system for those they represent.

The revisiting of Wittgenstein's language games by A. C. Grayling presents a most interesting essay about the distinction between facts and things and why language matters in this distinction. As the author presents it, language is a useful game. This essay was a helpful reminder of why the preoccupation with generative grammars and semiotic structures so popular in the 1980s was doomed to failure, because the issue of meaning does not reside in the structure of the game itself but rather in the uses to which it is put and in its importance to the participants. I also found David Brailsford's essay on "Games in Sports" important for reminding us that in game strategy, bicycling in particular, it is not perfection that is important but rather progression. The occasional visit to the gym will not make you healther; instead, we are reminded, it is consistency and commitment that accomplishes such an outcome.

We also understand that war and violent conflict in general is often approached as a serious game, many times without a clear understanding of the true nature of war and the costs paid by so many for the arrogant assumptions that frequently inform its strategies and tactics. Frank Ledwidge's analysis of "Losing the 'New Great Game,'" detailing the British failures in Afghanistan during the most recent war, specifically those in Helmand—its lack of accountability, its numbers game, its body counts, and ultimately its failure to know the enemy. In this most serious of games, foreign policy objectives were not supported by any coherent strategy or even clear tactics, and the arrogance of power was met by the incentive structures

of local cultures, social orders, and political incoherence.

The remaining two essays, "Games for the Brain" and "Games Animals Play," were most interesting, the first because it clearly points to the relationship between cognitive disorders and the use of "gamified" cognitive training for healing various forms of mental illness; the second reminds us all of the incredible variety of mating games in the animal world and the broad nature of natural incentives that go into making our world the diverse and interesting place it has become.

There is much more to this volume than I can elaborate here. But, let me just say that this work, as diverse as it is, is accessible to the general reader and therefore does a great service in bringing to the public the many different ways in which we can think of games that go far beyond the limited nature of commercial games.

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Playing Nature: Ecology in Video Games

Alenda Y. Chang
Minneapolis, MN: 2019. Introduction, acknowledgments, notes, gameography, and index. 299 pp. $27.00, paper.
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In *Playing Nature: Ecology in Video Games,* Alenda Y. Chang has written a book that feels complete and focused, but more importantly urgent and thorough. Chang combines a vast array of methodologies and theoretical framings both from envi-

ronmental studies and game studies and interrogates how best to combine them and their way forward.

One of the main arguments of the book is that nature and technology should not be viewed as mutually exclusive realms. On the contrary, Chang argues that "games can offer a compelling way to reconcile a deep connection to nature and the nonhuman world with an equally important connection to technology and the virtual" (p. 5) We humans occupy "an uneasy and liminal position" in this dichotomy, and digital games can help us navigate through it (p. 2). To break the barriers between nature and technology, she pays great attention to how play bridges the digital and the physical.

The book is divided into five chapters, built around five main concepts: mesocosm, scale, nonhuman, entropy, and collapse. In chapter 1, Chang analizes games as "mesocosms" or controlled spaces that allow us to study the natural environment. As such, video games act as islands of fragments, built from the modelling capacities of the medium, where a selective fidelity allows players to engage emotionally with evocative spaces that mirror nature. The concept of exploration is central for Chang. She explains that "games allow for a range of interpretation, but importantly, through active, exploratory play" (p. 41). Indeed, this exploratory play is vital not only in augmented-reality games such as *Pokemon GO*, but also in the genre of walking simulators, where exploration is the main mechanic.

Chapter 2, "Scale," analyzes games as simplifications that allow patterns to emerge. Through scalar framing, games can evoke a feeling of the sublime as well

as act as perturbation experiments from which interpretative consequences can be extracted. Scale connects dependence as well as magnitude, and games are useful tools for multiscalar analysis. By studying how games like *Spore* use scale to understand time and space, Chang observes that scale in games allows for experimentation, modelling, verification ("ground truthing"), and failure.

The third chapter, "Nonhuman," focuses on how video games represent and use flora and fauna—and on the concept of "bit narratives." Inspired by literary "it narratives" (the stories of objects), Chang theorizes that video games can serve as tools for ecological activism by telling the stories of physical and digital objects, as is the case with *Phone Story*. This chapter also includes references to animal game play, with a detailed analysis of *Neko Atsume (or Tokyo Jungle),* as well as the middleware used to generate vegetation for game spaces. One of the strongest ideas of the book comes from Chang's reinterpretation of the concept of "mountain-water painting" in Chinese art to talk of "mountain-water games" or games that integrate the player in representations of nature in a less dominant and more harmonic way, like *Journey.*

Entropy is the focus of the fourth chapter, which is a provocative study of economy, both as in-game systems and as the video game industry. In the first part of this chapter, Chang studies how many games in the "farming simulator" genre fall into a new techno-pastoralism and romanticized agriculture, erasing waste, work, and failure. Games, Chang contends, play upon widely recognized, culturally encoded frameworks, and these

idealized views of agriculture come from a romantic relationship with the past at the heart of modern societies. Against this view, she highlights how the conditions of immigrants and marginalized groups working in the farming industry and the ecological impact of agricultural activities are constantly ignored in these games. In the second part of this chapter, Chang applies ideas from the "energy" humanities to discuss video games and consoles as engines of play and concludes that the materiality of gaming systems produces what she calls a "local warming," discussed by players as a common problem of their practice. In the same way, Chang brings the ethereal notion of "the cloud" back to earth in her analysis of it through the lens of heat and green electronics.

Fittingly, the last chapter is dedicated to the idea of collapse, through which Chang questions the prevalence of post-apocalyptic fiction in video games, ecological or otherwise. The ideas of survivalism, frontier individualism, and interlinked social and environmental breakdown are notably central premises of some modern game genres. Chang sees these not only as examples of disaster capitalism and of "disanthropy" (the dark desire for a world without us) but also as exercises of "premediation," or explorations of future possibilities. The obsession of modern gaming with destructible environments and PVE (player versus environment) systems can be understood through the importance of failure in games. For Chang, failure and collapse can be seen as two points on a continuous spectrum. Central as well to these ideas is the closing discussion of the design principle of "permadeath," in which she moves from the permanent death of avatars to that of worlds, making them more fragile and precious. This strategy can bring about the players' openness to vulnerability.

The book will be of interest for environmental scholars wanting to know how media and the digital are dealing with the environment and popular discourses about it, and for game scholars with an interest in ecocriticism, the expressive affordances of the medium, and materiality. This is a well-researched work, full of references that are always well put to use, ranging from many disciplines and perspectives, combined in a way that always reinforces its discourse and never loses focus. The author does an excellent job in including and explaining many complex concepts and in criticizing the limited analytical tools of game studies and calls for "more diverse forms of critical articulation" (p. 24). All in all, *Playing Nature* is an excellent piece of scholarship that renounces neither clarity nor complexity. "Games must be properly contextualized to produce learning outcomes" (p. 204), writes Chang, and this book offers many ways to connect play to reflections on our place in nature.

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