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The Adaptation of Disaster:
Representations of Environmental Crises in Climate Change Fiction

In light of climate change, the attempt to overcome the gap between the 'Two Cultures' appears more urgent than ever. With climate change being only one of the environmental crises marking the so-called Anthropocene, knowledge production and representations are constantly challenged. The very reason that led to the idea of proclaiming a new geological epoch can be taken as evidence for the collapse of the Cartesian dichotomy between nature and culture. The Anthropocene marks an epoch in Earth's history in which the human species has become a geological force.[1] That is, the effects of industrialized civilization are now forming geological strata that irreversibly change the face of the planet and its future. However, if nature and culture cannot be meaningfully distinguished anymore, how, one might ask, is a divide within academia still of concern? Would it not naturally perish with the insight that what has been regarded as nature has now been thoroughly pervaded by remnants of human actions? To the contrary, the persistence of the gap between the sciences and the humanities is one of the main reasons that complicates the representation and, ultimately, hinders the understanding of the problems which characterize the new epoch. Inability or unwillingness to change behavior on a collective level will most probably lead to environmental, political and social disaster on an unprecedented scale.

What we are looking at can thus be described as a failure to adapt. Adaptation is a central aspect in the current debate since it both refers to the ability (of an individual or a species) to adapt to a set of circumstances and the practice of intermedial adaptation. In this paper, I will argue that adaptation of climate change, that is, the (fictional) representation of environmental crises, is crucial in understanding the failure to adapt in 'real' life. By analyzing examples of so-called Climate Fiction (Cli-Fi), I will explore the relation of scientific fact and fiction with regards to Global Warming by means of looking at processes of adaptation. Hence this paper focuses on texts in which climate change is represented in regards to its establishment as knowledge and to the consequences that are derived from this knowledge (or not). Michael Crichton's *State of Fear* (2004) and Roland Emmerich's *The Day After Tomorrow* (2004), while featuring opposing views toward

[1] The Working Group on the Anthropocene has presented its proposal to declare the time from 1950 onward "Anthropocene" on the International Geological Congress. While the official acceptance and thus naming of the geological epoch might take several years, it is already remarkably fast in comparison to historic decisions about the designation of an epoch, pointing to the political weight the decision is expected to carry. See for example: Damian Carrington. "The Anthropocene Epoch: Scientists Declare Dawn of Human-Influenced Age" 29 May 2016 *The Guardian,* www.theguardian.com/environment/2016/aug/29/declare-anthropocene-epoch-experts-urge-geological-congress-human-impact-earth.

the "truth" of anthropogenic Climate Change serve as striking inquiries into the formation of scientific fact, which, as both strikingly show, depends both on the ability of (a) scientist(s) to perform the necessary research as on its representation to the public. In my analysis I will parallel the depictions with the discussion of 'scientific accuracy' and legitimization of a fictional representation as scientifically valid. While Crichton and Emmerich focus on the 'reality' or 'truth' of Global Warming in a manner of life-and-death, *Solar* by Ian McEwan (2010) and *Freedom* by Johnathan Franzen (2010) depict their protagonists' relationship to climate change and environmental crises in a very different manner. The denial of a straightforward stance towards activism and allowing for the possibility that life does go on as usual is not to be confused as a denial of climate change. Rather, as I will show, they must be read as expressions of the contradictions and incompatibilities of scales characteristic of the Anthropocene.

Analyzing Climate-Fiction requires, as Drexler and Johns-Putra have argued, a re-evaluation of literary scholarships bias toward the 'literary'.[2] Instead, focusing solely on those texts that might be deemed 'literary' reproduces, as I will show, the Two-Cultures-Debate in the same manner as judging a text by it's perceived 'scientific accuracy'. Consequently, where Crichton and Emmerich were criticized for exaggeration, Franzen and McEwan were called out for not offering a stance. By regarding adaptation as a negotiating practice that is part of knowledge production *and* representation, this paper aims to revisit expectations and bias on both sides and to point out that neither science nor fiction is entirely determined by scientists or literary scholars.

1. Adaptation and the "Two Cultures"

In his 1959 Rede Lecture, C.P. Snow famously identified the sciences and the humanities as two different cultures which not only entertain a strong sense of belonging, but use completely different languages (Snow 1961: 4).[3] When Snow declared this "polarisation" to be "a sheer loss to us all" (12), he based this verdict on the promises the industrial, or rather, "the scientific revolution" (30) held for him. A broad education could, according to Snow, not only bridge the gap between the Two Cultures, but also between the rich and the poor and thus ensure social justice. The ignorance of "productive industry" (33) Snow detects in literary intellectuals and "pure" scientists, threatens development in a very broad sense: "For, of course, one truth is straight-forward. Industrialisation is the only hope for the poor" (27).

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[2] Adam Trexler, Adeline Johns-Putra. "Climate Change in Literature and Literary Criticism". In: Royal Metereological Society/ Wiley *Wiley Interdisciplinary Reviews: Climate Change*, 2 (2) 2011, pp. 185-200; p. 186.

[3] C. P. Snow, C.P. *The Two Cultures and the Scientific Revolution*. New York 1961, p. 4.
For an overview of the Two-Cultures-Debate see: Daniel Cordle. *Postmodern Postures. Literature, Science and the Two Cultures Debate*. Aldershot 1999.

More than fifty years after his lecture, Snow's claims have a very different ring to them. While development and progress are still hailed as a patent solution to many problems by politicians and industrialists, the environmental movement has called attention to the devastating effects of industrialization, especially on the poor. Although Snow's sturdy optimism toward the positive consequences of industrialization as well as the steadfastness of scientific facts has turned sour in many ways, the problems of, in Snow's term, intercultural communication are still prevalent.[4] While the products of industrialization form a material and cultural reality that threatens the continuation of lifestyles and life itself on a global scale, the integration of scientific fact into cultural consciousness constitutes a problem with potentially fatal consequences. What Snow describes as ignorance resulting in an utter lack of understanding is, indeed, a much more complex problem involving not only Two Cultures, but several interests, ideologies concerning humans and non-humans alike.

Until the 18th century, the concept of climate was thought of as a spatial category, i.e. climate was a property of a place or region that expressed itself in local flora and fauna as well as in the shape and character of local peoples.[5] Meteorological and climatological research especially during the 19th century changed the perception of climate by introducing a scientific perspective. While the category did not lose its spatial component entirely, today climate is thought of primarily as "the history of weather – the average state of the atmosphere over periods of years, decades, centuries, and more."[6] Climate became an abstract category only through the accessibility of massive amounts of data and statistics, which revealed its ability to change on a global scale. Hence, the evolution of the concept of climate from a (mostly) static and spatial to a dynamic and temporal category goes along with a profound extension of the spatial and temporal frame from a human to a cosmic scale.[7] In effect, climate appears to defy experience as well as representation in a traditional sense. Mathematical computerized climate models only intensify the problem, since they seem to render the representation of climate (change) as an exclusively scientific endeavor.[8]

The problem at hand is a problem of adaptation. Climate change in particular poses a twofold challenge in regards to adaptation as, on the one hand, the term refers to the necessity of adaptation *to* climate change, i.e. to a change of material conditions in response to climate change, and, on the other, of the adaptation *of* climate change, i.e. as the topic of a fictional text. The neat division between the adaptation *to* and the adaptation *of* is itself a heuristic tool to analyze attempts of representing current and future environmental crises, which "chal-

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[4] See for example Bruno Latours recapitulation of scientist's impression that Science Studies are aimed at destroying science's ability to talk about facts (Bruno Latour. *Pandora's Hope. Essays on the Reality of Science Studies*. Harvard 1999).

[5] See for example: Lucian Boia. *The Weather in the Imagination*. London 2005.

[6] Paul Edwards. *A Vast Machine. Computer Models, Climate Data and the Politics of Global Warming*. Cambrige, MA 2010, p. xiv.

[7] Cf. Timothy Clark. "Scale." In: Tom Cohen (ed.): *Telemorphosis. Theory in the Era of Climate Change*, (Critical climate change, 1) Ann Arbor 2012, p. 148–166.

[8] See Edwards, who aims to show "how we came to know what we know about climate — how we make climate knowledge" (Edwards. *A Vast Machine*, p. xiv).

lenge [the] basic assumptions that have underpinned the modern world."[9] In this paper, I aim to analyze how notions and practices of adaptation in both senses feature in discourses on climate change. During this endeavor, the heuristic distinction between adaptation *of* and adaptation *to* climate change serves as an orientation for the argument but is ultimately to be deconstructed.

The current crises complicate Snow's opposition in many respects. As "Hyperobjects", "things that are massively distributed in time and space relative to humans"[10], they cause an aesthetic (i.e. perceptional and representational) paradox: While their spatial and temporal scope exceed human scales by far, they nevertheless bring their anthropogenic causes into view. In a way they reveal an entirely new, anthropogenic, nature. At the same time, the agency of the non-human becomes undeniable, as the unintended consequences of two centuries of industrialization come into view. Thus, as storms, cars, CO_2 levels, radiation, and weather events gain agency, the anthropocentric organization of the world is merely a phenomenon of the past. This is reflected in an enormous increase of scholarship dealing with questions regarding the dissolution of categorical oppositions in the face of (post-)modern development over the last two decades: above all the dichotomy of nature and culture is called into question. Instead, several concepts have emerged which describe the relationship as a network, assemblage, or mesh of human and non-human actors.[11] Nevertheless, especially with regards to the cultural representation of science and scientific knowledge, the structure of the conversation remains surprisingly oppositional. For example, when it comes to the 'scientific accuracy' of fiction. Whereas this seems to be an example of successful intercultural and interdisciplinary collaboration, a closer look shows that the primarily promotional interest in a scientist's validation of a work of fiction's 'accuracy' affects our understanding despite being primarily financially motivated.

2. Climate between Science and Fiction

The attribution of 'scientific accuracy' is a common tool to promote works of fiction as legitimate representations of reality, or at least very probable versions of it. Unlike (literary) realism however, the relation to the outside world is not only determined by a common set of laws which render the representation plausible and familiar to an audience, but depends on outside validation. In the attempt to legitimize a work of fiction as (partially) 'real,' the claim to 'scientific accuracy' does more than enhance the pleasure or thrill to read or watch a work of fiction. Rather, it causes a shift in the relation of science and fiction by valuing the supposed truthfulness of the (scientific) content over inherently narrative qualities.

[9] Serenella Iovino, Serpil Oppermann (eds.). *Material Ecocriticism.* Bloomington 2014, p. 2.
[10] Timothy Morton. *Hyperobjects. Philosophy and Ecology after the End of the World*. Minneapolis 2013, p. 1.
[11] Cf. The instructive introduction of *Material Ecocriticism* as well as Serpil Opperman's article "From Ecological Postmodernism to Material Ecocriticism" in the same collection.

However, besides the perception of the fictional work at hand, the claim also affects the understanding of scientific facts. Asserting 'scientific accuracy' suggests that a scientific fact can be adapted interdisciplinarily without being compromised. In this inherently modern view, the scientific fact is regarded as an autonomous entity without history. While this view of science as the institutionalized uncovering of an unchangeable reality might still prevail, looking at the intersection of science and fiction through the lens of adaptation, adds to an understanding of scientific fact as the result of practices of inscription or translation.[12] Following Latour, then, one could say that scientific fact is already in itself the result of processes of adaptation. In consequence, fictional adaptations of science are not to be understood as a transformation or change of an original 'fact,' but as another translation in the chain of inscriptions leading from a thing or observation to the scientific fact and fictional adaptation respectively. Although this point cannot be further investigated within the scope of this paper, it should be noted that from this perspective science studies and adaptation studies are not only very closely related but could furthermore profit from each other.[13]

With regards to the relation between science and fiction, adaptation is to be understood as an ongoing process of negotiation rather than a method to transport something from one medium or discipline to another. Although its institutional organization might suggest otherwise, 'science' cannot serve as a fixed source-text. Hence, fidelity to 'science' can neither be measured nor validated by scientists. The resulting adaptations can therefore not be judged in regards to their 'truthfulness' either. Put differently, when it comes to science (and) fiction "the goal for science consultants is to let filmmakers negotiate scientific accuracy within their own context of narrative, genre, and audience" (Kirby 2011: 8). In fact, adaptations of science (facts, practices, perspectives) make for ideal vantage points to analyze networks of commercial interests, politics, epistemology, material agents, and emotional response.

Climate-Fiction (Cli-Fi) makes such an approach necessary at the same time as it proves its validity. Almost no other topic forms as strong an example as climate change to prove that there is no 'neutral' adaptation. The 'nature' of climate change discourse requires obvious choices in positioning the text/work with regard to its politics, particularly its stance towards the ability of complex scientific models to predict a future, and its attitude towards human responsibility for environmental crises. Viewing adaptations as both "products and producers of cul-

[12] Cf. Bruno Latour. "Drawing Things Together". In: Michael Lynch, Steve Woolgar (eds.). *Representation in Scientific Practice*. Cambridge, Mass. 1990, pp. 19-68; Bruno Latour. *Pandora's Hope. Essays on the Reality of Science Studies*. Harvard 1999.

[13] This becomes evident for example in Kamilla Elliott. "The Adaptation of Adaptation: A Dialogue between the Arts and Sciences." In: Pascal Nicklas, Oliver Lindner. *Adaptation and Cultural Appropriation*. Berlin 2012, pp. 145-161. Elliott investigates the interrelations of adaptation theories as "A Dialogue between the Arts and Sciences." Julie Sanders's suggestion to "think [of adaptation] in terms of complex processes of filtration, and in terms of intertextual webs or signifying fields, rather than simplistic one-way lines of influence from source to adaptation" also has a very Latourian ring to it (Julie Sanders. *Adaptation and Appropriation*. New York 2006, p. 24).

tures and political ideologies"[14] in no way defies scientific evidence for anthropogenic climate change (or any scientific theory, result, or prediction for that matter). Focusing on the historicity of scientific fact, their 'fabrication' as it were, instead of their unmediated existence is the opposite of claiming that they are untrue.

I will demonstrate this point by briefly looking at Roland Emmerich's film *The Day After Tomorrow* and Michael Crichton's novel *State of Fear*. Emmerich's disaster movie portrays a completely exaggerated scenario in which denial and inaction lead to "rapid climate" change that causes the whole northern hemisphere to freeze over within a matter of days. *State of Fear* on the other hand is (in)famous for its conspiracy theory that climate change is a scheme fabricated for its profitability. Both works claim 'scientific accuracy' through a combination of the intradiegetic representation of scientific discourse, a paratextual frame, and the ensuing debates respectively. Crichton's text is particularly interesting in this regard because it paradoxically denies the need of outside validation by integrating it. In his "Author's message"[15] at the end of the book, Crichton puts himself in the position of the outside expert asserting the claims of the novel. By means of bullet points, he sketches out his road to becoming a sceptic of climate change. In the manner of a true conspiracy theorist he transcends scientific reason (and common sense) by alleging hidden agendas behind climate research, ecology, and political calls for action, thereby claiming that instead of anti-climate-change-lobbyists it is the environmental movement that obscures the facts. His concluding point "Everybody has an agenda. Except me"[16] may carry some notion of self-irony, but in light of his claims and his plot, he appears to be adamant about his convictions. Emmerich's film of the same year, though intended as a warning voice within the debate, is no less suspicious in its dealings with science.[17] While embraced by those who were "hoping the film could do what scientists themselves could not"[18], many researchers (and activists) rejected the "Faustian bargain"[19] that was offered: accepting "flagrant inaccuracies"[20] and the gross exaggeration of a marginal hypothesis as a vehicle for the public acceptance of anthropogenic climate change as a reality. However, as David Kirby convincingly argues, it is not the ecological catastrophe that makes a contribution to the debate, but the depiction of the "science/politics interface."[21] Like Crichton, Emmerich spends a good deal of effort (and screen-time) on the adaptation of scientific discourse. Kirby quotes physicist Stephan Rahmstorf from the Potsdam Institute for Climate Impact Research, who thinks of the film as "chillingly realistic"[22] in regard to its representations of the U.S. government's response to climate research at the time. While the scenario might be 'pure' fiction, the film takes an

[14] Kamilla Elliott. "The Adaptation of Adaptation", p. 149.
[15] Michael Crichton. *State of Fear*. New York 2004, pp. 569-573.
[16] Ibid., p. 573.
[17] David A. Kirby. *Lab Coats in Hollywood*. Cambridge, MA 2011, pp. 177-184.
[18] Ibid., p. 184.
[19] Ibid., p. 178.
[20] Ibid., p. 177.
[21] Ibid., p. 180.
[22] Ibid., p. 183.

opportunity to highlight a central aspect of scientific discourse. Since something may well be regarded as an irrefutable fact within the scientific community, the way in which scientific conclusions are reached and presented often lead to confusion and skepticism among non-scientists, especially those with an interest in doubting the results. While the admission of 'high probability' (as opposed to certainty) or 'scenario' (as opposed to prediction) do not challenge the scientific value of a statement, *The Day After Tomorrow* demonstrates how adherence to the linguistic requirements of scientific accuracy can challenge the believability of a scientist's prediction in the public eye.

When climatologist Jack Hall presents his theory of abrupt climate change in the geological past and its indication for the current environmental crisis to policy makers, two questions from the audience stand in for a problem of communication that ultimately, as the film suggests, causes the cataclysmic events to unfold. The first question, as to the specific date when an event such as Hall is describing might occur in the future, forces the climatologist to 'admit' that he does not know, which spurs the vice president of the USA to put further pressure on the scientist, asking him about the cost and posing the question: "Who is going to pay the price?" Confronted with this all too familiar argument in climate debates, Hall's return – the price of not to react now would be much higher – echoes the frustration of many scientists and environmentalists. Nevertheless, he manages to get the last word in the scene, when he counters the vice president's accusation of putting forth "sensationalist claims" with the almost arrogant reply that an iceberg the size of Rhode Island breaking off the Antarctic ice-sheet seems pretty sensational to him. What is striking about this and other scenes at the interface of science and politics is, again, not the validation it might receive from 'actual' scientists, but the precision with which the movie, despite being a prime example for a Hollywood-blockbuster, maps the confrontation of two different discourses. The inability or unwillingness of the politician to interpret Hall's limitations regarding the prognostic capacity of his model, i.e. his reluctance to give a specific date despite his call for immediate preventive steps, is neither just a moral or intellectual shortcoming of the vice president, nor is it solely a dramatic necessity within the movie. It is a cultural misunderstanding. That Hall resists doomsday-prophecy in order to stay true to the facts proves to be a disadvantage within the political discourse. What signifies scientific truthfulness for the scientist, sounds like an acknowledgement of fundamental uncertainty to the skeptical politicians.

Instead of simply presenting a (political) counterpart to *State of Fear* by claiming a privileged access to reality for scientists, *The Day After Tomorrow* actually manages to contextualize the significance of the aforementioned encounter between scientists and politicians. The "fabrication" of facts, while certainly a rich source for conspiracy theorists (such as Michael Crichton), here, is represented as a dynamic practice of the production and application of knowledge. What Hall and his fellows present is characterized as a work in progress dependent on a global network of scientists and scientific instruments. However, the movie is surprisingly aware of the challenges that such a network presents with regards to the interaction between disciplines, between colleagues, and between humans and non-humans: Hall's reaction to a colleague's compliment on his talk – "That's

what we're here for. Put on a good show." – reveal the, albeit frustrating, recognition of the communicational barrier between the two discourses. At the same time, while the audience already expects the catastrophe to hit, the scientists take the first evidence for the disruption of the North Atlantic current as a technological malfunction. Hall, too, needs to be convinced of the sudden relevance of his model, which "is a reconstruction of a prehistoric climate shift. It's not a forecast model." The movie dramatizes the unfolding scenario by extending the scientist's surprise to meteorological services, weather channel presenters, observational instruments, and finally the city of Los Angeles being literally hit by the unprecedented climate change.

Despite exaggerated scale of the catastrophe in the movie, the scenario is embedded in a discussion of the adaptation of knowledge. Even when tornadoes destroy Los Angeles the discussion in the ensuing NDAA (National Defence Authorization Act) meeting revolves around hierarchies and what is believed to be possible. The meeting in which scientists and military personnel come together to decide on a course of action (and are authorized to implement it) functions complementary to the climate change conference. Once Hall's hypothesis proved to be accurate – although, ironically, he did get the time-frame wrong – he is now able to directly influence decisions on how to proceed. While the results from a 48-hour adjustment to the computer models by four scientists (in itself a *very* rapid change) does still not serve to convince the vice president, it stands in for the struggle to catch up with reality. The potential cost of inaction is immediately actualized when a Tsunami floods Manhattan and freezes over in a manner of hours. The blizzards, as Hall predicted in his new model, cover the entire Northern Hemisphere with ice. The spectacular images enforce above all the instant adaptation to a completely new, though not unprecedented, environment.[23]

Suddenly, modern civilization (from "1,500 $-waterproof coats" to cell phones and shopping malls) is rendered useless or even dangerous and survival depends on very basic skills and knowledge. While this sets the stage for very stereotypical heroism within the movie, it is nonetheless not to be dismissed too easily, since it raises questions about what one considers 'basic' knowledge and how much of the (physical) adaptation to climate change a society thrusts upon individuals, how many people it is willing to abandon, and which parts of culture (and Culture) it deems necessary.[24] The ultimate legitimation of Hall's predictions, however, takes a personal sacrifice: the government is finally convinced to take action. Hall suggests evacuating only the southern half of the U.S., because it is too late to help those in the north, while knowing that his son is in Manhattan.

[23] Immediately before the extent of the storm is confirmed, Hall's son and a group of friends visit the Natural History Museum in New York City where a mammoth exhibition anticipates the coming events.

[24] In this respect, the burning of books in the New York Public Library for warmth on the one hand, and the closing of the Mexican border to US-American refugees on the other provide stunning examples (cf. Solvejg Nitzke. "Is there an End to it? Fictional Shelters and Shelter-fiction." In: Angela Krewani, Karen Ritzenhoff (eds.). *The Apocalypse in Film. Dystopias, Disasters, and Other Visions about the End of the World*. Lanham 2015, pp. 79–90.

If it takes not only a "superstorm" but a scientist practically sacrificing his own son to convince politicians of the necessity to change course, the movie indeed presents an apocalyptic outlook on the possibility of successful exchange between science and politics. Nevertheless, *The Day After Tomorrow* succeeds in making the negotiation of fact and fiction a structural and a topical aspect of the story by confronting the adaptation *of* climate change with the struggle of its characters to adapt *to* the rapidly changing conditions. Whether or not the "film could do what scientists themselves could not"[25] remains questionable, however. In comparison to Crichton's novel, the disaster movie suffers from the credibility issues it addresses. That is, it stages a scientific scenario which fails to convince the (especially scientifically educated) audience of its accuracy. In a final adaptation – this time of an image and connected discourse –, the movie ends with a shot of earth seen from space – the familiar icon of the environmental movement in the "new Ice Age" but, as an astronaut comments, seen through an atmosphere that has "never [been] so clear." In this image and its cultural connection to claims such as atmospheric scientist James Lovelock's Gaia theory, in which earth/Gaia will reinstate the balance of the earth-system,[26] and the protagonist's prediction that humanity (and civilization) will survive, the cataclysmic potential of the movie is contained. The stunning images of a frozen earth, although they are meant to convey the sense of an imminent catastrophe that many environmentalists share, appears to tilt the science to fiction relation heavily in favor of the latter. It could even be read to justify "nature's destructive forces" as a necessary and ultimately welcomed consequence to humanity's inaction.[27] The speech of the reformed ex-vice president, thus, refers to a strange world.

At the core of Crichton's and Emmerich's Cli-Fi lies a gesture of revelation which rests on the assumption that 'behind' (public) climate science there is a truth to be discovered that is not or cannot be appropriately/properly mediated by the scientists themselves. The revelatory gesture in both *State of Fear* and *The Day After Tomorrow* paradoxically reinforces the gap between the 'Two Cultures' by oversimplifying the science underlying the study of earth's climate. *State of Fear* grounds its skepticism toward climate change in a (false) dichotomy between 'sound science' (i.e. data, visible changes, etc.) and scientific modeling that widely underestimates the complexity and reach of scientific models as well as the effectiveness of peer-review systems.[28] Whereas Crichton doubts the validity of scientific models with regard to climate change altogether, Emmerich's attempt to illustrate the consequences of Global Warming takes 'rapid' climate change all too literally by piling on disastrous weather events. Despite their opposing attitudes regarding anthropogenic climate change, both stories implicitly react to a

[25] David. A. Kirby. *Lab Coats in Hollywood*, p. 184.

[26] It should be noted that Lovelock's theory assumes that Gaia will burn "the human plague" off the face of the Earth if necessary (cf. James E. Lovelock. *The Revenge of Gaia: Earth's Climate in Crisis and the Fate of Humanity*. New York 2006).

[27] It is this conclusion, where Emmerich's movie strongly resembles a 'secular apocalypse', outsourcing the definitive action to a 'higher' entity (Nature). See also Greg Garrard. Ecocriticism. New York 2012, pp. 97-101.

[28] On the false dichotomy of "data vs. models" in climate science as well as "citizen science" see: Edwards xviii-xix.

skeptical perspective towards man-made climate change by either confirming suspicions or drowning them in cataclysmic imagery. What may seem a marginal similarity at first, proves to be a decisive factor in distinguishing adaptations of climate change. Without the (imagined) materiality of the conspiracy-plot or the disaster that looms behind the scientific discourse on climate change neither representation could reach a conclusion, thus, both suggest that there is a discrepancy between the perception of climate change discourse and the 'actual' climate that can only be bridged by adding materiality, even if it is only an imagined materiality. Climate change, however, is a "catastrophe without event."[29] While public renderings of climate change often legitimize their proposed plan by illustrating climate change by means of a series of disasters of different scale, climate change cannot be subsumed by any one single event or symbol such as 'the bomb' within the framework of Nuclear Winter.[30] In this respect both examples fail to adapt climate change since they either deny its existence because it is not directly perceptible or seek refuge in an attribution of weather extremes to climate change.[31] This is by no means a scientific but rather a moral endeavor that is not interested in observations but in (rather sensationalist) attempts to put the blame on individuals.

3. Non-Catastrophic Climate Plots

The desire to establish causes to daily weather events is far older than the current debate on anthropogenic climate change. "When weather 'misbehaves', or delivers meteorological devastation through windstorm, torrent, blizzard, drought or intense heat, the psychological need to attach blame to such events becomes overwhelming."[32] In recent decades, climate change has evolved from a descriptive category of past shifts of climatic conditions to "an independent causative agent."[33] This opens up room for a complex debate on responsibility and liability, even if it can hardly ever be attached to an individual weather event, however disastrous its consequences.

Being able to finally prove a theory right or being able to adapt it according to an unfolding series of events must remain a phantasy that ignores both the complexity of climate modeling and the time-scale and randomness with which individual weather events occur. As a result, the attribution of blame and the attempt to compensate those who suffer the consequences is extremely difficult. Yet, while the difficulties to unambiguously identify cause and effect does not – as Crichton's plot suggests – prove wrong the anthropogenic nature of the current climate change, it poses intricate challenges to the adaptation of knowledge. The

[29] Eva Horn. *Zukunft als Katastrophe*. Frankfurt 2014, pp. 112-113.
[30] Cf. Matthias Dörries. "The Politics of Atmospheric Sciences: "Nuclear Winter" and Global Climate Change." In: *Osiris*, Vol. 26, No. 1, Klima (2011), pp. 198-223
[31] Cf. Mike Hulme. "Attributing Weather Extremes to 'Climate Change': A Review." In: *Progress in Physical Geography* 38 (4), pp. 499-511.
[32] Ibid., p. 499.
[33] Ibid., p. 500.

representational problem, thus, gains political traction since, as Rob Nixon argues, not only the changes in climate itself are invisible, but so are those already suffering from the consequences. In order to ensure the answerability of those responsible for current environmental crises, rather than presenting them as a series of catastrophic events, they must be reconsidered in terms of "slow violence […] a violence that occurs gradually and out of sight, a violence of delayed destruction that is dispersed across time and space, an attritional violence that is typically not viewed as violence at all."[34] Framing the effects of climate change as "slow violence" is a way of emphasizing the unequal distribution of power rather than individual liability, and, more importantly in this context, it accepts that there is no "event" to hold on to. The attempt to "plot and give figurative shape to formless threats"[35] in order to "keep front and center the representational challenges and imaginative dilemmas posed not just by imperceptible violence but by imperceptible change whereby violence is decoupled from its original causes by the workings of time"[36] acknowledges and reacts to what Timothy Clark describes as "derangement of scale"."[37] This is crucial, because it points to the difficulties of adaptation not only between but also within discourses. That is, it is not (only) a matter of different cultures of knowledge and representation but a more general perceptional problem of "scale effects":

> Scale effects in relation to climate change are confusing because they take the easy, daily equations of moral and political accounting and drop into them both a zero and an infinity: the greater the number of people engaged in modern forms of consumption then the less the relative influence or responsibility of each but the worse the cumulative impact of their insignificance. As a result of scale effects what is self-evident or rational at one scale may well be destructive or unjust at another. Hence, progressive social and economic policies designed to disseminate Western levels of prosperity may even resemble, on another scale, an insane plan to destroy the biosphere. Yet, for any individual household, motorist, etc., a scale effect in their actions is invisible. It is not present in any phenomenon in itself (no eidetic reduction will flush it out), but only in the contingency of how many other such phenomena there are, have been and will be, at even vast distances in space or time. Human agency becomes, as it were, displaced from within by its own act, a kind of demonic iterability.[38]

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[34] Rob Nixon. *Slow Violence and the Environmentalism of the Poor*. Cambridge (Mass.) and London (UK) 2011, p. 2.
[35] Ibid., p. 10.
[36] Ibid., p. 11.
[37] Timothy Clark. "Scale", p. 158. "One symptom of a now widespread crisis of scale is a derangement of linguistic and intellectual proportion in the way people often talk about the environment, a breakdown of 'decorum' in the strict sense. Thus a sentence about the possible collapse of civilization can end, no less solemnly, with the injunction never to fill the kettle more than necessary when making tea. A poster in many workplaces depicts the whole earth as giant thermostat dial, with the absurd but intelligible caption 'You control climate change.' A motorist buying a slightly less destructive make of car is now 'saving the planet'" (ibid., pp. 150-151).
[38] Ibid., p. 150.

This is a problem that confronts the representational problem of climate change as a "catastrophe without event" on a day-to-day basis. And the crucial thing in the present context is that the problem of scale effects pervades the 'Two Cultures.'

Ian McEwan's novel *Solar* sets the stage for an investigation both of the interaction between the Two Cultures and between scientists and a general public by choosing a scientist for a sceptical protagonist.

> In contrast to most other novels ostensibly treating ecological crisis, McEwan's novel does not stage a dystopian future or develop an apocalyptic ecological scenario that culminates in a gigantic collective disaster. Thus, there is neither a climax of delightful horror at the sight of extreme natural events, nor a personified nature taking revenge against humanity.[39]

Hence, *Solar*'s adaptation of climate change provides a categorically different constellation of discourses, characters, moral and ethical considerations than a disaster- or conspiracy-focused narrative. Since it refuses to qualify the actions of its characters by means of catastrophe, it is at liberty to play with genre conventions and reader expectations. Michael Beard is the opposite of the dedicated hero-scientist Jack Hall from *The Day After Tomorrow*. Stealing the intellectual property of his post-doc research colleague to profit from the increasing awareness of climate change is only one of the occasions in which the novel suggests that scientific and personal integrity are closely related but not always distinguishable from the outside.

As Evi Zemanek points out, McEwan was expecting severe criticism for presenting a character, and a scientist at that, who could not care less about the impact his actions have on anyone but himself.[40] Tough morally repugnant or, indeed, because of it, Beard proves to be quite adaptable to the public discourse of climate change. His reputation as a Nobel Prize laureate allows for a relatively lush lifestyle while requiring only a minimum of actual scientific work.

> One thing was certain: two decades had passed since he last sat down in silence and solitude for hours on end, pencil and pad in hand, to do some thinking, to have an original hypothesis, play with it, pursue it, tease it into life. The occasion never arose – no, that was a weak excuse. He lacked the will, the material, he lacked the spark. He had no new ideas.[41]

Not only do his views of climate change resemble those voices in *State of Fear* which claim that climate change is based on a PR-act rather than on sound science[42], his behavior seems to prove them right. Although not "wholly skeptical about climate change," Beard mistrusts the entanglement of apocalyptic narrative and climate science:

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[39] Evi Zemanek. "A Dirty Hero's Fight for Clean Energy: Satire, Allegory, and Risk Narrative in Ian McEwan's *Solar.*" In: *Ecozon*@ 3 (1) 2012, pp. 51-60; p. 51.
[40] Ibid., p. 51.
[41] Ian McEwan. *Solar*. London 2010, pp. 15-15.
[42] Cf. Evi Zemanek. "A Dirty Hero's Fight", p. 53.

> he was unimpressed by some of the wild commentary that suggested the world was in 'peril,' that humankind was drifting towards calamity, when coastal cities would disappear under the waves, crops fail, and hundreds of millions of refugees surge from one country, one continent, to another, driven by drought, floods, famine, tempests, unceasing wars for diminishing resources. There was an Old Testament ring to the forewarnings, an air of plague-of-boils and deluge-of-frogs, that suggested a deep and constant inclination, enacted over the centuries, to believe that one was always living at the end of the days […]. The end of the world was never pitched in the present, where it could be seen for the fantasy it was, but just around the corner, and when it did not happen, a new issue, a new date would soon emerge.[43]

Taken independently, this quote could find approval both from scientists[44] and environmentalists, who fear that catastrophism hinders action rather than enabling it.[45] This, however would mistake Beard's attitude, for his dismissal of apocalyptic rhetoric does not lead to a more considerate way of discourse but justifies his own ignorance of the matter, since "he himself had other things to think about".[46] Analogous to the way he lives of a reputation he built decades ago, Beard adapts a progressive attitude toward climate change not because he is convinced the current warming is anthropogenic (or because he is even interested in this question) but because he profits from being labelled a 'climate change activist'.

Again, the depiction of the interface between scientific, political, and artistic discourses presents the communication of scientific fact as a process of negotiation.[47] In this instance the "show," as Hall rather regretfully comments, scientists are expected to put on, is the determining factor of Beard's career and, as one might argue, his life. Those parts of the novel which deal with climate change most directly do so by observing Beard in his struggle to keep up appearances. Interestingly, despite his own attitude Beard is met with almost no skepticism. Neither on the expedition to the Arctic, nor during a compelling speech to pen-

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[43] Ian McEwan. *Solar*, pp. 15-16.

[44] See the above-mentioned caution against the "Faustian bargain" offered by movies such as *The Day After Tomorrow* (David A. Kirby. *Lab Coats in Hollywood*, p. 178, 191).

[45] Cf. Garrard. *Ecocriticism*, pp. 113-116.

[46] Ian McEwan. *Solar*, p. 15. "The Gulf Stream would vanish, Europeans would freeze to death in their beds, the Amazon would be a desert, some continents would catch fire, others would drown, and by 2085 the Arctic summer ice would be gone and the polar bears with it. Beard had heard these predictions before and believed none of them. And if he had, he would not have been alarmed. A childless man at a certain age at the end of his fifth marriage could afford a touch of nihilism" (ibid., p. 75). Cf. Evi Zemanek. "A Dirty Hero's Fight", p. 54.

[47] And again, the depiction is acclaimed by Stefan Rahmstorf (see Evi Zemanek. "A Dirty Hero's Fight", p. 55 and David A. Kirby. *Lab Coats in Hollywood*, p. 181). The website RealClimate.org on which Rahmstorf published his review of *Solar* would be an interesting subject for further analysis, especially since it claims that "the discussion here is restricted to scientific topics and will not get involved in any political or economic implications of the science" (Stefan Rahmstorf. "Solar." Review. *RealClimate. Climate Science from Climate Scientists.* 4 May 2010. Web. 14 July 2011).

sion-fund managers on the necessity to cure the "sick planet"[48] is he met with doubt. Instead he is embraced as a voice of reason. From a reader's perspective, this is somewhat surprising because Beard often behaves, bluntly put, like an idiot. In Spitzbergen, he proves his utter inability to view natural environments as anything else than an inconvenience:

> Perhaps he could only have avoided the inevitable if he had accepted one of the other invitations, to the Seychelles or Johannesburg or San Diego, or if, as he thought later with some bitterness, climate change, radical warming above the Arctic Circle, was actually taking place and was not a figment of the activist imagination. For when his business was done, he discovered that his penis had attached itself to the zip of his snowmobile suit, had frozen in hard along its length, the way only living flesh can do on sub-zero metal. […] He saw Jock Braby on TV proclaim an obituary through a forgiving smile. *He went to see global warming himself*. Nonsense, of course he would survive. But this was it, a life without a penis. How his ex-wives, especially Patrice, would enjoy themselves. But he would tell no one.[49]

Even when faced with his own incompetence, Beard is unable to accept it – instead blaming it on choosing the wrong destination – and even before trying to solve the actual problem, he thinks about his appearance. While this scene, were it a solitary instance, could be interpreted as the somewhat endearing though ridiculous incapacity of a "pure scientist" (Snow) to deal with 'actual' nature, *Solar* repeatedly confronts Beard's supposed brilliance with his unhealthy and at times disgusting corporeality. His most eloquent speech against global warming is, as the reader knows all along, a product of his struggle against nausea and thus becomes "one of the comic highlights in this satire."[50] While the audience apparently listens unsuspectingly, "Beard's nausea intensifies and ends in his vomiting behind the curtain; the hypocrite gets violently sick at his own words. Beard's speech is staged as mock theatre and is played by an actor knowing his role all too well."[51] Concluding the novel, Beard, still oblivious to his imminent downfall, orders a meal of "orange-coloured cheese, dipped in batter, rolled in breadcrumbs and salt and deep-fried, with a creamy dip of pale green"[52] and "four wedges of skinless chicken breast, interleaved with three minute steaks, the whole wrapped in bacon, with a honey and cheese topping, and served with twice-roasted jacket potatoes already impregnated with butter and cream cheese."[53] Beard's 'last meal' is not only a mockery of any health concern a man his age might consider, it displays his attitude, a consumerism that is unconcerned with the future. The question whether the "unfamiliar, swelling sensation" Beard feels in his heart when he sees his daughter at the end of the novel is the heart-attack that is at least implied by his dietary choices or an actual emotional

[48] Ian McEwan. *Solar*, pp. 148-156.
[49] Ibid., pp. 58-59 (emphasis in orig.).
[50] Evi Zemanek. "A Dirty Hero's Fight", p. 55.
[51] Ibid.
[52] Ian McEwan. *Solar*, p. 276.
[53] Ibid., p. 278.

feeling, is overshadowed by his first (and last) instance of sincere self-doubt: "he doubted as he opened his arms to her that anyone would ever believe him now if he tried to pass it off as love."[54]

> McEwan artfully ridicules Beard as the protagonist of a satire that scrutinizes a certain type of scientist as well as a certain type of man, husband, and lover. Thanks to the many comic and humorous elements, the taking of individual, voluntary, familiar and often trivial risks is apparently quite pleasurable for Beard. But read allegorically with reference to the collective, involuntary and unfamiliar ecological risk, this satirical portrait demonstrates the consequences of inadequate risk perception and disastrous risk management.[55]

Zemanek's reading of *Solar* as a "risk narrative" takes a first step in the direction of Clark's demand to "read[…] and reread[…] texts on different scales."[56] Michael Beard, in his role as a model consumer and a scientist with a supposedly privileged access to the 'bigger picture', serves as a focal point for the confrontation of and contradiction between the personal and the planetary scale.

Looking at Beard's explicitly egoistic and petty behavior not as isolated incidents but as points in a network that connects individual acts with global consequences reveals the 'derangement of scales' (Clark) within the novel and within the discourse on climate change. Although the failure of his career, love-life, and, ultimately, of his own body seem to be the inevitable result of personal lifestyle choices, they become, in Zemanek's terms, an allegory for a (failed) collective risk assessment. As a final indulgence in an abundance of corporeal pleasure – by far surpassing any satisfaction of needs – Beard's 'last meal' becomes a symbol for a consumerist desire that is apparently incorporated in a way that makes conversion impossible. While the expectation for Beard's reformation through the adaptation of a healthier, more considerate, and ultimately happier lifestyle forms a subtext, the novel refuses to succumb to self-improvement imperatives. In the same manner, "saving the world"[57] is anything but a selfless act for Beard. The realization of his inability to do so is, thus, not a grounds for regret or a thing that exceeds his personal ambitions, but the failure of a career move. Still, at no point in the novel, does Beard lose agency. Although his actions follow a pattern that seems at the least hard to escape, they are always the result of personal choice and thus hold at least the possibility to be different. That Beard nevertheless shamelessly chooses to be who he is feels somewhat counterintuitive for a novel dealing, if only in parts, with climate change. The detached narrative perspective that neither condemns nor praises Beard's choices presents the story as the opposite of a *Bildungsroman*. *Solar* even makes sure to give rise to any notion of a resolution towards the future by killing off its one upright character, thus rejecting the task of educating its readers.

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[54] Ibid., p. 279.
[55] Evi Zemanek. "A Dirty Hero's Fight", p. 58.
[56] Timothy Clark. "Scale", p. 156.
[57] Ian McEwan. *Solar*, p. 278.

The apparent confusion and even disappointment *Solar* was met with reveal an interesting expectation for Cli-Fi in general and McEwan's novel in particular, that is to provide guidance in the political and social confusion caused by climate change. While the more genre-bound examples discussed above happily oblige to this expectation by delivering a 'message' regarding their stance towards climate change, a non-catastrophic approach apparently opens room for a more complex discussion of the worlds (and lifestyles) that are at stake. Whereas *State of Fear* and *The Day After Tomorrow* thus can be regarded as representations of different sides of a debate, non-catastrophic adaptations elude this classification. Even though Jonathan Franzen's *Freedom* initially appears to present an opposing version of the handling of (knowledge about) climate change as it relates to personal lives from McEwan's *Solar*, my concluding reading of Franzen's novel aims to show that both *Freedom* and *Solar* deal in surprisingly similar ways with the central question of adaptation and the role of literature within climate change discourses.

Apart from a few demographic similarities, Walter Berglund and Michael Beard do not have much more in common than a personal and professional relation to environmental issues, which are, however, overshadowed by their personal lives in both cases. Walter, a family man from Minnesota, and his wife Patty form the center of a large novel revolving around the struggle to reconcile ambitions and ideas about life and relationships with their lived reality. In contrast to *Solar*, *Freedom* does not focus on a single character but is structured by relationships. Hence, an allegorical reading such as the one Zemanek proposes for *Solar* is not possible in the same straightforward manner. Nevertheless, the expectations toward the novel as a plea for environmentalism and ensuing disappointment toward its role in environmental discourse are surprisingly similar. This is grounded largely in Walter's role in nature conservancy and his conviction that global overpopulation is the leading cause for the destruction of natural environments and the ensuing danger to social, political, and personal freedom. However, despite his good intentions, Walter's environmentalism turns out to be a story of utter failure:

> According to a long and very unflattering story in the *Times*, Walter had made quite a mess of his professional life out there in the nation's capital. His old neighbors had some difficulties reconciling the quotes about him ('arrogant', 'high-handed', 'ethically compromised') with the generous, smiling, red-faced 3M employee they remembered pedaling his commuter bicycle up Summit Avenue in February snow; it seemed strange that Walter, who was greener than Greenpeace and whose own roots were rural, should be in trouble now for conniving with the coal industry and mistreating country people. Then again, there had always been something not quite right about the Berglunds.[58]

In contrast to Beard, whose immoral and opportunistic attitude secures his success as a promoter (and salesman) of necessary technological adaption to climate change, Walter's genuine concern for the environment seems to cause the exact

[58] Jonathan Franzen. *Freedom*. New York 2010, p. 3.

opposite. His enthusiastic and well-meaning activism fails as soon as he tries to implement his personal convictions on a larger scale. The opening of the novel establishes an analytical approach to Walter's and his family's lives that is followed through the entire course of the novel. The concluding sentence of the novel's first paragraph sets its course. As it turns out, there is something about the Berglunds that is "not quite right." Hence the novel's analytical approach concerns both the tracing of Walter's professional and personal failures. Moreover, the approach is, as it turns out, literally (psycho-)analytical, since the most revealing part of the novel consists of Patty Berglund's autobiography "Mistakes Were Made" which she has "composed at her therapist's suggestion."[59]

Besides Walter's explicit interest in environmental issues, it is the form, or rather the scope of the novel, that qualifies it as an adaptation of climate change and the perceptional and conceptual transformations it causes respectively: "In a lot of ways, *Freedom* looks more like a 19th century novel than a 21st century one. [Franzen] remains a devotee of the wide shot, the all-embracing, way-we-live-now novel. In that sense he's a throwback, practically a Victorian" (Grossman 2010). It is interesting that Franzen, here, is himself held up for his conservationist efforts; in the title of this *Time* review, he is called "the great American novelist," suggesting that his way of writing and his way of life, his own mid-western origin, and not least his ornithological passion are inseparably linked to the way he writes. It explains above all the expectations directed towards his fiction. Not only is he (apparently) expected to provide a truthful depiction of contemporary American family-life, he also – as has been shown for McEwan – is expected to provide guidance in the matters at hand.[60]

Intriguingly, *Freedom*'s critical reception often resembles the barely hidden *Schadenfreude* some of St. Paul's citizens feel toward their "greener than Greenpeace" ex-neighbor. It is aimed mainly at Walter's lengthy speeches on overpopulation. While, as Margaret Hunt Gram argues, other "totalizing political problems" are successfully emplotted "by having its characters encounter them as experiences or dilemmas",[61] "[u]nsustainable population growth, in contrast, arrives in *Freedom* not as part of the story but via passages of monologue or dialogue or thought, each characterized by a kind of discursive excess or overflow."[62] Especially when he tries to convince his college-friend Richard Katz, a childless single man with a rather successful career in rock music, to "help" him and his (later) lover Lalitha "with overpopulation",[63] Berglunds' speeches gain a sermon-like quality that stands out throughout the novel.

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[59] Ibid., p. 27.

[60] See for example Colin Hutchinson, who discusses Franzen's "Politics of Disengagement" in regards to his earlier novels ("Jonathan Franzen and the Politics of Disengagement." In: *Critique* 50.2 (2009), pp. 191-207).

[61] Margaret Hunt Gram. "Freedom's Limits: Jonathan Franzen, the Realist Novel, and the Problem of Growth." In: *American Literary History*, 26:2 (2014), pp. 295–316; p. 295.

[62] Ibid. 295.

[63] Jonathan Franzen. *Freedom*, p. 219.

> Think about how crowded the exurbs are already, think about the traffic and the sprawl and the environmental degradation and the dependence on foreign oil. And then add fifty percent [of the population; SN]. And that's just America, which can theoretically sustain a larger population. And then think about global carbon emissions, and genocide and famine in Africa, and the radicalized dead-end underclass in the Arab world, and overfishing of the oceans, and illegal Israeli settlements, the Han Chinese overrunning Tibet, a hundred million poor people in nuclear Pakistan: there's hardly a problem in the world that wouldn't be solved or at least tremendously alleviated by fewer people. And yet […] we're going to add another three billion by 2050. […] if the population keeps increasing nothing else we're going to do is going to matter. And yet *nobody* is talking about the problem publicly. It's the elephant in the room, and it's killing us.[64]

Walter's convictions, fueled by the admiration of his assistant Lalitha and later by her death, increasingly appear to drift into a fundamentalist direction. What looks like a slightly paranoid and/or apocalyptic variety of typical environmental rage directed at the unwillingness and ignorance of governments and general public alike to change (supposedly) simple things in order to save the planet, is turned into a personal vendetta, when Walter's grand scheme fails. Initially, he plans to use a Texan billionaire's pleaded interest in saving the Cerulean Warbler by reserving large habitats exclusively for the bird for his own interest in reversing population growth. The Texan's plan, however, turns out to be a truly Faustian bargain in which a large area of rural Wyoming is to be completely exhausted of coal by means of "Mountain Top Removal"[65] and finally renatured for the Warbler. When Walter is convinced that he is finally able to spark actual change, his world crumbles around him and he is forced to move back into the house on "Nameless Lake" and reduce his environmental efforts to (unsuccessfully) terrorizing his neighborhood, trying to convince them to put bells around their cat's necks in order to protect endangered song birds. His fate as a crazy bird enthusiast and potential cat killer seems fixed,[66] when he is himself saved from himself by his reconciliation with his estranged wife.

Although Walter Berglund is characterized as a thoroughly good guy, the comparison to *Solar*'s protagonist shows a surprisingly similar perspective. While Beard's interest in 'saving the world' exhausts itself in selfish motives, he is in many ways more successful than Berglund whose motives seem 'pure.' That Berglund, too, fails miserably, despite his best efforts, could be interpreted as a rather grim perspective of both texts on people's ability to change. Walter lacks the opportunist and selfish qualities which allow Beard to implement climate change rhetoric and profit from it and thus – regardless of his motives – possibly move other people to consider changes in their lifestyles. At the same time, Walter's honest qualities and personal efforts at least secure him the continuation of his life as part of a community, of which his marriage is the smallest form. Reading *Freedom* on a larger scale, however, reveals that Walter and his family lead a double life with regards to his environmentalist efforts. His aim to "make having

[64] Ibid., p. 220.
[65] Ibid., p. 212.
[66] Ibid., pp. 541-561.

babies more of an embarrassment"[67] has a severe effect on how he is seen and, ultimately, on how he sees himself: an embarrassment and a hypocrite. Although he himself may be known for his commuter bicycle, his family is a prime example for the (American) lifestyle whose freedoms are extremely energy-intensive.[68] As his views on overpopulation clash with his own past "breeding"[69] and his doubts about Lalitha's wish to have her "tubes tied"[70], the larger contradictions of (personal) freedoms become apparent. Aware of these contradictions, Walter describes the difficulties in adapting to global problems in terms of scale effects:

> But the problem now is that more life still is beautiful and meaningful on the individual level, but for the world as a whole it only means more death. And not nice death, either. We're looking at loosing half the world's species in the next hundred years. We're facing the biggest mass extinction since at least the Cretaceous-Tertiary. First we'll get the utter wipeout of the world's ecosystems, then mass starvation and/or disease and/or killings. *What's still 'normal' at the individual level is heinous and unprecedented at the global level*.[71]

As this passage conclusively shows, the emplotment of Walter's speeches is not a problem of Franzen's writing, or as Hunt Gram claims, due to "a fundamental affective incompatibility between antigrowth content and narrative in general […] and *realist* narrative in particular"[72] but grounds in the literary character's outlook. Hunt Gram's conclusion that "*Freedom* cannot risk alienating its potential consumer"[73] disregards the complexity of the novel's perspective on adaptation of and adaptation to environmental crises. Although she identifies the problems of scale and time in regards to the representation of overpopulation as the cause for the apparent dissonance between the narrative in general and Walter's "didacticism",[74] Hunt Gram's criticism of *Freedom*'s (or even Franzen's) apparent succumbing to the presupposed expectations of its implied readers misses the point.[75] It overlooks the awareness of its characters, especially Walter, for the discrepancies between the personal and the global/planetary. The novel's sup-

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[67] Ibid., p. 221.

[68] "The period I have mentioned, from 1750 to now, is also the time when human beings switched from wood and other renewable fuels to large-scale use of fossil fuel—first coal and then oil and gas. The mansion of modern freedoms stands on an ever-expanding base of fossil-fuel use. Most of our freedoms so far have been energy-intensive." (Dipesh Chakrabarty. "The Climate of History." In: *Critical Inquiry* 35 (2009), pp. 197-222; p. 208). See also Margaret Hunt Gram. "Freedom's Limits", p. 8.

[69] Jonathan Franzen. *Freedom*, p. 220.

[70] Ibid., p. 307.

[71] Ibid., p. 222 (emphasis in orig.).

[72] Margaret Hunt Gram. "Freedom's Limits", p. 302.

[73] Ibid., p. 309.

[74] Ibid., p. 303.

[75] "The novel assumes an implied reader with an affective relationship to capital that abides, like that same implied reader's affective relationship to childbearing, by the rules of the reproductive futurist game. If the novel assumes that its readers want to see capital reproduce and will be averse to any thwarting of capital's legitimate cultivation, then it is no surprise that *Freedom* relegates unsustainable economic growth, like unsustainable population growth, to discourse" (ibid., p. 308).

posed "struggle to reconcile [realist] narrative to one of the most urgent political problems of its moment", while indeed a signal for "a larger and higher-stakes representational struggle"[76], can only be considered a failure if literature is expected to maintain the Enlightenment dictum of *prodesse et delectare* (be useful and entertain). However, as I have argued above, the expectation of a straightforward moral lesson or 'message' is at a disadvantage when it comes to the hyper-complex global problems of the present. Since there is no binding guideline, i.e. a religious belief-system, any narrative takes part in the negotiation of fact and fiction.

Framing climate change as a matter of one-way adaptation, i.e. the 'truthful' translation of scientific facts into fiction and public discourse, fails to take into account the simultaneity of different realities. That is, non-catastrophic adaptations of climate change, though they are able to represent the representational struggle itself, are apparently not suited as agents of political change, as long as an 'optimistic' or 'hands-on' approach to (climate) change is expected. However, "[t]hinking of climate change in relation to literary or cultural criticism will not be a matter of inventing some new method of reading [or writing; SN] *per se*, for its most prominent effect is of a derangement of scales that is also an implosion of intellectual competences."[77] In other words, adaptation of climate change into modes of thinking and reading leads into uncharted territory. Calls for change – behavioral, perceptional, and representational – often still ignore the perseverance of discursive practices and the reach of intellectual (and, for that matter, scientific) thought. As Hannes Bergthaller puts it in regards to new materialism:

> We [literary scholars] may have good theoretical reasons to decry the invidious effects of denialist thinking on the way in which societies conceptualize their relationship to the natural world, yet we cannot hope to simply replace it, like a faulty engine, with a better ontology, because such semantic patterns are themselves products of social evolution and deeply ingrained in the autopoiesis of communication.[78]

In effect, the adaptation both *of* and *to* climate change must acknowledge the non-eventful nature of the problem at hand, even though this leads, as Beard and Walter painfully prove, almost certainly to personal and political failure. The acceptance of failure, to act, to (properly) represent, and to understand, however, holds potential both in regards to literature and the current political struggle. While, as I have argued, the reviews accusing McEwan and Franzen respectively of denying climate change or reducing global problems to tedious speeches miss

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[76] Ibid., p. 311. "That the novel as a representational form has trouble telling stories about the growth problem signals that problem's particular difficulty. Politics requires narrative. Often it requires conventional narrative, something like realist narrative. When a novel struggles to reconcile such narrative to one of the most urgent political problems of its moment, it may mean there's a larger and higher-stakes representational struggle in the offing" (ibid.).

[77] Timothy Clark. „Scale", p. 164.

[78] Hannes Bergthaller. "Limits of Agency: Notes on the Material Turn from a Systems-Theoretical Perspective." In: Serenella Iovino, Serpil Oppermann (eds.). *Material Ecocriticism.* Bloomington 2014, pp. 37-50.

the point, the force of the reactions might be an indicator for the political power of these narratives. While more straightforward adaptions of climate change (debate) such as the ones attempted in *State of Fear* and *The Day After Tomorrow* oblige the demand for a clear 'message' they leave behind a sense of closure (and pleasure) that has nothing to do with the real world problems negotiated. In this perspective, *Solar* and *Freedom* present the contradictions and incompatibilities of scales that characterize the current epoch of environmental crisis without offering any relief. In this fashion they refuse attempts to reduce literature to a dependent medium, a mere tool that can "do what scientists themselves [can] not."[79] Whether read allegorically or not, the failure of adaptation in regards to climate change and vice versa holds profound representational and political potential in that it explores the limits of human capability when the Anthropocene seems to substantiate humanity as a natural force.

[79] David A. Kirby. *Lab Coats in Hollywood*, p. 184.