will be seen that perhaps photography and art are also vibrant in themselves. Importantly, their work engages with materiality in a number of different ways, including the social and political, and seeks to help readers imagine differing ecological futures and therefore the project is systematically concerned with political ecology. Their work, moreover, has the potential to suggest myriad subjective responses that reignite socially dynamic ways of resolving ecological problems.

### ***Petrochemical America***

*Petrochemical America* is a book of photographs and “Throughlines” by Richard Misrach and Kate Orff.<sup>iv</sup> Richard Misrach is a well-known American landscape photographer associated with the American West, although he has worked with politically charged landscapes before, especially his nuclear test site series (Tucker, 1996). Commentators, notably Rebecca Solnit, have provided a compelling political context for some of his photographs, linking his images to different forms of violent beauty, which are often manmade and deeply troubling (63-89). Yet Liz Wells has suggested that “Misrach’s engagement with the politics of land use ... sometimes seems incidental to his priorities as a visual artist” and that such work simply prompts “existential responses that provoke little in the way of political debate” (Wells, *Land Matters* 108-9). *Petrochemical America*, on the other hand, is an undeniably socially and politically engaged project. This project focuses on a geographic area that stretches one hundred and fifty miles along the Mississippi River corridor from Baton Rouge to New Orleans, an area known colloquially as the “River Road” or “Cancer Alley”. The book is split into two sections. The first section, “Cancer Alley,” contains landscape photographs produced by Misrach in 1998 and 2010, the result of two separate but connected commissions by the High Museum in Atlanta for their *Picturing the South Series*. The series includes photos of the plantations, other indicators of the history of slavery, as well as images of agriculture, suburban living and images depicting petrochemical processing and distribution. The 2010 commission also prompted Misrach to explore environmental solutions, which resulted in a collaborative encounter with Kate Orff, landscape architect, associate professor at Columbia University and founder of SCAPE.

Orff’s contribution, the “Ecological Atlas” occupies the second section of the book and comprises a series of texts and diagrams, called Throughlines. These graphics

and texts incorporate Misrach's photographs, together with drawings and statistical data providing information about the consumption of oil in the States, together with oil's related products and the relationship of the consumption of oil to a wider global and environmental context. This far-reaching section outlines the impact of oil on the environment from its extraction, processing and distribution, to the uses and effects of oil-related products and the influences these activities have on the complex yet fragile communities and ecologies in the Mississippi Delta. Texts that acknowledge the global impact of oil inform the reader about outsourced labour in the developing world and other areas of devastating pollution (166-7). Brief mention is made of climate change on some of these pages, although the focus of the book is more on erosion and toxic pollutants. This part of the book is both visually and informationally rich, demonstrating the interconnecting influences of the petrochemical industry on many aspects of American life and beyond. Finally, in Orff's separate supplement to the book, *Glossary of Terms & Solutions for a Post-Petrochemical Culture*, she addresses what communities and individuals can do to bring about a post-petrochemical environment.

In contrast to many photographic monographs depicting environmental disasters, the book contains quite a lot of written material, although the book is still clearly visual in its emphasis; indeed, the Throughlines seem typical of the profusion of the visual presentation of data, although they notably integrate Misrach's photographs (McCandless; Krum). Many of Misrach's photographs in the first section of the book are accompanied by extended captions that inform the reader of the history of the site depicted or the cause of environmental change. Attention is also paid to the social aspects of history and the people whose lives have been materially important to the region at all levels of American society. The different companies and activities that have wrought damage on environmental locations and human lives, often in the form of pollution or physical displacement, are accounted for. The Mississippi, which periodically floods, pervades the book providing a focal point and a narrative device for the organization of the complex material. Whilst the captions focus on human, social and environmental information, the images are mainly free of people, although their presence in the form of housing, industry, heritage sites and human impact are evident throughout. The photographs are melancholic in tone, partly because of the human absence, partly because the material they depict is morally troubling and indicative of humanity's lack of care for different types of ecologies.

[Situating Fig 1 here, although it would look great at the top of the page]

Fig. 1. *Cypress Swamp, Alligator Bayou, Prairieville, Louisiana, 1998*, from *Petrochemical America*, photographs by Richard Misrach, Ecological Atlas by Kate Orff (Aperture 2012)

Looking more closely at specific examples it is clear that Misrach visualises devastated or declining landscapes, as is typical for much landscape photography that is concerned with environmental issues. For example, *Cypress Swamp, Alligator*

*Bayou, Prairieville, Louisiana, 1998* (fig. 1) depicts a group of trees decaying in a diffuse, golden light. The trees are reflected in the water and two birds are perched atop the tree in the foreground, providing a sense of scale for the viewer. Even for those with little knowledge of cypress swamps there is a pervading sense of a loss of grandeur, whilst there is also an obvious visual aesthetic at work. The limited colour palette is indicative, perhaps, of the limited biodiversity here and the death of the landscape seems to generate an eerie calmness that pervades the image. Indeed, one can even enjoy such an image as it is not only beautiful but the clear representation of space offers an imaginary exploration of the bayou, even though it is likely to be a melancholic tour. The extended caption informs the reader about the location of the swamp and its importance to Native American sustenance and notes the history of the decline of the site including clear cutting timber and pollution. Finally the caption acknowledges the failed attempts to revive the Bayou as a site for conservation and ecotourism (44).

The petrochemical industry processes, manufactures and distributes fertilizers to the agriculture sector and connections between different types of production and consumption are both suggested and explicitly made throughout the book. *Sugar Cane and Refinery, Mississippi River Corridor, Louisiana, 1998* (fig. 2) depicts an access pathway through a sugar cane field, with a refinery in the background. Smoke trails from some of the stacks are visible through a mist that is both suggestive of morning haze and significant pollution. The photograph uses a limited colour palette, although on this occasion the profusion of green in the foreground suggests abundance; the pathway through the field draws attention to the refinery in the distance while the mist suggests the intense heat and humidity associated with warm weather in Louisiana. There is no extended caption for this image, but the information provided elsewhere in the book connects different kinds of oil and sugar refinery to notions of lifestyle, consumption, soil erosion, pollution, obesity etc. The close physical cohabitation of space in relation to crops, which are fertilized by petrochemical products, and petrol is explicitly addressed later in the book, drawing attention to the importance of the maintenance and health of the landscape as a means of supporting life (150-5).

[Approximate position of Fig. 2; again at the top of a page would be good]  
Fig. 2. *Sugar Cane and Refinery, Mississippi River Corridor, Louisiana, 1998*, from *Petrochemical America* (Aperture 2012)

[Approximate position of Fig. 3. As it is a very long, thin image, this would be best positioned as a double-page spread with text under both sides of the image]

Fig. 3. Kate Orff, *Requiem for a Bayou*, from *Petrochemical America*, photographs by Richard Misrach, *Ecological Atlas* by Kate Orff (Aperture 2012)

These themes of pollution, social decay and wider social responsibility are substantially developed in the *Ecological Atlas*. Misrach's *Cypress Swamp, Alligator*

*Bayou, Prairieville, Louisiana, 1998* makes a reappearance in part of Orff's Throughline *Requiem for a Bayou* (fig. 3). Making explicit the Bayou's once rich array of fauna through diagrammatic graphics, the biodiversity of the region is visually represented. The human involvement, which involves both food and economic cultures, some of which, like fishing, are traditional to the area, are juxtaposed with recent interventions that are resulting in substantial pollution and alterations of the biodiversity of the region (particularly through invasive species and subsidence). The erosion of the bayou is also dwelt upon and importantly Orff acknowledges the inter-relatedness of all actants within this regional ecosystem: "Microorganisms, animals, and recently people participated in an interdependent aquatic systems of energy exchange, the food web" (171). Orff finishes this section with a reminder to readers that "Regional aquatic systems and human livelihoods are under threat" (171).

One of the most significant Throughlines uses a Misrach photograph from 2010: *New Housing Construction, Paulina, Louisiana*. In Orff's Throughline the image becomes an opportunity to make connections between oil-dependent lifestyles and the increasing consumption of petrochemical goods. *Bigger, Further, Filled with More Stuff* (fig. 4) becomes a symbol of suburban lifestyles, detached living, long commutes and general sense of abundance. Various petrochemical products surround the house drawing attention to its construction and likely use. Further diagrams illustrate the increase in house sizes and the increase in motor fuel per capita between 1900 and 2010 (from 1940 the increase of 356 gallons per capita is evident). The accompanying paragraph narrates the change in housing in the States away from "row houses" to "suburban subdivisions" (195). Orff notes that building materials "have the potential to produce harmful vapors" and that "[t]he environmental damage and deleterious health they induce over their product life cycles has not been factored into our choices" (195). Orff completes this Throughline by stating that "[t]he dream of home ownership, the natural abundance of land and seemingly limitless natural resources, all part of American's nation-building story, have led to an unsustainable excess of material consumption" (195).

[Approximate position of Fig. 4. This is another long, thin image which would work well over two pages with text under both sides of the image.]

Fig. 4. *Bigger, Farther, Filled with More Stuff*, from *Petrochemical America*, photographs by Richard Misrach, Ecological Atlas by Kate Orff (Aperture 2012)

Although I have examined a few extracts in depth, the detail of such a project does seem to be materially important, even though the aesthetics of the photographs, and of the Throughlines are also clearly significant. Firstly, many of these examples address material actions of large petrochemical corporations and their impact on local and global communities. Secondly, this impact is addressed in relation to the historical social formations within the region, acknowledging Native American, Afro-American and more recent economic factors, such as attractive tax policies that encourage big business to the area and the widespread poverty of the region. The

oil-rich nature of the landscape is also acknowledged as a factor in its development and use today. However, what is of interest, in a project that makes these explicit social, historical, economic and material links obvious is that although these changes have been driven by human action and intention, the actants in the picture are many and varied. Looking back at *Requiem for a Bayou*, for example, it is clear that the long-standing biodiversity of the region attracted human settlement (abundance of seafood) whilst also contributing substantially to the formation of oil abundance of marine life). Indeed, making connections between marine life, oil and the petrochemical waste that now pollutes the environment in *Requiem for a Bayou*, as a reader, the importance of marine life in starting and then changing life as we know it, becomes clearer. Whilst there is an implied narrative here, Orff and Misrach do not propose that these changes are in any way inevitable or natural, but the actants in the assemblage are multiple; humans are part of the larger ecological picture, but so are various other actants including marine life, plastic bottles, carrier bags and housing materials.

Looking further at *New Housing Construction as Bigger, Further, Filled with More Stuff*, one can read the products in the home, whether for construction or for food consumption, as actants in a complex network of materials, even though it has a distinctly human emphasis. Orff's text spends more time ascribing acting power to the products in the home than to human choices, partly because these consumer choices seem to be made without weighing up the environmental impact of their being. Importantly, in this social and economic environment, the landscape is neither victim nor background as the products ultimately stem from the environment itself, albeit in a highly processed form that required considerable ingenuity to bring them about. The complexity of the project also acknowledges the importance of these products to modern lifestyles and the benefit they have brought – there is no call for a return to a simpler life as these actants form part of the complex network of our lifestyles. Indeed, Kate Orff extends the discussion around the importance of oil's products into a diagram illustrating the profusion and occurrence of oil's products along the River Road Corridor (128-129). This Petrochemical Landscape, identified by chemicals and recognizable brand logos, has penetrated thoroughly and systematically into the region. The accompanying text reflects on the use and importance of some of these products in "medical equipment, cars, computers, bombs, cosmetics, building materials, inks, and cleaning agents" (129). Orff also acknowledges "American consumers benefit from the myriad of products made possible by petrochemistry, while pollution and waste affect only the poorest communities" (129).

The strength of Misrach and Orff's project, then, lies in several different features and how this has been structurally brought together in the space of the book. The social material reality of the petrochemical industry is outlined and this includes information on economics, profit and taxation policies. The aspects of poverty, exploitation and history are acknowledged even though some of this history and contemporary existence is only alluded to visually with an emphasis placed on text. The biodiversity of the region is acknowledged; some of the visual stress here falls within traditional representations of damaged and scarred landscapes, but Orff's

Throughlines visualize complex ecosystems. The dynamic actants in these ecosystems are positioned as agents within a complex field of interactions. The agentic capacities of pollutants, plastics, houses, building materials and cars are also acknowledged so although the human transformation of the environment is represented, the action of the complex agentic materials is also pictured. Finally, some of the results of these agents and social and economic processes are visualized including illnesses, obesity and the decline of social networks. The various ecosystems, which include humans, also include land, plants, animals and microorganisms and non-living actants. The long-term existence, impact and contribution to the larger ecosystem of these are noted.

In section four, "Displacement" of the "Ecological Atlas" Orff links the emission of greenhouse gasses to "global-scale atmospheric pollution" and notes the "world's poor – not American consumers – are the most vulnerable to climate change's negative consequences" (157). This section's emphasis on communities creates an effective context in which to situate the many types of community action and organization that are listed in the *Glossary of Terms & Solutions for a Post-Petrochemical Culture* (Orff). There is also one photograph in Misrach's section that suggests community resistance: a billboard photograph, with the slogans "No Thanks, Petroplex" and "Our health is not for sale" occupies almost the entire image (102). This booklet is illustrated with diagrams only but it lists practical and realizable projects and ways of working that emphasise small-scale changes with the potential for larger-scale impact; some of these are politically-minded organisations that resist current environmental and social degradation (such as Action Network (2) and Community Strength (5)), whereas others are about labels for new types of green products (Eco-Friendly Cleaning and Lawn Products (7); Eco-Label Index (8)). New technologies and new practices are also listed. Orff acknowledges that some of the entries are "controversial, some whimsical" but "all help shift away from our collective dependency on fossil fuels" (24). The booklet creates a context in which the photographs, which show the deplorable state of landscapes, communities and ecologies, are not seen as an irreversible problem (although it is likely that some of these landscapes cannot be reinstated to their earlier state). Helplessness and despair is replaced with a proposal for collective and individual action. Some of these entries recognize the contribution of species and technologies to new green initiatives.

Finally, it is important to acknowledge that the photographs, the Throughlines, the book and the practices that led to the project's existence are also represented (212-3). At the end of the book, Orff's team diagrammatically image the equipment used in the making of the book, and their dependence in many different ways on petrochemical products. Yet this is not just an exercise in self-reflexivity, important though that is; it is also an exercise in acknowledging their own agentic capacity and the agentic capacity of their tools and resources. Such an exercise enables them to visualize their engagement with the petrochemical industry as users and consumers but also as producers of new material products that emerge from a petrochemical society. No wonder that any solution, some of which are proposed in the form of the *Glossary of Terms & Solutions for a Post-Petrochemical Culture* (Orff), are complex.

The practices, products, objects and organisations that are proposed by this booklet does not point toward a simpler life, but one that uses resources more wisely and emphasizes various forms of collective and individual action, some of which might happen at national and international levels. However, the booklet expressly rejects “the premise of a linear, mechanistic narrative of endless growth based on extracted hydrocarbons and distributed waste in favor of looped and living paradigms centred on human energy and renewable resources” (24).

The success of the book, then, is to suggest that all the elements of the ecosystem are actants and that the book itself is an actant; this prompts the viewer to reflect on the role of photography as an actant in our ecosystem. Bennett’s theory would suggest that all material objects take part in our ecosystems including photographs. It is clear that the production and distribution of images (whether through books, magazines, exhibitions or the internet) have profound ecological consequences in terms of the consumption of energy and other resources. Projects such as Misrach’s and Orff’s, which attempt to promote positive action on numerous levels, could surely have material effects beyond a melancholic mourning for what was in the past. Whilst there is no photograph of the future, the combination of rich visual materials and text, combined with the *Glossary*, help us to imagine a more environmentally sensitive future that recognizes both actants and networks of action. Indeed, part of the book’s strength is that the material effects of the project are articulated in practical ways, as well as demonstrating its interconnectedness to the very industry and broader society that it expressly critiques. This society is not just drawn in terms of pollutants and ecologies but is also drawn in social material terms, demonstrating links to the very social material structures of American society and global capital. The book’s strength, in contrast to other photographic representations of ecological disaster, is to bring together social materiality with conative materialities in ways that are visually exciting and informationally rich.

## Conclusion

By extension, Bennett’s argument would have us see all photographic objects, regardless of their context and where and how they are distributed, as vibrant matter with unpredictable but lively results. Such a proposition has the potential to complicate some of the concerns about the purpose of looking at photographs of environmental disasters, particularly in the context of art. Indeed, although it is all too easy to imagine that future viewers of some of these images of devastated landscapes will suppose that we simply enjoyed these spectacles of disaster whilst failing to act, given the undecidability of the image, and the vibrant nature of it, other future possibilities in terms of how the photograph may be encountered need to be imagined.

However, where *Petrochemical America* is particularly important is that the project itself demonstrates the vibrant materiality of the petrochemical industry. Some of the effects of this industry are unwanted, especially by local populations who live in a highly polluted and socially fragile environment, and by international communities who will suffer the impacts of climate change. Yet these pollutants or actants are not

simply shown to be “rubbish” or something that is undesirable, but also active and forceful in our lives creating dynamic changes; indeed some products bring about increased crop yield as well as polluting the environment. But the effects of these actants are also shown to be affecting wider communities, especially when links to climate change or the long history of ecology of the River Road Corridor are made. The less desirable aspects of the petrochemical industry raises questions about the role of technology and risk in our society. But Bennett notably finishes her book with musing on how notions of frugality may be less helpful for imagining our future. The point is not to phase out or ban technologies, but to assess their impacts, to see the kinds of technological changes that we might make as having real material effects and affects. The technological objects, vibrant as they are, will have forceful and not entirely predictable effects in our lives. Assessing technology, though, in terms of its vibrant materiality remains important to Bennett:

If I live not as a human subject who confronts natural and cultural objects but as one of the many conative actants swarming and competing with each other, then frugality is too simple a maxim. Sometimes ecohealth will require individuals and collectives to back off or ramp down their activeness, and sometimes it will call for grander, more dramatic and violent expenditures of human energy. ... I believe that encounters with lively matter can chasten my fantasies of human mastery, highlight the common materiality of all that is, expose a wider distribution of agency, and reshape the self and its interests. (122)

Bennett also importantly addresses the question of blame and responsibility: if matter makes vibrant assemblages with unpredictable outcomes can we hold “individuals responsible for their actions or hold officials accountable to the public?” (37). Bennett’s answer is not entirely reassuring:

The notion of a confederacy of agency does attenuate the blame game, but it does not thereby abandon the project of identifying (what Arendt called) the sources of harmful effects. To the contrary, such a notion broadens the range of places to look for sources. Look to long-term strings of events: to selfish intentions, to energy policy offering lucrative opportunities for energy trading while generating a tragedy of the commons, and to a psychic resistance to acknowledging a link between American energy use. ... In each item on the list, humans and their intentions participate, but they are not the sole or always the most profound actant in the assemblage. (37)

Ultimately, as Bennett notes, we need to consider our ethical responsibilities within an assemblage. More worrying, however, is the question of how humans, all too often unaware of the complexity of the assemblage in which they live and take part, with its many invisible powers and matter impinging upon them, can become aware of the full range of acting materials around them. This is where *Petrochemical America* seems so important; the full import of human, social, economic, material and pollutant actants are being visualised within their complex ecologies and assemblages. Becoming aware of how material and technological environments

impact upon human notions of lifestyle and wellbeing seem to be a step in the direction of being able to better measure the consequences, and perhaps even predict in the future, the outcome of complex assemblages that include a full range of actants; indeed we may even become more concerned with species protection and the conatus of the non-living. *Petrochemical America* is still an anthropocentric study of human activity, but the beginnings of the realisation of other actants emerge through the images, captions and the Throughlines.

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i In London alone this has included Edward Burtynsky's exhibition *Oil* at the Photographers' Gallery (2012), the Prix Pictet exhibition *Consumption* at the V&A Museum (2013), William Ewing's exhibition *Landmark: The Fields of Photography* at Somerset House (2013), Sabastião Salgado's exhibition *Genesis* at the Natural History Museum (2013), and the Syngenta Photography Award exhibition *Scarcity Waste* at Somerset House (2015). This pattern of exhibitions is clearly replicated elsewhere, especially as many of the abovementioned exhibitions were touring shows.

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- ii Although it is impossible to provide a full bibliography of these publications, one could mention these notable and well known titles: Daniel Beltra's *Spill*; James Balog's *Ice: Portraits of Vanishing Glaciers*; Edward Burtynsky's *Water*; Olaf Otto Becker's *Above Zero*; Joel Sternfeld's *Oxbow Archive* and *When It Changed*.
  - iii This distinction perhaps explains why photography is largely absent from exhibitions and catalogues such as *Radical Nature: Art and Architecture for a Changing Planet 1969-2009* (Barbican Art Gallery) and Linda Weintraub's *To Life!: Eco Art in Pursuit of a Sustainable Planet*. Both publications/exhibitions focus on ideas for the future and models of new ways of acting or being. Where photographs do feature they support the documentation of an object, event or performance.
  - iv The project has also been exhibited at the Aperture Foundation, New York, the David Brower Center, Berkeley, California and Pomona College Museum of Art between 2012 and 2014. The focus of this essay, however, is on the book version of the work.