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## Perspectives

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Eline D. Tabak

## Science in Fiction: A Brief Look at Communicating Climate Change through the Novel

Responding to Lynda Walsh's argument for looking at alternative models of knowledge production—and taking into account Jeroen Oomen's argument in favor of the pursuit of scientific knowledge—I am using this paper to take a serious albeit brief look at one of society's more creative opportunities for communicating the climate: the contemporary climate-change novel.

Looking at novels as means for communicating climate change immediately raises the following question: can novels, as singular works of literary fiction, still enter and influence public debate in the twenty-first century? Answering that particular question goes beyond the scope of this paper; the examples of influential novels that are most often cited are from the late eighteenth and nineteenth centuries, such as the 1852 classic Harriet Beecher Stowe's *Uncle Tom's Cabin*, suggesting that evidence for novels changing public opinion in this day and age is scanty. Nevertheless, in this paper, I make the assumption that a novel, containing the “right” elements, has the potential to influence public opinion and debate on climate change. Taking a look at the most successful examples of climate fiction, it appears as though the inclusion of science—both on the levels of the plot itself and as a paratext—is vital for their positive reception as a convincing or “good” book on the topic of anthropogenic global warming. (That said, some are more ambiguously received than others.) As a result, the novel can be an important channel in which complex discourses can be communicated.

I will look at three successful American books that reflect upon anthropogenic climate change: Susan M. Gaines's *Carbon Dreams* (2001), Barbara Kingsolver's *Flight Behavior* (2012), and Michael Crichton's *State of Fear* (2004).<sup>1</sup>

As scientific knowledge plays an important role in the books, the way these novels treat scientists—and their scientific findings—provides great insight into how society gener-

<sup>1</sup> Susanne M. Gaines, *Carbon Dreams* (Berkeley: Creative Arts Book Company, 2001); Barbara Kingsolver, *Flight Behavior* (New York: HarperCollins, 2012); Michael Crichton, *State of Fear* (New York: HarperCollins, 2004). The author consulted an e-book edition (iBooks) of *State of Fear*, which contains additional materials not found in the print edition; page numbers correspond to the print edition.

ally regards the practice of science. And then there is another layer: its presentation in the paratext. My chosen books were written by authors who are in some way educated and knowledgeable in the natural sciences—particularly Gaines and Kingsolver—and in a way depend on this education and knowledge for the credibility of the science communicated in their work. This assertion and performance of the authors' expertise occurs in the paratext, or everything besides the story itself, "in order to *present it . . . to make it present*, to assure its presence in the world, its 'reception' and its consumption."<sup>2</sup> With this in mind, I will trace the role of the scientist in the plots and the paratextual elements of the aforementioned novels, and the ways in which they frame these books as communicating scientific "truth" and "good" climate science.

### **A Geochemist, an Ecologist, and a Climate Skeptic Walk into a Bar**

In stark contrast with other climate change novels (including *Flight Behavior*), the main scientist and protagonist of Gaines's *Carbon Dreams* is a young woman: geochemist Dr. Cristina Arenas discovers a means of analyzing the organic residues found in biomarkers to gain insight into the Earth's carbon levels and their correlation to global temperatures throughout the millennia. While plagued by a lack of funding and other academic troubles, including the responsibility as a scientist to stay rational and not speculate about her findings and present-day climate change, Cristina's hypothesis reaches and intrigues not only her academic colleagues, but also the broader public and even the US Congress. Where Cristina is the embodiment of scientific rationality, her partner—gardener and organic farmer Chip—represents a more emotionally driven response to the changing environment and the looming realization and threat of climate change. When Cristina's research is misinterpreted by a different scientist in a skeptical piece on climate change in the *New York Times*, it is Chip who convinces Cristina to write to the newspaper in an attempt to rectify their mistake. Chip also points out the ways in which scientists are funded and bribed by the fossil-fuel industry, much to Cristina's disbelief: "Money and power? . . . I think you've got things a little mixed up. That's what economists and politicians do. I'm a scientist, in case you haven't noticed."<sup>3</sup> Later, when Cristina has to testify in Congress, she decides to look deeper into the issue Chip raised and finds out that there is indeed an issue with science being funded by the fossil-fuel industry.

2 Gérard Genette, "Introduction to the Paratext," trans. Marie Maclean, *New Literary History* 22, no. 2 (1991): 261–72, print, quote on 261.

3 Gaines, *Carbon Dreams*, 243.

While the scientist is not decentered in Gaines's book—I would say the figure is central—the author does emphasize that scientific knowledge cannot stand its own, isn't free from politics, and needs that little bit extra to make an impact. Above all, the relationship between Cristina and Chip in *Carbon Dreams* shows that a symbiosis is needed. Neatly packaged—albeit in a bit of a cliché—as a romantic relationship between a scientist and an organic farmer, Gaines's novel presents the message that science is certainly in need of other means to disseminate its findings to the broader public: publishing hypotheses in academic journals and presenting papers at conferences is not enough. Both a simpler and more convincing way of communicating *and* a certain drive are needed to send the messages of climate science out into the world.

*Flight Behavior*, praised for how it combines the conventions of the realist novel—a localized narrative by means of the genre—with the global effects and discourse of climate change, focuses on the life of Dellarobia Turnbow, a Tennessee local who gave up her college dreams after getting pregnant at seventeen. Unhappy, Dellarobia seeks out an affair and stumbles across a field full of monarch butterflies. It is a sight of “unearthly beauty,” but unfortunately also a warning: the monarch butterflies that Dellarobia finds are migrating far too early and to the wrong place. Most likely due to a changing climate, the monarchs made the collective decision to migrate to Tennessee rather than Mexico and, because of this, they risk extinction. While Dellarobia first believes the monarchs to be a gift from God—which, unlike climate change, she believes in—the arrival of entomologist and ecologist Ovid Byron slowly introduces Dellarobia to the reality of the phenomenon. And, of course, to the science of climate change and its consequences for Earth's fauna. This realization is facilitated by a scientist, which, like in Gaines's novel, makes the figure of the scientist once again central in the narrative.

In contrast with *Carbon Dreams*, it is not the scientist who needs to be reminded by others to share their message with the world; instead, Dellarobia's life—a very personal and localized narrative—is used as a means to create a more human (and emotional) story through which to share the scientist's message. We read how Dellarobia, rather than the scientists with years of experience and expertise, is approached by local newspapers and news channels to talk about the phenomenon because her story is the one people want to hear. The message is clear: academic actors alone are not enough to disseminate the science of climate change. While important, we need different means of sharing scientific findings with the public. This does not mean that scientific discourse needs

to be completely marginalized or decentered. Near the end of the book, Dellarobia decides to go back to school to study. She talks to one of her children, explaining how she and her husband Cub will separate, and what this means for them: “You get to go here and go there, you’ll migrate. Like the monarchs.”<sup>4</sup> Ultimately, scientific discourse has wormed its way into Dellarobia’s life.

The plot of Michael Crichton’s *State of Fear* is perhaps too complex—or chaotic, even unbelievable—to fully explore within the scope of this essay. Still, I want to discuss briefly its representations of scientists in academia. The book centers around the conviction—consistent with Crichton’s own beliefs—that anthropogenic climate change is grossly exaggerated, even untrue, and part of a “politico-legal-media complex” (PLM complex) that is dedicated to deliberately “promoting fear in the population—under the guise of promoting safety,” as explained by one of the characters, Professor Hoffman.<sup>5</sup> Hoffman points out universities specifically as being part of this PLM complex. Caught up in political games and the search for funding, universities actively scheme with politicians and feed the public fear of climate change. In *State of Fear*, scientists and academia as a whole (with the necessary exceptions, like Hoffman) are portrayed as being part of a conspiracy. Rather than creating a symbiosis between the knowledge of “rational” scientists and more “emotionally driven” characters, as Gaines and Kingsolver do, *State of Fear* follows a millionaire, his assistant, and a lawyer around the globe to expose the reality behind climate change. Besides decentering their role, *State of Fear* also appears to attempt to discredit the work of scientists. Scientists who endorse theories of anthropogenic climate change, that is.

### Science and the Scientist in the Paratext

The importance of “the scientist” is traceable beyond the fictional narratives in these books. Interestingly, “objective” scientific knowledge is also performed in the books’ paratextual elements and their presentation of the authors’ knowledge and credibility.<sup>6</sup> In her acknowledgements, Gaines thanks several people: a couple of farmers, a geologist, a chemist, and a biologist for their advice and “stimulating conversations that

4 Kingsolver, *Flight Behavior*, 426.

5 Crichton, *State of Fear*, 456.

6 Although it is likely these paratextual elements were written and decided upon by the authors’ publishers, I will refer to the authors themselves for the sake of simplicity and readability.

contributed to the making of this book.”<sup>7</sup> It is only in the back that Gaines mentions the scientific resources she consulted, including that the “discussions of geochemical process in *Carbon Dreams* are based on those prevalent in the scientific community in the early 1980s. . . . Basic principles of the earth sciences are presented as reliably as possible within the novel’s historic and aesthetic constraints, with many omissions and oversimplifications.”<sup>8</sup> After this follows a list of recommended sources. *Carbon Dreams*’ paratext is concise, yet leaves no doubt that Gaines, who is “educated in the sciences, with degrees in chemistry and oceanography,”<sup>9</sup> has done her research on the topic and has written a book containing science we should trust.

The paratext of *Flight Behavior* approaches scientific credibility in yet a different way. The book begins with a short biographical note, mentioning Kingsolver’s success as an author and that, before she became a writer, she “earned degrees in biology and worked as a scientist.”<sup>10</sup> Kingsolver gets polemical in the author’s note, however. She pinpoints what elements of her novel are fiction, and which ones are “unfortunately true.”<sup>11</sup> Just like Gaines, this is also when Kingsolver goes into detail and names the experts and sources she consulted. Most remarkably, Kingsolver asserts her own position as a scientist when she thanks Dr. Preston Adams (after whom she also named a character) who “was the first person ever to tell me I was a scientist. I’ve not forgotten.”<sup>12</sup> As is made clear in the biographical note, Kingsolver considers herself both a writer of fiction (and nonfiction) and a scientist, and this appears to be a central point in her personal presentation.

While Gaines and Kingsolver (almost humbly) perform their own positions as scientists—an oceanographer and a biologist respectively—and assert the reliability of their sources in the paratext, Crichton takes it to another level. The controversial topic of his novel might be the reason for this, but it is certainly worth taking a closer look at *State of Fear*’s paratext. Crichton’s book begins with a disclaimer: a firm reminder that we are reading a work of fiction. “However,” the author writes, “references to real people, institutions, and organizations that are documented in footnotes are accurate. Footnotes are real.”<sup>13</sup> The novel also includes two appendices: the first is an essay by Crichton on

7 Gaines, *Carbon Dreams*, v.

8 Gaines, 353.

9 Gaines, 355.

10 Kingsolver, *Flight Behavior*, i.

11 Kingsolver, 435.

12 Kingsolver, 436.

13 Crichton, *State of Fear*, iii.

the danger of politicizing science and the second documents the graphs used in the novel. This is followed by an extensive bibliography (spanning no less than 30 pages) documenting his research and the sources used in the novel, with a personal remark from Crichton following most sources.

And there is more. For those who choose to read the e-book, there are three speeches by Crichton included on media speculation and the environment. “Years before starting a novel,” we read, “Crichton often explores his views on a particular subject by giving speeches before an audience.” So we learn that Crichton has not only been working on this for years, reading extensively and becoming familiar with the subject, but that he has also given successful lectures on the topic. In almost humorous contrast to the proof of Crichton’s extensive research, the “About the Author” section comprises three short sentences and merely mentions his most popular works of fiction. It almost looks as if Crichton is purposely separating his role as a remarkably prolific author and his role as climate change skeptic. Yet note: he doesn’t present himself as a scientist. Looking at the shorter paratexts of Gaines and Kingsolver’s novels, which do combine the roles of author and researcher, one has to wonder why Crichton and his publishers made the strategic choice to present his novel in this way.

The influence of *State of Fear* on American politics is documented. Republican and then chair of the Senate Environment Committee Jim Inhofe (known for taking a snowball to Senate as evidence that global warming is a hoax) required his committee to read the book and even invited Crichton as a Senate witness, where the author had the opportunity to join the debate and answer questions. Rather than an author with a background in anthropology and medicine, Crichton was treated as an expert on the subject of global warming because of his novel. Crichton’s climate skepticism, whilst it did nothing to undermine the centrality of “science,” was certainly successful both in destabilizing accepted understandings of climate change and raising critical awareness of the issues in the novel; it shows how scientific facts come embedded in emotional and political contexts, both inside and outside of climate fiction.

## Concluding Remarks

Climate-change communication does not solely consist of disseminating scientific knowledge, or crudely put, throwing around facts and numbers. It thrives across a diverse array of media that share and reflect on this knowledge. Risk psychology tells us that people generally do not act in the face of climate change because the risk seems too far away—both geographically and temporally; publications on risk and climate change show us that a more emotional approach could in fact be the missing link.<sup>14</sup> (See the suggested further readings for more on this.) At the risk of speculating—which Cristina, the rational protagonist of *Carbon Dreams* would certainly disapprove of—this connection between scientific and more emotional narratives could perhaps even be a means of bringing closer together what Kari Norgaard terms the “double realities” of climate change.<sup>15</sup> If this is so, and we are in need of a medium that brings the far-away closer to home and elicits emotions, one does not need to look further than the novel.

And yet, simply introducing science into fiction—whether it is sound or not—does not make the cut. Rather, I would argue that positioning in the paratext is just as important as—if not more so than—the textual elements of the novel, if it is to successfully influence public debate and public opinion surrounding climate change. A novel’s literary merit and success are related to its real-life social influence, but they are not the only elements that matter. A quick roundup of reviews shows that all three novels have been received in different ways. *Carbon Dreams* is overwhelmingly commended for its realist depiction of science, also noting the educational potential of Gaines’s novel. Reviews of *Flight Behavior* are also overwhelmingly positive, but rarely mention the scientific aspects of Kingsolver’s work. And then there is Crichton. *State of Fear* was described in the *New York Times* as “not so hot” and in *Entertainment Weekly* as “one of Crichton’s best,” but the general reception of Crichton’s popular thriller is dominated by critics debunking the science presented throughout the work. Rather than critics and readers alike focusing on the quality of the thriller, there are essays, reviews, and entire web pages dedicated to criticizing Crichton’s scientific knowledge. In May 2018, a simple search on the Internet

14 See Susanne C. Moser, “Communicating Climate Change: History, Challenges, Process and Future Directions,” *WIREs Climate Change* 1 (2010): 21–53, and Sabine Roeser, “Risk Communication, Public Engagement and Climate Change: A Role for Emotions,” *Risk Analysis* 32, no. 6 (2012): 1033–40.

15 Kari Norgaard, *Living in Denial: Climate Change, Emotions, and Everyday Life* (Cambridge, MA: MIT Press, 2011), print.



resulted in 139,000 hits for *Carbon Dreams*, 107,000 for *Flight Behavior*, and 547,000 for *State of Fear*. While Kingsolver's novel is the most lauded amongst literary scholars and critics, Crichton's *State of Fear* is arguably the most widely influential of these three novels so far—despite (and quite likely *because of*) its questionable science. It appears, then, that performativity of expertise in the paratext also has its limits—especially about such a controversial topic as climate change.

For in the end, we are still talking about fiction as a commercial activity. In order for a book to be bought by publishers and readers, and to be widely read and discussed, it needs to be good. Interesting characters, a solid plot, and *good writing* are what make us want to read in the first place. Looking at the real-life impact of Crichton's *State of Fear*—which still checks all the boxes of an entertaining mass-market thriller, despite its questionable science, the resulting controversy, and the fact that it will never become a literary classic—the potential influence of a solid novel, in combination with scientific knowledge, as a means of communicating climate change seems enormous, and certainly warrants further analysis.

### **Suggested Further Reading**

Marshall, George. *Don't Even Think About It: Why Our Brains Are Wired to Ignore Climate Change*. London: Bloomsbury, 2014.

Mehnert, Antonia. *Climate Change Fictions: Representations of Global Warming in American Literature*. Basingstoke: Palgrave Macmillan, 2016.

Weik von Mossner, Alexa. *Affective Ecologies: Empathy, Emotion, and Environmental Narrative*. Columbus: Ohio State University Press, 2017.