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# A Sociological Perspective on the Representation of Science in Climate Change Novels

## Introduction

A principal idea in sociology holds that cultural and institutional patterns of distinct social spheres can be variously interdependent.<sup>1</sup> An extension of that assumption leads to the notion that science, technology, and modern society co-produce each other as scientific knowledge and technology are “at once products of social work and constitutive of forms of social life.”<sup>2</sup> In the Anthropocene, in which nature and society have become ever more intertwined “so that the fate of one determines the fate of the other,”<sup>3</sup> this aspect of the institutional and cultural realization of modernity may have laid the foundation of its own renunciation when accounting for the ecological and societal consequences of climate change caused by human activities over the last 200 years. This ambivalence challenges the understanding of the interrelationship between modern society, science, and its ecological environment. Besides various academic

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<sup>1</sup> Robert K. Merton, “Social and Cultural Contexts of Science,” in: *The Sociology of Science: Theoretical and Empirical Investigations*, ed. Norman W. Storer (Chicago: University of Chicago Press, 1973), p. 175.

<sup>2</sup> Sheila Jasanoff, “The Idiom of Co-Production,” in: *States of Knowledge: The Co-Production of Science and Social Order*, ed. Sheila Jasanoff (London: Routledge, 2004), p. 2.

<sup>3</sup> Jan Zalasiewicz et al., “The New World of the Anthropocene,” *Environmental Science and Technology*, Vol. 44, No. 2 (2010), p. 2231.

approaches, contemporary popular culture increasingly engages with this thematic complex, be it the arts, film, or, for instance, literary fiction.<sup>4</sup> With respect to the latter, literary theory postulates that a new genre of so-called climate change novels has emerged in world literature in reaction to the Anthropocene's ecological and social consequences. What is more, a substantial subset of such novels attributes a central narrative function to the institution of science.

Seeking to utilize literary fiction as a catalyst for sociological thinking, this paper asks how climate change novels represent science's multi-layered involvement in the configuration of the cause, discovery, and response to human-induced climate change. In line with this, the second section of this paper offers a brief background on the relation between science, society, and climate change. The third section sketches how social inquiry can be built on the epistemic propositions hinted at in literary fiction. The three subsequent parts are the centre of the paper and reflect on the social role science plays in the plots of climate change novels.

### Modern Society and Climate Change

In order to track literary insights on the role of science in modernity's unsustainable relation with its ecological environment, this section frames the configuration of science, modern society, and climate change. To clarify first, modernity and modern society are widely and differently used terms in social thought. Due to its limited size, this paper abstains from precisely establishing its application of the concept of multiple modernities, but it considers all those societies with a considerable per-capita and/or total ecological footprint as at least partially modern.<sup>5</sup> What is more, the cultural and institutional outlook of their functionally differentiated economic subsystems could be characterized as considerably indifferent towards all those social and ecological aspects that are not a part of their immediate considerations. Second, the scientific consensus on anthropogenic climate change attributes global warming to human activities, especially to those economically modern and modernizing societies that have primarily driven

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<sup>4</sup> Manjana Milkoreit, "The Promise of Climate Fiction," in: *Reimagining Climate Change*, eds. Paul Wapner, Hilal Elver (Abingdon: Routledge, 2016), pp. 172–174.

<sup>5</sup> Shmuel N. Eisenstadt, "Multiple Modernities," *Daedalus*, Vol. 129, No. 1 (2000), pp. 2–5.

the expansion of the greenhouse effect over the last 70 years.<sup>6</sup> Most of the observed and experienced climate change in this period is likely to have been due to the increase of that aggregate phenomenon.<sup>7</sup> Furthermore, a rather tacit climate change consensus among the social sciences and the humanities holds that human societies are not necessarily inclined to interact with nature in such an unsustainable way. Instead, institutional and cultural patterns that are crucial building blocks of modern societies nurture such societal practices that harm the ecological environment.<sup>8</sup>

In this respect, one major tenet of modernity has been the growth of science into a functionally semi-autonomous and culturally distinct institution of society that has the primary function to produce and certify knowledge within and beyond its internal contexts of application. Among others, Ulrich Beck states that science is therefore structurally embedded in the production of risks that are associated with modern society, because it co-produces knowledge and technology whose societal utilization have created and accelerated problems such as those that come with climate change and global warming.<sup>9</sup> Building on the notion of modern science as a societal and ecological risk producer, Uwe Schimank distinguishes two kinds of conditions that have increased this role: those aspects inherent to the produced knowledge and technology and the social conditions of its invention, diffusion, and application.<sup>10</sup> In addition to this rather unintended role, science also seeks to identify such risks as problems and provide ideas how to overcome societal threats for which it is, in part, responsible itself.<sup>11</sup> In more figurative terms, the institution of science is part of modernity's Faustian inclination to constantly seek and achieve social benefits, while it simultaneously contributes to the contrary. The

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<sup>6</sup>Will Steffen et al., "The Trajectory of the Anthropocene: The Great Acceleration," *The Anthropocene Review*, Vol. 2, No. 1 (2015), pp. 92–94.

<sup>7</sup>Naomi Oreskes, "Beyond the Ivory Tower. The Scientific Consensus on Climate Change," *Science*, Vol. 306, No. 5702 (2004), p. 1686.

<sup>8</sup>Robert J. Antonio, Brett Clark, "The Climate Change Divide in Social Theory," in: *Climate Change and Society: Sociological Perspectives*, eds. Riley E. Dunlap, Robert J. Brulle (New York: Oxford University Press, 2015), p. 333.

<sup>9</sup>Ulrich Beck, *Risk Society: Towards a New Modernity* (Los Angeles: SAGE, 1992), p. 163.

<sup>10</sup>Uwe Schimank, "Science as a Societal Risk Producer: A General Model of Intersystemic Dynamics, and Some Specific Institutional Determinants of Research Behavior," in: *The Culture and Power of Knowledge: Inquiries into Contemporary Societies*, eds. Nico Stehr, Richard V. Ericson (Berlin: De Gruyter, 1992), p. 216.

<sup>11</sup>Uwe Schimank, "Ökologische Integration der Moderne—Eine integrative gesellschaftstheoretische Perspektive," in: *Zum Gesellschaftlichen Umgang mit dem Klimawandel*, eds. Cristina Besio, Gaetano Romano (Baden-Baden: Nomos, 2016), pp. 64–65.

following section establishes why this tripartite role of science as a co-producer, diagnostician, and therapist of the societal and ecological risks of modernity might find representational resonance in contemporary climate change novels given the potential of popular culture for social analysis.

### Sociology and Literature

As literary fiction is the primary source for this inquiry of popular culture, the following substantiates its epistemic potential to contribute to the sociological understanding of science, modern society, and climate change. It builds on the narratological standpoint that all those thematically applicable novels can be analyzed as an intersection between the genres of climate change and so-called science novels.<sup>12</sup> Literature of the latter kind explores the social aspects of science by thematizing, for example, the agency and the institutional and cultural context of science.<sup>13</sup> For sociological purposes, that allows the examination of two topics of discursive representation: first, purposive actions of researchers and scientific institutions, and, second, “the way in which that fictionalized process is affected by the author’s reconstruction of the dominant discourse of the day, both within and beyond the scientific community.”<sup>14</sup> Without employing fictional plots as quasi-factual documentary accounts, the representation of the culture of science in climate change novels provides the sociological reader with an epistemic offer on the relation between science, modernity, and climate change.<sup>15</sup> Epistemologically, this take is a second order observation of the cultural discourse on science and climate change.<sup>16</sup> Authors of novels can be classified as first order observers that are less constrained in their approach and scope to process and present their

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<sup>12</sup> Adeline Johns-Putra, “Climate Change in Literature and Siterary Studies: From Cli-Fi, Climate Change Theater and Eco-poetry to Ecocriticism and Climate Change Criticism,” *Wiley Interdisciplinary Reviews: Climate Change*, Vol. 7, No. 2 (2016), pp. 267–270.

<sup>13</sup> Olga A. Pilkington, “Introduction: What’s in a Name?,” in: *Lab Lit: Exploring Literary and Cultural Representations of Science*, eds. Olga A. Pilkington, Ace G. Pilkington (Lanham: Lexington Books, 2019), pp. 1–2.

<sup>14</sup> Norbert Schaffel, “Aspects of the Science Novel,” *Zeitschrift für Anglistik und Amerikanistik*, Vol. 64, No. 2 (2016), p. 121.

<sup>15</sup> Urs Büttner, “Naturbewältigung, ‘Natural Imaginaries’ und die Möglichkeiten der Kunst: Ein theoretischer Versuch zur Ökologie des Wissens,” in: *Literatur und Ökologie: Neue Literatur- und Kulturwissenschaftliche Perspektiven*, eds. Claudia Schmitt, Christiane Solte-Gresser (Bielefeld: Aisthesis, 2017), pp. 101–105.

<sup>16</sup> Susan M. Gaines et al., “Fiction Meets Science: Background and Concept,” *Fiction Meets Science Concept Paper*, No. 1 (Bremen: University of Bremen, 2013), p. 9.

perception of social and cultural phenomena. In contrast, other analytical practices, for instance academic scholarship like sociology, seek rather objective reflections and are therefore methodologically more restricted. Because of that counterintuition literary imaginations of modern societies as geological agents can function as ingredients for an understanding that reflects on more conventional accounts of science, society, and climate change.<sup>17</sup> Such an approach of the sociology of literature allows to integrate the interpretation of literary fiction into sociological analysis. Subsequently, such fictional texts are documents of analysis “with which to probe into reality, testing certain features of the world as described in the text.”<sup>18</sup> In that sense, the following three parts comprise no comprehensive survey, but a study of exemplary climate change novels.

### Science as a Co-Producer of Climate Change

Based on the sampled literary narratives, the role modern science plays in the societal production of human-induced climate change appears to attract less consideration in contemporary climate change novels. One reason for that could reside in the narrative difficulty to incorporate the prolonged timescale and multidimensional nature of science’s involvement in the causation of climate change into a plot. Its share can be traced to the intended and unintended appropriation of its research insights by other societal fields for the production and application of scientific and technical knowledge objects, especially for economic purposes. In general, the institution of science seldomly acts on its own accord with regard to the extra-scientific utilization of its products by other social actors.<sup>19</sup> This exchange is mutual, because science depends on other social fields, particularly on the economic, political, and military subsystems of modern society, to gain access to resources that are essential to its functionality, i.e. funding or societal acceptance. Nevertheless, the aggregate effects of

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<sup>17</sup>Dipesh Chakrabarty, “The Climate of History: Four Theses,” *Critical Inquiry*, Vol. 35 No. 2 (2009), pp. 207–212.

<sup>18</sup>Mariano Longo, *Fiction and Social Reality: Literature and Narrative as Sociological Resources* (Farnham: Ashgate, 2015), p. 140.

<sup>19</sup>Schimank, “Ökologische Integration der Moderne”, p. 64.

science over the last two centuries underpin its role in the composition of the ecological impact of modernity.<sup>20</sup>

If science is a crucial part of the causes of climate change and global warming, even only as a rather inadvertent co-producer, it is reasonable to look for narratives that portray how and why it bears co-responsibility for its environmental consequences. But, as already mentioned, the involvement of science in the production of the social causes of climate change is a large-scale, entangled, and longtime process. It is therefore misguided to expect a narrative emplotment of the complete functional chain that starts with the production of scientific knowledge, illustrates its societal diffusion, and details its varied application, while simultaneously emphasizing how all these events and actions in their totality contribute to climate change. Instead literary narratives proceed “by linking together moments and scenes that are in some way distinctive or different.”<sup>21</sup> More generally phrased, “what fiction [...] makes possible is to approach the world in a subjunctive mode, to conceive of it as if it were other than it is: in short, the great, irreplaceable potentiality of fiction is that it makes possible the imagining of possibilities.”<sup>22</sup> Climate change novels, therefore, tend to capture singular and subjective imaginations of exemplary cases of science’s contributions to local and global environmental harm. For instance, Amitav Ghosh’s environmental novel *The Hungry Tide* follows this approach by depicting the Sundarbans, a cluster of low-lying islands, mangrove forests, and saltwater swamps located at the Ganges–Brahmaputra–Meghna delta delta plain along the Bay of Bengal, as a delicate ecosystem that is already endangered by the side effects of India’s and Bangladesh’s economic development and potential sea level rise due to global warming. In addition, one of the novel’s main characters, Piya, a cetologist who comes to the Sundarbans to survey local river dolphins, questions how the results of her research might transform the islands into a center for marine science and ecological conservation. As an unintended side effect, this scientific upgrading of the islands could attract the local and global tourism industry.<sup>23</sup>

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<sup>20</sup> Jürgen Renn, *The Evolution of Knowledge: Rethinking Science in the Anthropocene* (Princeton: Princeton University Press, 2020), pp. 3–22.

<sup>21</sup> Amitav Ghosh, *The Great Derangement: Climate Change and the Unthinkable* (Chicago: The University of Chicago Press, 2017), p. 17.

<sup>22</sup> *Ibid.*, p. 128.

<sup>23</sup> Amitav Ghosh, *The Hungry Tide* (London: Borough Press, 2005), pp. 397–400.

Bernhard Kegel's *Abgrund* picks up the same theme of science's habit to ascribe societal, in this case economic, value to natural objects that can be of interest to other social actors.<sup>24</sup> His narrative is centered on the Galápagos Islands whose ecosystem inspired Charles Darwin to develop his theory of biological evolution by natural selection. Almost 200 years of subsequent institutionalization of research has transformed the archipelago into a major ecological research site. In consequence, the islands have become a hotspot for ecotourism that is the backbone of the local economy and employs most of the local population. While the novel acknowledges science's co-responsibility for this development, its emphasis lies on the conflicts that are caused by tourism, its detrimental effects on the islands' environment, and the inconsistent interests of the researchers.

Kim Stanley Robinson's novel *Forty Signs of Reign*, the opening of his *Science in the Capital* trilogy, adds a political angle to the literary representation of science's role as a co-producer of human-caused climate change that is embodied in the minor figure of Zacharius Strengloft, a presidential science advisor who has been pejoratively nicknamed *Dr. Strangelove* by the novel's central protagonists in reference to the mad nuclear war expert of Stanley Kubrick's eponymous movie. Characterized as "a pompous ex-academic of the worst kind, hauled out of the depths of a second-rate conservative think tank,"<sup>25</sup> the narrative presents Strengloft as a bureaucratic intellectual that purposely abstains from proposing alternative lines of analysis which run counter to values and objectives of a political administration that revolves around denying and understating climate change.<sup>26</sup> His advisory role resembles that of a partisan advocate who serves to implement and communicate a pre-defined set of policies that ignore the causes and downplay the potential effects of climate change.<sup>27</sup> Thus, he represents the prototype of the so-called merchant of doubt within and beyond the scientific field who caters to non-scientific interests, does little to no substantial research on climate change, and, as

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<sup>24</sup> Bernhard Kegel, *Abgrund* (Hamburg: Mare, 2017).

<sup>25</sup> Kim Stanley Robinson, *Forty Signs of Rain* (New York: Bantam Books, 2004), p. 155.

<sup>26</sup> Robert K. Merton, "Role of the Intellectual in Public Bureaucracy," in: *Social Theory and Social Structure*, ed. Robert K. Merton (New York: Free Press, 1968), p. 273.

<sup>27</sup> Roger A. Pielke, *The Honest Broker: Making Sense of Science in Policy and Politics* (Cambridge: Cambridge University Press, 2007), pp. 15–16.

counselor, deliberately obscures the truth on the issues of global warming.<sup>28</sup> Robinson's narrative exemplifies how bad or false scientific policy advice, even if it may only come from a small, but influential minority within the institution of science, constitutes an indirect cause of societal ignorance of the environment that reinforces the normative non-acknowledgement of and structural non-adjustment to climate change in considerable parts of modern societies.

### Science as a Diagnostician of Climate Change

While only a minority of the sampled novels emphasize the role of science as co-producer of climate change, the representation of its role as a diagnostician of the causes, actuality, and effects takes precedence.<sup>29</sup> In this respect, Ilija Trojanow's *EisTau* centres on the experience of Zeno Hintermeier, a former glaciologist, whose research helped to diagnose the causal relationship between global warming and the local retreat of glaciers in the Alps.<sup>30</sup> Unwilling to continue the study of the ongoing glacial decay, he leaves his research career and becomes a tour guide on a cruise ship to the Antarctic.<sup>31</sup> In his new profession, Zeno encounters ignorance and intransigence by many of the passengers and crew members when he seeks to explain to them how their individual consumptive habits have contributed to the global warming that causes the mass melting of the Antarctic ice sheet.<sup>32</sup> Among other aspects, Zeno's experience both as a glaciologist and as a tourist guide implies how science is unable to convince the public of the causal relationship between contemporary social patterns and the structural trajectory of the climate. Moreover, Zeno recognizes the tourists' contradictory standpoint as these cherish the natural beauty of the Antarctic ice, while simultaneously rejecting the notion that their own behaviour can have a tangible impact on the region.<sup>33</sup>

<sup>28</sup> Naomi Oreskes, Erik M. Conway, *Merchants of Doubt: How a Handful of Scientists Obscured the Truth on Issues from Tobacco Smoke to Global Warming* (London: Bloomsbury, 2010), pp. 169–215.

<sup>29</sup> Sylvia Mayer, "Science in the World Risk Society: Risk, the Novel, and Global Climate Change," *Zeitschrift für Anglistik und Amerikanistik*, Vol. 64, No. 2 (2016), p. 213.

<sup>30</sup> Ilija Trojanow, *EisTau: Roman* (München: Hanser, 2011), pp. 74–75.

<sup>31</sup> *Ibid.*, p. 83.

<sup>32</sup> *Ibid.*, p. 109.

<sup>33</sup> *Ibid.*, pp. 24–35.



Another literary representation of science as a diagnostician of the effects of climate change is Barbara Kingsolver's *Flight Behavior*.<sup>34</sup> The novel depicts the forced migration of monarch butterflies from Mexico to the Appalachian Valley in the United States of America. The monarchs had to leave their roost sites in Mexico due to seasonality changes caused by global warming that has transformed the climate of their regular winter habitat into an existential risk. Ovid Byron, a lepidopterist, and his research team see it as another indication how global climate change disrupts the local ecosystems of the Appalachians and Mexico. Even in their new biotope, climate change amplifies the winter's effects that, in turn, threaten the reproductive viability of the butterfly population.<sup>35</sup> When Dellarobia Turnbow, a local informant who becomes an ad-hoc research trainee, asks Byron for ideas on how to tackle the problems of the local ecosystem in order to increase the monarch's chances for survival, he cautions that "[w]e cannot jump to conclusion. All we can do is measure and count. That is the task of science."<sup>36</sup> Later in the book, Dellarobia summarizes the results of their research on the behaviour of the monarchs in the Appalachians: "Other things go wrong, and they stay the same, so it confuses them. [...] So they're here by mistake [...]. And they can't adjust to it."<sup>37</sup> Byron adds that a butterfly like any living organism "is the sum of its behaviors [...]. Its community dynamics. Not just the physical body."<sup>38</sup> Byron's verdict on the monarchs also applies to modern societies, given their, for the time being, insufficient will and ability to adapt to repercussions of climate change and global warming.

Regarding the role of science in society, Byron does not consider himself a zookeeper that is out to save the monarchs: "That is a concern of conscience [...]. Science doesn't tell us what we should do. It only tells us what is."<sup>39</sup> Far from dismissing its own responsibility, this interpretation of the passage proposes that the novel carves out how science as a social institution acknowledges that it does not possess the capacity, influence, and acceptance in modern society to persuade other systemic actors of

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<sup>34</sup> Barbara Kingsolver, *Flight Behavior: A Novel* (New York: HarperCollins, 2012).

<sup>35</sup> *Ibid.*, p. 228.

<sup>36</sup> *Ibid.*, p. 244.

<sup>37</sup> *Ibid.*, p. 260.

<sup>38</sup> *Ibid.*, p. 316.

<sup>39</sup> *Ibid.*, p. 320.

the truth on climate change's causes, imminence, and effects.<sup>40</sup> From a theoretical perspective that considers modern society as functionally differentiated into various social subsystems, Byron's stand illustrates a structural ambivalence of modernity, according to which the societal division of labor and value spheres can produce a societal configuration in which agents that act within the corresponding roles of their respective subsystems have a considerable degree of functional autonomy with regard to internal action. Especially in case of modern science systems that are able to judge the validity and worth of their own knowledge objects according to internal intellectual criteria, these advantages come along with a potential loss of self-sufficiency from and influence on society as a whole. Both novels demonstrate that science cannot function without external assistance and it cannot affect society without the cooperation and conscience of other social agents. As the next section shows, this topos is also emphasized in literary fiction that deals with the question of how to approach, mitigate, and adapt to climate change.

### Science as a Therapist of Climate Change

Science's role in understanding the response of the climate system to human interventions naturally leads to the question whether and how to address this ecological development as a societal problem. Currently, modern societies pursue three options both simultaneously and, especially regarding the constructive ones, insufficiently: adapt to, mitigate, and/or ignore climate change and its societal effects.<sup>41</sup> In this regard, as already mentioned above, *Forty Signs of Rain*, the first part of Kim Stanley Robinson's *Science in the Capital* trilogy, represents a prototypical scenario of how and why a modern society, in case of the United States of America, is currently unable to tackle this problem set. This is in part due to knowledge and technology gaps, but the main reasons for this adaptive gap are socially constructed. Those societal actors advocating for adaptation and mitigation—the protagonists of the novel taking that stance are researchers

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<sup>40</sup> Sonja Fückler et al., "A Fictional Risk Narrative and Its Potential for Social Resonance: Reception of Barbara Kingsolver's Flight Behavior in Reviews and Reading Groups," in: *Under the Literary Microscope: Science and Society in the Contemporary Novel*, eds. Sina Farzin, Susan M. Gaines, Roslynn D. Haynes (University Park, Pennsylvania: Penn State University Press, 2021), pp. 219–227.

<sup>41</sup> David A. King, "Climate Change Science: Adapt, Mitigate, or Ignore?," *Science*, Vol. 303, No. 5655 (2004), pp. 176–177.

that work for the National Science Foundation (NSF), the largest federal agency in the US that funds basic science and engineering—constantly experience how they do not control the necessary societal positions and do not possess the sufficient resources to initiate this policy paradigm shift. Instead, they witness repeatedly that those goods are partially or wholly under the control of other partisan actors within the political and economic system of the US that strategically ignore scientific facts and, peculiarly, their own ignorance of these facts. At the end of the first novel, one of the main characters of the trilogy, Frank Vanderwal, a biomathematician who works for the director of the NSF, recognizes the structural shortcoming of the institution of science in the US and proposes a different approach for its interaction with society:

[...] it's our job now as scientists to force the issue and make it happen, by employing all our resources in an organized way. To get to the other side faster. The money and the institutional power that NSF has assembled ever since it began has to be used like a tool to build this. No more treating our grantees like clients whom we have to satisfy if we want to keep their business. No more going to Congress with hat in hand, begging for change and letting them call the shots as to where the money is spent.<sup>42</sup>

As idealized as such an account appears, this intended cultural and institutional change within the scientific field resembles an ongoing development how scientists frame climate change as today's principal grand challenge that requires a coordinated intergenerational effort from all actors within and beyond the scientific field.<sup>43</sup> Over the course of the second and third novel that paradigm shift succeeds, but only because the political and the economic fields also change their principal standpoints on climate change due to mainly internal logic of reasons. The imminent effects of abrupt climate change and global warming, in the form of, among other things, the slowdown of the thermohaline circulation of the Gulf Stream and repeated floodings, are ecological tipping points that change the political landscape of the US, so that a new administration is elected into the White House whose climate change approach fundamentally departs

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<sup>42</sup>Robinson, *Forty Signs of Rain*, p. 322.

<sup>43</sup>David Kaldewey, "The Grand Challenges Discourse: Transforming Identity Work in Science and Science Policy," *Minerva*, Vol. 56, No. 2 (2018), pp. 161–82.

from former bipartisan environmental procrastination. Just as crucially, the immediate interest of economic actors to preserve the function of their markets forces them to recognize the economic utility of environmentalism and to fund the necessary mitigation and adaptation therapies proposed, guided, and, among others, implemented by scientific institutions:

But the truth was, the interlocking networks of human institutions were woven into such a tight mesh that it was hard to get any wave functions or simplifications going. They were tied down like Gulliver by all their rules and regulations. Only the violence of the original perturbation—the flood in Washington—was getting them as much flex as they were seeing; that and the hard winter. Any more than that they were going to have to create by lots of small actions, repeated many times.<sup>44</sup>

As utopian as the trilogy's plot is, it is realistic in its projection that this paradigm shift within the institutions of science can only succeed in alignment with parallel changes within the economic and political system that concentrate the societal cooperation on the implementation of mitigation and adaptation measures. Consequently, the trilogy not only represents a “pre-figuring what a solution to the problems posed by global warming might look like,”<sup>45</sup> it moreover imagines the required shifts within modern society that are the structural preconditions for those solutions to be socially feasible. Thus, while *Science in the Capital* concentrates on the role of science as an institution that identifies the problems of and proposes the solutions to climate change, it also demonstrates how “saving the world”<sup>46</sup> is, at least, a scientific, political, and economic project.

To emphasize the final point, the novels represent a set of habits, common to regular scientific practices, as instrumental for coping with and solving the problems of climate change: “Take a problem, break it down into parts (analyze) quantify whatever parts you could, see if what you learned suggested anything about causes and effects; then see if this suggested anything about long-term plans, and tangible things to do.”<sup>47</sup> A somewhat ironic claim is that both the societal causes of and the proposed solutions to

<sup>44</sup>Kim Stanley Robinson, *Fifty Degrees Below* (New York: Bantam Books, 2005), p. 534.

<sup>45</sup>Christopher Maughan, “Representations of Environmental Activism in Kim Stanley Robinson's *Science in the Capital* Trilogy and Michael Crichton's *State of Fear*,” *Trans-Scripts*, Vol. 3 (2013), p. 43.

<sup>46</sup>Kim Stanley Robinson, *Sixty Days and Counting* (New York: Bantam Books, 2007), p. 372.

<sup>47</sup>Robinson, *Fifty Degrees Below*, p. 526.

climate change are, in part, the outcome of such forms of conduct that rest upon the notion of shapeable progress. Schimank holds that this principle functions as a cultural frame of reference for collective and individual social agents in modern society.<sup>48</sup> It combines the notions of development and agency: first, progress means improvement and is imperative, and, second, any event, object, goal, or configuration can be intentionally induced by actions of self-governing social agents.<sup>49</sup> This conviction characterizes most scientific characters of the novels. As it becomes ever more implemented as an institutional value in solving the problems related to the causes and effects of human-induced climate change, it is depicted to be crucial in science's role to pull society out of its self-inflicted ecological instability.

### Conclusion

These brief reflections on the literary representations of science as co-producer, diagnostician, and therapist of climate change highlight two aspects of this thematic complex in literary fiction and popular culture in general: for the general audience, it illustrates “the ethical and social ramifications of this unparalleled environmental crisis, reflects on current political conditions that impede action on climate change, explores how risk materializes and affects society, and finally plays an active part in shaping our conception of climate change.”<sup>50</sup> From a sociological point of view, climate change novels thus contribute to the public understanding of climate change and function as a societal device to imagine modernity as both a social and biological force that damages the base of its ecological foundation. The second aspect reproduces the first one and is of particular interest to the sociological reader: literary representations of science and its societal function in relation to climate change offer substantial impulses to reflect on and add to the sociological understanding of the figuration of science, modern society, and the Anthropocene.

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<sup>48</sup> Schimank, “Ökologische Integration der Moderne,” pp. 73–77.

<sup>49</sup> Uwe Schimank, “Planung versus Evolution: Wie verändert sich das Soziale?,” in: *Handbuch der Soziologie*, eds. Jörn Lamla, Henning Laux, Hartmut Rosa, David Strecker (Konstanz: UVK, 2014), pp. 118–123.

<sup>50</sup> Antonia Mehnert, *Climate Change Fictions: Representations of Global Warming in American Literature. Literatures, Cultures, and the Environment* (Cham: Springer, 2016), p. 4.

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### **A Sociological Perspective on the Representation of Science in Climate Change Novels**

According to a comprehensive scientific consensus, the environmental impact of modern societies is a significant cause for the current experienced effects of global warming. In addition to science's function as a diagnostic instance of the Anthropocene, it occupies at least two additional roles in the story of human-induced climate change. Modern science tries to act as a therapist as it proposes numerous actions that need to be taken when tackling the risks, causes, and consequences of climate change. Moreover, the institution of science is a (co-) producer of anthropogenic risks due to the intentional and unintentional utilization of scientific knowledge and science-based technologies for societal purposes. Therefore, this contribution asks from a sociological point of view how representations of science in exemplary climate change novels, a body of contemporary literature that deals with human-induced global warming and its societal implications, depict this multi-layered embedding of science as a producer, diagnostician, and therapist of societal risks in the story of human-caused climate change.

**Keywords:** sociology of climate change, sociology of literature, modernity, climate fiction, Anthropocene

**Słowa kluczowe:** socjologia zmian klimatycznych, socjologia literatury, współczesność, fikcja klimatyczna, antropocen