A THOUSAND FUTURES

A SEARCH FOR SCENARIO SPACE

KATHRYN CRAMER

ABSTRACT

Although both science fiction and professional foresight work both are engaged with what the future might look like, they operate mostly independently from one another. A literature search reveals the characteristics of written science fiction and foresight, seeking ways these practices could be successfully combined. Concepts are explored through the example of agriculture and agricultural technology as well as technologies for constructing narrative semantics. Approaches are outlined for generating foresight scenarios and for creating a semantic tagging system for generating a semantic space for scenarios using intellectual technologies from science fiction.

ACKNOWLEDGMENTS

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[1] Also referred to as "OCAD SFI."

LAND ACKNOWLEDGEMENT

I wrote this in Toronto, Ontario and in Westport, New York: in two countries that used to have a very permeable border between them. The fate of that border is unclear, but this remains a liminal document floating between.

Figure 1: Kathryn Cramer with Post-It Notes in Westport, NY, July 2019. Photo by Ratio Hartwell.

When I arrived in Canada for graduate school in the fall of 2018, I had a hard time understanding what Land Acknowledgements were about. So. The land we are on now belonged to someone else, but now we are here using it? Finders, keepers?

I didn't understand.

This summer, at an event held by the organization Decolonize Davenport, I heard a more candid Land Acknowledgement. One of the organizers has graciously provided me with the text, that reads:

> We acknowledge that we meet, organize, and protest upon the territory of the Mississauga of the Credit First Nation, Anishnawbe, Haudenosaunee, Wendat nations. They are the original stewards of this land, as well as the original social justice activists, whose models of resistance we see reflected in our own activism.
>
> Today we meet on Treaty 13 land, which was defined during the Toronto Purchase claim of 1805. The Treaty indicates that Tkaronto is unceded, and has never been sold or agreed to be shared with settlers by the Mississaugas of the Credit First Nation. The truth is that most of the area this city covers has been settled illegally and unjustly.
>
> We acknowledge that we do community organizing on unceded territory, at the expense of the displacement of Indigenous peoples. As settlers and activists, we must recognize the existence of this space and its violent and ongoing colonial history. We are grateful for the privilege and opportunity to come together today and act in solidarity with land and water defenders all across this land.

The sentence, "We acknowledge that we do community organizing *on unceded territory*, at the expense of the displacement of Indigenous peoples" made me understand what Land Acknowledgements should be about.

Judging by what I know, my farm is on land that was part of the traditional territory of the Mohawk, most likely the Akwesasne. But Lake Champlain was a transportation

corridor, so various peoples, including Iroquois and Abenaki, passed through the area frequently, using it in common.[2]

Although Samuel de Champlain, "Father of New France," is often credited with having "discovered" Lake Champlain, in 1609 when he sailed south down the lake, Champlain and his party "traveled only at night to avoid discovery."[3]

The early recorded history of the area is violent. In the Conclusion to *The French Occupation of the Champlain Valley, 1609 to 1759*—a book I bought in the gift shop at Ft. Ticonderoga on Lake Champlain in the summer of 2019—Guy Omeron Coolidge writes:

> From the arrival of Samuel de Champlain in 1609 until the conquest of the English in 1759 the only permanent inhabitants of the valley of Lake Champlain were French. It is true that the Iroquois exercised a sort of indeterminate sovereignty over this valley for some centuries; they did not, however, have permanent villages because of ease of attack by way of the lake; for them it was only a hunting ground. … After 1650 when the Algonquins were driven out of New England and began to look for a new home, Vermont became a no-man's land in which neither

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[2] Preston, David L. *The Texture of Contact: European and Indian Settler Communities on the Frontiers of Iroquoia, 1667 – 1783*. Lincoln, Nebraska: University of Nebraska Press, 2009, pp.58 – 59.

[3] Bellico, Russell P. *Chronicles of Lake Champlain: Journeys in War and Peace*. Fleischmanns, NY: Purple Mountain Press, 1999, p. 28 – 30.

Iroquois nor Algonquin wished to remain … By right of discovery and exploration by Champlain the valley of the lake belonged to France and formed an integral part of New France.[4]

This is a peculiar argument about sovereignty that I don't think I've seen before: They were part-timers so their sovereignty didn't count?

Cole's Island in Lake Champlain, which can be seen from my farm, is the location where Isaac Jogues, one of the Catholic Church's "North American Martyrs," was allegedly tortured. From the 17th century to the present day, the story of his torture has been used to justify the disenfranchisement and maltreatment of the Mohawk, the Iroquois, and other Indigenous peoples. More on this later.

My apple orchard is on land which holds a community resource. Colonization involves enclosure of the commons. That it was once a Commons appears, from Coolidge's reasoning, to have been a justification for its appropriation.

When we acknowledge the Land, we should not only acknowledge historical possession and occupation, but also how the land has been used to do people wrong—now and in the past—and how that land might better serve those alive now were the

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[4] Coolidge, Guy Omeron. *The French Occupation of the Champlain Valley from 1609 to 1759.* [1938, 1979] Fleischmanns, NY: Purple Mountain Press, 1999, p. 170. Originally published by the Proceedings of the Vermont Historical Society, Vol. VI, No. 3, 1938.

bounds of colonization not still in force. Therefore, I also acknowledge that our farm is in the Adirondack Park, indirectly subsidized by American mass incarceration.[5] [6]

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[5] Hall, Clarence Jefferson, Jr. "Toward an Environmental History of American Prisons." June 22, 2017.
http://www.processhistory.org/environment-prisons/

[6] Our taxes are reduced because various local governmental entities at the town, school district, and county level use prison labor.

DEDICATION

For

Karl Schroeder

an enactment of what

we wished existed.

And for

Asia Clarke

Jacqueline Shaw

&

Sebastian Campos-Möller

in hopes that I have given

you tools you can use.

And for

Judith Merril (1923 – 1997)

for teaching me

through conversation & her anthologies

that any genre worth working in

is worth bending.

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No, no, the mind I love must still have wild places, a tangled orchard where dark damsons drop in the heavy grass, an overgrown little wood, the chance of a snake or two (real snakes), a pool that nobody's fathomed the depth of—and paths threaded with those little flowers planted by the mind. It must also have *real* hiding places, not artificial ones—not gazebos and mazes.

—Katherine Mansfield, 1920[7]

Let the writing on your face
be a smell of apple orchards on late June.

— Carl Sandburg[8]

The first of June, and the world that was not mine yesterday now lies spread out at my feet, a splendor. I seem, in the middle of the night, to have returned to the world of apples, the orchards of Heaven. Perhaps I should take my problems to a shrink, or perhaps I should enjoy the apples that I have, streaked with color like the evening sky.

—John Cheever[9]

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[7] Mansfield, Katherine. *Journal of Katherine Mansfield.* New York: A. A. Knopf, 1927, p. 173.

[8] Sandburg, Carl. "Lesson." *Honey & Salt*. New York: Harcourt, Brace, and World, 1963, p. 54.

[9] Cheever, John. *The Journals of John Cheever* [1990]. New York: Vintage, 2008, p. 212.

PREFACE

Figure 2: Paula Red Apples. Photo by Kathryn Cramer.

FARMING AS METAPHOR

One thing I have learned from having an orchard in Westport, New York, is that apples and orchards are good to think with.[10] Much of this document was written with that principle in mind. Eventually, I realized why this formulation had a familiar ring. Claude Lévi-Strauss wrote in 1962, a sentence in French that is loosely translated as his widely quoted maxim, "animals are good to think with."[11]

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[10] Lakoff, George and Johnson, Mark. *Metaphors We Live By*. Chicago: University of Chicago Press, 1980.

[11] Lévi-Strauss, Claude. *La Pensée sauvage*. Paris: Librairie Plon, 1962.

TRUTH IN APHASIA

On July 7th, 2020, I had difficulty speaking. My left side felt tingly and distant.

In the Toronto Western Emergency Room, Dr. Cho—talking faster than I felt able to listen—screened me for a possible stroke.

"What day is it?" I was ready for that question.

Then the doctor asked what we learn in OCAD's Masters of Design program in Strategic Foresight and Innovation. I wasn't ready for that one.

"We make Post-It Notes," I said.

HOW TO FARM A FUTURE

I have written this document with certain friends in mind: friends at OCAD who would like to understand more about how to write about the future but who aren't science fiction writers.

While I have worked alongside them in class, I have not been in a position to convey my craft-knowledge in a way they can use. So, imagining I am talking to them, I have set out to write it here.

The experience of writing this has been like one of the many hall-of-mirrors scenes where the protagonist just has to keep shattering mirrors until they understand what is real.

Watching my own writing progress has been like watching a sequence of increasingly tall people climb out of a very small car.

I hope I have given you something you all can use.

Here, I challenge a lot of the disciplinary orthodoxies of the Strategic Foresight and Innovation curriculum. And my discontents have led me to go to the effort to seek alternative methods for imagining the future. But even if you don't agree with my critiques, the methods described at the end should still be helpful.

NOTES ON TERMINOLOGY

"SF" & SCIENCE FICTION

While the news media use "sci-fi" as an abbreviation for science fiction —a term coined by Forrest J. Ackerman—for decades, the preferred acronym within the written science fiction field has been "SF." SF stands for *science fiction* and may also encompass *speculative fiction*. Where *SF* appears in this document, the abbreviation should be understood to mean "science fiction."

Recently, Donna Haraway has—rather joyfully—appropriated "SF" to refer to "speculative fabulation."[12]

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[12] Haraway, Donna. *SF: Speculative Fabulation and String Figures*. Berlin: Hatje Cantz, 2011.

SF is that potent material-semiotic sign for the riches of speculative fabulation, speculative feminism, science fiction, speculative fiction, science fact, science fantasy—and, I suggest, string figures.[13]

While I enjoy the anarchic spirit in which Haraway offers this over-writing of an acronym already in use, it is counterproductive both in Haraway's conflation of various disparate entities, and Haraway's implicit offer of the possibility of becoming literate in "SF" without having read science fiction. (An additional problem with Haraway's new term *speculative fabulation* is that it, too, was already in use by Robert Scholes, Christine Brooke-Rose, and others.)[14] I rescind Haraway's implied offer: *Read* SF.

Many science fiction insiders, such as Bruce Sterling and Rudy Rucker, who are quoted here use the abbreviation *SF*, but to avoid confusing readers who are acclimated to Haraway's usage, I will for the most part be using the term science fiction, spelled out except as the abbreviation occurs in titles or quotations.

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[13] Haraway, Donna. "SF: Science Fiction, Speculative Fabulation, String Figures, So Far." A speech given to the Science Fiction Research Association. *Ada: A Journal of Gender, New Media, and Technology*, No. 3, 2013. https://adanewmedia.org/2013/11/issue3-haraway/

[14] Rose, Christine Brooke. *A Rhetoric of the Unreal: Studies in Narrative and Structure, Especially of the Fantastic*. Cambridge University Press, 1981, p. 81.

"Tagging" & "Coding"

Here I use the word "tagging"—as in how blog posts are tagged and as in hashtags—for what is also called "coding" in qualitative research.[15] I avoid using the term "coding" because my subject matter overlaps computer science topics where "coding" means to write lines of computer code, which is to say, computer programming and the digital humanities. See, for example, this passage from the opening of Ed Finn's *What Do Algorithms Want: Imagination in the Age of Computing?* in which Finn situates computer code as a social practice:

> By investing the figure of code with cultural power, we also endorse the notion that it functions on a platform: the idea that humanity might run a universal operating system. So code can be magical, code can change the world, and code can change the mind. But how does this actually work? What are the entities, the structures of operation in that space of computation?[16]

Thus, for those accustomed to the social sciences, my use of "tags" and "tagging" should be understood to be synonymous with "codes" and "coding" as these terms are used in the social sciences.

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[15] Saldaña, Johnny. *The Coding Manual for Qualitative Researchers, Third Edition.* London: Sage Publications, 2016

[16] Finn, Ed. *What Algorithms Want: Imagination in the Age of Computing.* MIT Press, 2017.

INTRODUCTION: FORESIGHT & SCIENCE FICTION

> Utopia is the process of making a better world, the name for one path history can take, a dynamic, tumultuous, agonizing process, with no end. Struggle forever.
>
> Compare it to the present course of history if you can.
>
> —Kim Stanley Robinson, *Pacific Edge: Three Californias*[17]

I worked on several foresight-oriented science fiction projects before applying to graduate school at OCAD. With Ed Finn, I was an editor of the anthology *Hieroglyph: Stories and Visions for a Better Future*, and I was also an editor of the X-Prize Foundation's science fiction website, Seat14C.com[18]. So, I thought I was familiar with both science fiction and foresight.

A CHASM IN NEED OF A BRIDGE

Once I arrived at OCAD, it took a while to acclimate to the existence of the lack of a coherent connection between the two. My expectation when enrolling in OCAD's Strategic Foresight and Innovation program was that I was well-prepared to build a

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[17] Robinson, Kim Stanley. *Pacific Edge: Three Californias.* New York: Tor Books, 1988, p. 95.

[18] "Seat 14C: The Original Story." X-Prize Foundation, 2017. http://seat14c.com.

bridge between written science fiction and foresight and design's use of science fiction concepts. This has proved not to be the case. It is a hard problem.

SCIENCE FICTION & THE FORESIGHT DIAMOND

Foresight researcher Raphael Popper created a visualization called the *Foresight Diamond*[19], classifying various kinds of foresight: a "practical framework including 44 methods commonly used in strategic foresight and decision-making." Popper has a company in the UK organized around this concept.

Science fiction, as a community of practice, has been entangled in foresight and future studies for most or all of the history of the science fiction field in that science fiction writers have frequently been called in by government and business on the matter of understanding what the future will bring. (Indirectly—via consulting for Arizona State University—I have consulted for both NASA and the World Bank.[20])

Neal Stephenson describes science fiction as a loophole in the rules of academic publishing:

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[19] Popper, Raphael. "About Futures Diamond: The Framework." TheFuturesDiamond.com, 2011. https://www.futuresdiamond.com/the-diamond/.

[20] "Evoke - An online alternate reality game supporting social innovation among young people around the world." The World Bank. https://www.worldbank.org/en/topic/edutech/brief/evoke-an-online-alternate-reality-game-supporting-social-innovation-among-young-people-around-the-world

… the rules of the academic publishing road are both strict and cruelly enforced. This imposes some narrow and hard limits on what smart people can get away with writing about, which are sufficiently restrictive that some effort goes into finding loopholes. The biggest of these appears to be science fiction. Science fiction novelists arrogate to themselves and, by convention, are readily afforded, a kind of court jester's immunity. And indeed, there have been any number of hard science professors who have donned the motley, taken up the pen, and written more or less successful works of hard science fiction as a way of dodging those two terrible strictures against popularization/simplification, and synoptic pulling-together-of-diverse-strands.[21]

The portion of the field most consistently tapped for futures consulting has been the hard science fiction writers, many of whom are both working scientists while also having careers as commercial writers. (Hard science fiction is the type of science fiction most closely aligned with science.) This is especially true of governmental entities such as NIAC, the NASA Institute for Advanced Concepts, where the conceptual space explored overlaps with core motifs of science fiction. As discussed in the notes to *The Hard SF Renaissance*,[22] this influence on government is not always benign.

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[21] Stephenson, Neal. "Everything and More Foreword" [2003] *Some Remarks: Essays and Other Writing.* New York: HarperCollins, 2012, pp. 280-281.

[22] Hartwell, David G., & Cramer, Kathryn. *The Hard SF Renaissance*. New York: Tor, 2002. Woven through the notes in the book is a discussion of the involvement of Jerry Pournelle et al. and their involvement with the Reagan administration and promoting the Star Wars Defense Initiative.

Popper's website defines "Foresight" in a more specific way than its general usage. The definition from Futures Diamond the website is:

> Foresight is a systematic, participatory, prospective and policy-oriented process which, with the support of environmental and horizon scanning approaches, is aimed to actively engage key stakeholders into a wide range of activities anticipating, recommending and transforming (ART) technological, economic, environmental, political, social and ethical (TEEPSE) futures.[23]

Not all the methods included in the Futures Diamond meets this possibly overdetermined definition of foresight.

The Futures Diamond has four corners: *Creativity*, *Interaction*, *Evidence*, and *Expertise*. Popper positions science fiction as almost purely *creativity*, partaking of none of the rest, i.e., interaction, evidence, and expertise. Popper appears to argue science fiction writers just make stuff up, whole cloth:

> Creativity-based methods normally require a mixture of original and imaginative thinking, often provided by technology 'gurus,' via genius forecasting, backcasting or essays. These methods rely heavily on (a) the inventiveness and ingenuity of very skilled individuals, such as science fiction writers or (b) the inspiration which emerges from groups of people involved in brainstorming or wild cards sessions.

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[23] Popper, Raphael. "About Us." FuturesDiamond.com. https://www.futuresdiamond.com/about-us/

Figure 3: Raphael Popper's Futures Diamond[24]

Presumably, Popper knows better than this, and this framing is for the convenience of fitting science fiction into his box. Otherwise, Popper characterizes science fiction based upon a lack of interest in science fiction as a community of practice. Popper notes science fiction writers are highly skilled, but Popper does not say *at what*.

In a 2008 slidedeck, Popper calls for more "science-fictioning."[25] Popper describes commercial science fiction as being used "informally" as "sources of inspiration by

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[24] Popper, Raphael. "Foresight Methodology," in Georghiou, L., Cassingena, J., Keenan, M., Miles, I. and Popper, R. (eds.), *The Handbook of Technology Foresight*, Edward Elgar, Cheltenham, 2008, pp. 44-88.

[25] Popper, Raphael. Foresight Methodology: an overview and more… Rafael Popper – PREST - Manchester Institute of Innovation Research. A slidedeck. 2008.

people thinking about the future." I have perused the bibliographies of works connected to design fiction and related practices; these bibliographies do not bear out this claim. Either futures practitioners are not crediting the science fiction writers they are reading, or they are mostly not reading them.

Popper goes on to say there was a problem with finding "high quality SF." Science fiction is not published in secret. It is usually published in thousands or tens of thousands of copies. It is not obvious, from the point of view of a professional science fiction editor, why foresight practitioners should have such difficulty finding high quality science fiction. At the point Popper wrote these words, I had been editing a *Year's Best SF* volume for HarperCollins for several years. There were competing series by other editors with differing aesthetics and points of view and such series had existed for decades. Judith Merril published her first volume of *SF: The Year's Greatest Science-Fiction and Fantasy* in 1956.[26] This type of annual anthology, under the curation of a variety of loving experts, has been continually in existence during Popper's entire career as a futurist.

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[26] Merril, Judith. *SF: The Year's Greatest Science-Fiction and Fantasy*. New York: Dell, 1956. Merril's series ran until 1968.

Is Policy Just Hard Science Fiction?

In 2020, the Brookfield Institute, affiliated with Ryerson University, published online the project, *The Policymaker's Guide to the Galaxy: What science fiction can teach us about the future of work,* a series of interviews with science fiction writers about policy. While the interviews are interesting, they are not especially successful at bridging the gap between foresight and science fiction. For example, Annalee Newitz is quoted:

> I often tell people that I think that policy is actually just hard science fiction, because when we make policies about anything from urban planning to regulations around the environment, it's always based on an understanding of how things will be in the future, and how we think human culture will function. A lot of the time, the worst policies are the ones that don't take the future into account.[27]

While Newitz makes an interesting point, it is not an *actionable* point unless one knows *both* how to write hard science fiction *and* how to write policy. Newitz does *not* mean that we should put hard science fiction writers in charge of drafting US national policy.[28] Rather they mean that the tools of synthesizing information to create science fiction narratives of the future grounded in fact are similar to the tools that are used—or

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[27] Newitz, Annalee. "Policy is Just Hard Science Fiction: An interview with Annalee Newitz." An interview by Sarah Villeneuve. Brookfield Institute, July 17, 2020. https://brookfieldinstitute.ca/policy-is-just-hard-science-fiction/

[28] This sort of thing was tried during the Reagan administration.

should be used—to generate policy. The Brookfield Institute's attempt to bridge the gap between science fiction and foresight further demonstrates the need for a bridge.

"Futures Literacy" without Science fiction Literacy?

Riel Miller's book *Transforming the Future: Anticipation in the 21st Century,* published in his capacity as Head of Foresight at UNESCO, is a most fascinating and extreme example of the disconnect between foresight and science fiction, seeming (almost) to exist in an alternate universe where the science fiction field never happened at all, into which such writers as Kim Stanley Robinson and Cory Doctorow were never born.

Miller's biography in the book describes him as "one of the world's leading authorities on the theory and practice of 'using-the-future' to change what people see and do." Miller appears ready to go "where no man has gone before,"[29] and ready to populate the place with new acronyms no one has *ever* used before: *AA* (for *Anticipatory Assumptions*) and *DoA* (*Discipline of Anticipation*).

While I agree with Miller that an understanding of the substructure of one's beliefs about the future is helpful preparation for futures work, for both better and worse, for a century science fiction has contoured our understanding of the future. While the center

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[29] To paraphrase *Star Trek*.

of this is in the anglophone world, as I will discuss later, the US and UK culture industries have distributed science fiction cultural products throughout the world.

What few references there are in *Transforming Future Anticipation* to science fiction, as such, are all incidental references in Stuart Candy's in the section at the back of the book discussing his game, "The Thing from the Future." There are no science fiction writers in the index, nor does "science fiction" appear there. While "Timescape" appears in the index, it is a reference to an internet platform, not Gregory Benford's 1980 novel of that title, nor the science fiction publishing line, nor the Star Trek movie.

The main text of the book expresses a utopian longing for something Miller et al. wish existed. A sample passage:

> People's fictions about the later-than-now and the frames they use to invent these imaginary futures are so important for everyday life, so ingrained and *so often unremarked*, that it is hard to gain the distance needed to observe and analyze what is going on. *(italics mine)*

Another:
> In a way that parallels the theories that led to efforts to run experiments for detecting sub-atomic particles, anticipatory systems theory proposes the potential existence of different kinds of future, sparking the search for methods to detect these largely unimagined and invisible elements of the world around us.

(The literary term Miller is suppressing here is *hard science fiction*.) I am not sure whether to be amused or shocked. But I do not recognize Riel Miller's post-literate project as a form of "literacy" [30] but rather as a strategic form of cultural aphasia.

What is it about the *existence* of science fiction that so threatens Miller's intellectual project? Miller has a UNESCO road show to go with it. I attended for a day when they came to OCAD in 2019. The only mention of the existence of science fiction that I recall was a dismissive reference by a panelist to "Wakanda," a brief allusion to the existence of Afrofuturism in order to dismiss it.

The position Miller has chosen is an extreme suppression of the imaginary while simultaneously imploring his congregation to imagine. The intensity of his awareness of science fiction is betrayed by the thoroughness of this suppression. Miller's methodology also entails an appeal to Category Theory that I will address later.

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[30] Miller, Riel, ed. *Transforming the Future: Anticipation in the 21st Century*. New York: Routledge, 2018.

The Notes of an Anthologist

Arriving as a graduate student at OCAD in Strategic Foresight and Innovation, I was a science fiction anthologist: I published books of stories called anthologies.

In collaboration with my late husband David G. Hartwell, I had spent a decade as editor of two Year's Best anthologies.[31]

I edited two anthologies of hard science fiction—*The Ascent of Wonder* (1994) and *The Hard SF Renaissance* (2002)—and authored the chapter on "hard science fiction" for *The Cambridge Companion to Science Fiction*.[32] When you edit anthologies, you read a lot of short stories. When you go to complete an anthology, you have to remember enough about those stories to decide which of the several hundred you read should make it into the book. Part of the professional practice of an anthologist is knowing how to keep records so you know which stories are best. Further, you have to know enough about the story to write a paragraph or three about it for the headnote. I believe in tagging systems, and I believe tagging systems should be as elaborate as you need them to be.

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[31] Year's Best SF, Hartwell & Cramer, eds., Vol. 7 - 17. HarperCollins, New York, 2002 - 2012. Year's Best Fantasy, Hartwell & Cramer, eds., Vol. 1 - 9, HarperCollins, New York, 2001 - 2005; Tachyon Publications, San Francisco, CA, 2006 - 2009.

[32] James, Edward, & Mendlesohn, Farah, eds. *The Cambridge Companion to Science Fiction (Cambridge Companions to Literature)*. Cambridge: Cambridge University Press, 2003. doi:10.1017/CCOL0521816262.

1   RESEARCH QUESTION: RECONCILING FORESIGHT WITH SCIENCE FICTION

My research question for this project is essentially the same as my purpose in being in this graduate program: How might we reconcile how science fiction professionals think about the future with how foresight professionals think about the future such that reconciling these makes for better insights about the future? I have sought to compare the frameworks for understanding futures, drawing upon mathematics to bring computational thinking to narratives of the future.

This is not an abstract whim. Rather, we inhabit a world where our own subjectivity is increasingly objectified and aggregated into data that serves the interests of large corporations and governments. We are certainly the *objects* of computational thinking.[33]

Can we build out our own subjectivity with its tools to better understand where we are going? Whether or not one regularly reads science fiction, it is ubiquitous in our culture, mostly via the influence of film and television.

While the visions of the future filtering through may originate with science fiction writers, the underlying thinking may be lost in translation.

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[33] Zuboff, Shoshana. *The Age of Surveillance Capitalism: The Fight for a Human Future at the New Frontier of Power*. New York: Public Affairs, 2019.

How might we bridge the gap between Fiction and Design, between stories about

the future and foresight scenarios?

2   METHODOLOGY

As is evident from the title, this work is primarily exploratory, a search for a solution. One might describe my progress on this project as "iterative." Each phase has built on the last. This inquiry proceeded in phases, eventually spiraling back to the initial goal, that was to reconcile science fiction with design and foresight practice. It is not iterative in the sense of having the same operations applied to it again and again (as with fractals), but rather each phase has taken the insights from the previous and modified them.

My overall methodology is a blend of Constructivist Grounded Theory[34] and a Digital Humanities approach. This is also a literary document, written so as to demonstrate themes and principles articulated in its theoretical aspects.

The strength of this project is that it went through a long design process in which hypotheses were entertained and discarded. The weakness is that I did not follow a replicable method of inquiry from start to finish, reporting back my results. Rather, this was a process of exploration in search of what I had thought at the time I applied to graduate school would be a simple answer. I was trying to bridge the gap between a

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[34] Denzin, Norman K. and Lincoln, Yvonna S., eds. *The SAGE Handbook of Qualitative Research*. Los Angeles: SAGE, 2018, pp. 413 – 437.

science fiction writer and editor's view of the future and the view of the future

expressed through the OCAD coursework. It's just that the bridge was hard to build.

REFLECTION ON PRACTICE

My methodology arises from my professional experience from the mid-1980s to the

present. The science fiction field has a large body of criticism and scholarship, much of

which evolved outside academia and is, for the most part, constructivist in character. I

co-founded The New York Review of Science Fiction, a monthly journal of reviews and

essays on science fiction—that we ran out of our house in Pleasantville, New York—

under the imprint Dragon Press that had previously published Samuel R. Delany's

criticism, and was one of its editors for seventeen years. I edited anthologies on specific

themes and motifs. I worked for literary agencies, where our responsibilities included

matching up works of fiction with markets. I managed an 80,000-item database of

antiquarian books, organized in part by motif. I worked for Eastgate Systems, where the

house aesthetic was deploying the tools of digital humanities to make art and the tools

of art to make digital humanities. And I was part of the team at Wolfram Research that

introduced data libraries into Mathematica 6, a major upgrade of the technical

computing system Mathematica, and was also involved in the launch of the

computational knowledge engine Wolfram Alpha. How these professional experiences

inform my perspective will be discussed in more detail later.

My undergraduate degree is in mathematics, and I graduated in 1987 just before computer algebra systems came in; at the time, academic mathematics was mostly a pencil-and-paper pursuit. My 1992 Master's degree is in American Studies at a time when the Cultural Studies perspective predominated; ghosts of this are likely evident in my approach. My biggest discomfort with Cultural Studies as a practice is its resistance to the idea that one work is better than another; as an editor, my professional practice presupposes that I can judge relative quality.

After American Studies, I spent two semesters as a graduate student in German literature which involved both an encounter with the Frankfurt School and a struggle to reconcile academic literary theory with my more motif-oriented engagement.

PHASES OF THE PROJECT

Chronologically this project went through five phases. All of them figure into the final form of this document.

PHASE 1: A SERIES OF STORIES

Initially, I planned to write a series of stories modelling a pattern for designers and foresight researchers to follow. This does not scale. Since I already know how to write science fiction, this would not bridge the gap for others.

Figure 4: Computational Narrative Slide. Design by Kathryn Cramer. Photo from Adobe.

I imagined using computational thinking to formulate a system for computational narrative for foresight, envisioning computational narrative deployed as a foresight concept, bridging the gap between design thinking and computational thinking; providing a framework in which to situate, from the design side, critical design, design fiction, and science-fiction prototyping; and on the computational side, providing a framework for semantic networks and data structures. I discovered there is a body of patents in which others envision using computational narrative for a variety of applications, though none similar to what I had in mind.

PHASE 3: SEMANTIC HELL

The languages of fiction, design, and computational thinking are very different. I spent the summer of 2019 on my farm in the Adirondacks trying to build semantic common ground between different disciplines. Mostly, the concepts don't match up. Even when there *seems* to be a match, the meaning of the word is different. The one significant overlap seemed to be the concept of *Pattern Language*.[35]

PHASE 4: GROUNDING THE INQUIRY IN MY FARM

That summer, I was also running my farm. I decided to ground my inquiry in the literal ground: I would come up with a plan for my otherwise intractable farm. In the fall for 2019, I met with my secondary advisor Gamal Mohammed; he gave me a lot of excellent advice on how to apply the concepts of pattern language to an agrarian built landscape. I thought about the farm in terms of pattern language and ways forward with the farm.

So, essentially, when I say I grounded the inquiry in my farm, what I mean is that I took the concepts I had been wrestling with in previous stages to the design inquiry into how we might run the farm. We already knew a lot about why the farm was unlikely to turn a profit under conventional orchard management for reasons I will elaborate on

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[35] Alexander, Christopher, et al. *A Pattern Language Towns, Buildings, Construction* [1977]. Oxford University Press, 2013.

later. What I was looking for was a high road: how might we use agricultural climate mitigation strategies in ways that might also have additional benefits.

Figure 5: Cider Label by Kathryn Cramer & Ratio Hartwell

I am not yet an experienced enough designer to be able to redesign all the farm systems simultaneously: walk before you run. Nonetheless, I had interesting thoughts about what might be done. Still, I was no nearer to a plan for the farm that, say, would lead us to break-even financially.

Though this project is no longer an attempt to come up with a plan for the orchard, I have continued to use the orchard as a tool for thinking through design and foresight concepts for several reasons:

1. Because farms have deep history and this deep history informs our present and future. Patterns repeat.

2. Because experience with attempting to design on a farm provides realism to design problems.

3. Because engaging with animals on a family farm provides a basis for understanding the meaning of futuristic agricultural innovation, which in turn yields insights for general implementations of AI, machine learning, and robotics, tools increasingly used by large corporations and government entities on humans.

4. Because farming gives you an understanding of predator/prey relationships.

5. And because the way Big Data companies view humans has many similarities to how Big Ag views pigs and chickens.

I have taken the insights gleaned from engaging with the reality of the farm, and have translated the results of that design inquiry back into the abstract realm of the problems I was working on initially.

PHASE 5: SEMANTICS & MOTIFS

The Covid-19 crisis hit. OCAD closed. The US border closed. As the United States of America disintegrates politically under the weight of the incompetence, malevolence, and the white supremacy of the Trump administration, as a concept, a venue, and a

framework into which to farm, the US seems like a collective hallucination some of us once had; a beautiful but now-popped soap bubble. I have circled back around to bridging the gap between science fiction and foresight which is, in its way, as hard a problem as making my farm break even.

A Farmed Synthesis

Because this was an iterative process, and because I grounded the inquiry in my farm, unpacking my thoughts about more abstract findings involves seeing the resulting ideas through the lens of farming. A synthetic methodology I derive from the foregoing is this: I read agriculture, in the form of my farm and its history, to build an aesthetic and a rhetoric to read technology and its implications for futurity. As Claude Lévi-Strauss said, animals are good to think with.

3 MORE PRACTICE CONSIDERATIONS

It is important that students bring a certain ragamuffin, barefoot irreverence to their studies; they are not here to worship what is known, but to question it.[36]

—Jacob Bronowski

IMPLICIT DATA STRUCTURES & COMPUTATIONAL THINKING

In our OCAD graduate coursework, we are given many boxes to interact with, for example, the Business Model Canvas[37] and its conceptual relatives. As we fill these boxes—with Post-It Notes on whiteboards—these conceptual tools are implicitly data structures. Yet aggregation of data seems not to be the goal for The Box. It is as though we are to use spreadsheet programs which, however, have no Save feature.

OCAD's Strategic Foresight and Innovation program has been built around diagrammatic reasoning, which has left me feeling boxed in much of the time. I struggle to reconcile my current design school education with computational thinking.

Computational thinking involves formulating information in such a way that it can be understood and manipulated by a computer.

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[36] Bronowski, Jacob. *The Ascent of Man*, Episode 11: "Knowledge or Certainty," BBC, 1973. https://www.dailymotion.com/video/x20ohne

[37] Osterwalder, Alex; Pigneur, Yves; and Clark, Tim. *Business Model Generation: A Handbook for Visionaries, Game Changers, and Challengers*. Hoboken, NJ: John Wiley & Sons, 2010.

Stephen Wolfram, in 2016, explains:

> …let's try to define what we mean by *computational thinking*. As far as I'm concerned, its intellectual core is about formulating things with enough clarity, and in a systematic enough way, that one can tell a computer how to do them. Mathematical thinking is about formulating things so that one can handle them mathematically, when that's possible. Computational thinking is a much bigger and broader story, because there are just a lot more things that can be handled computationally. [38]

Jeanette Wang, a Vice President at Microsoft Research, writing in 2014, explained it this way:

> Computational thinking is the thought processes involved in formulating a problem and expressing its solution(s) in such a way that a computer—human or machine—can effectively carry out. Informally, computational thinking describes the mental activity in formulating a problem to admit a computational solution. The solution can be carried out by a human or machine. This latter point is important. First, humans compute. Second, people can learn computational thinking without a machine. Also, computational thinking is not just about problem solving, but also about problem formulation. [39]

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[38] Wolfram, Stephen. "How to Teach Computational Thinking." Stephen Wolfram Blog, September 7, 2016. blog.stephenwolfram.com/2016/09/how-to-teach-computational-thinking/." I edited this piece for Wolfram Research.

[39] Wang, Jeanette M. "Computational Thinking Benefits Society." Social Issues in Computing, 40th Anniversary Blog, 10 Jan. 2014, socialissues.cs.toronto.edu/index.html?p=279.html.

Data structured for computational thinking consists of these elements: *Entities*, that have names and *Properties*, and these properties have *Values*. For example, Toronto is a kind of Entity called a *City*; this city has the *Property* of temperature.[40]

The Cognitive Tools of Computation

There are good grounds to shy away from trying to make something *computational* that is not already obviously *computable*.

Big Data, and the value of reframing things as computational to gain insight, have been wildly oversold in ways discussed in depth in David Golumbia's *The Cultural Logic of Computation*[41] and Shoshana Zuboff's *The Age of Surveillance Capitalism*.[42] Much of this sales pitch is ideological and the resulting innovations are not necessarily to our benefit.

The missed opportunity-cost has been huge. In his essay, "Innovation Starvation," science fiction writer Neal Stephenson laments that the best minds of his generation

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[40] See, for example, "CityData." Wolfram Language Documentation, Wolfram Research, reference.wolfram.com/language/ref/CityData.html.

[41] Golumbia, David. *The Cultural Logic of Computation*. Cambridge, MA: Harvard University Press, 2009.

[42] Zuboff, Shoshana. *The Age of Surveillance Capitalism: The Fight for a Human Future at the New Frontier of Power*. New York: Public Affairs, 2019.

have been used to create spam filters.[43] Additionally, the cognitive tools of computation have already demonstrated their propensity to magnify cognitive bias and inequality. Safiya Noble describes the example of problematic Google search results:

> Whether looking for autosuggestions or answers to various questions or looking for suggestions about what is beautiful or what a professor may look like (which does not account for people who look like me who are part of the professoriate—so much for "personalization"), Google's dominant narratives reflect the kinds of hegemonic frameworks and notions that are often resisted by women and people of color.[44]

What I propose here is not computerization; rather, that we use the cognitive tools of computational thinking to advance design and foresight beyond their current ability to imagine narratives and scenarios of the future. This means we need to bring awareness of these problems into the process.

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[43] Stephenson, Neal. "Innovation Starvation." Wired, 2011. Retrieved from https://www.wired.com/2011/10/stephenson-innovation-starvation/ on October 2018. First appeared in the journal Foreign Policy.

[44] Noble, Safiya Umoja. *Algorithms of Oppression: How Search Engines Reinforce Racism*. New York: New York University Press, 2018, p. 25.

THE BACK-CHANNEL CIRCUIT TO SEMANTICS

Strategic Foresight and Innovations' visual thinking tools—which is to say of *diagrammatic reasoning*.[45] These have their roots in Charles Sanders Peirce's concept of *Abductive Thinking* which is a system for making educated guesses.[46]

Diagrammatic reasoning, as outlined formally by Michael Hoffmann, is supposed to involve three steps:

1. Constructing a diagram.

2. Experimenting with the diagram.

3. Observing and analyzing.

In the third step, one event which is supposed to happen is analyzing the constraints and possibilities of a consistent representation system. In turn, this should lead to a revised ontology and an improved semantics.

It is the back-channel circuit, starting with the box labeled "analyzing," and ending with the box, "an axiomatic system, a theory, or a language (syntax, semantics)" that this document inhabits.

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[45] Hoffmann, Michael. *Seeing Problems, Seeing Solutions. Abduction and Diagrammatic Reasoning in a Theory of Scientific Discovery*, 2007. Retrieved on July 22, 2020 from https://www.researchgate.net/publication/42335877_Seeing_Problems_Seeing_Solutions_Abduction_and_Diagrammatic_Reasoning_in_a_Theory_of_Scientific_Discovery.

[46] Bonfantini, Massimo A. & Proni, Giampaolo. "To Guess or Not to Guess." In *The Sign of Three: Dupin, Holmes, Peirce*. Umberto Eco and Thomas A. Sebeok, eds. Bloomington: Indiana University Press, 1983, pp. 133-134.
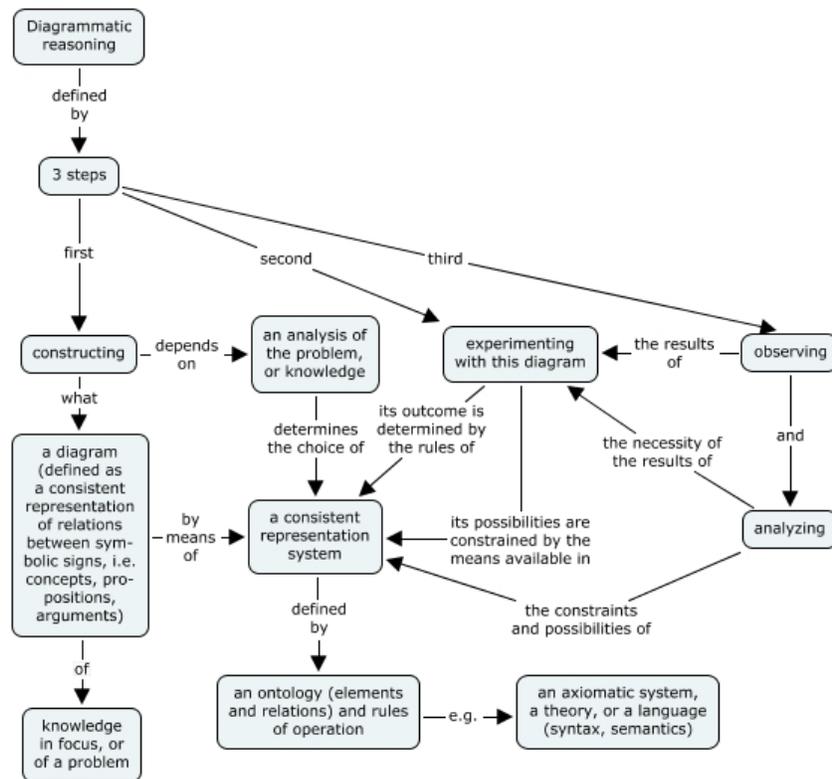
Figure 6: Michael Hoffman's diagram of the process of Diagrammatic Reasoning., created by Hoffman with IHMC Cmap.

Although their agenda is different, Jaqueline Shaw's Strategic Foresight and Innovation Major Research Project, entitled "Towards an Intersectional Praxis in Design,"[47] likewise inhabits this circuit. This piece of diagrammatic reasoning should be more fully integrated into faculty praxis in OCAD's teaching in Strategic Foresight

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[47] Shaw, Jaqueline. "Towards in Intersectional Praxis in Design." Submitted to OCAD University in partial fulfillment of the requirements for the degree of Master of Design in Strategic Foresight & Innovation, Toronto, Ontario, Canada, 2019.

and Innovation. Stating it more plainly, students should have more freedom to redesign diagrammatic templates.

AGAINST THE GRAIN

In Walter Benjamin's "The Concept of History,"[48] he argued for reading *against the grain—gegen den Strich lessen—* and not just accepting our historical treasures, wonders, and tools as they come to us:

> There is no document of civilization which is not at the same time a document of barbarism. And just as such a document is not free of barbarism, barbarism also taints the manner in which it was transmitted from one owner to another. A historical materialist therefore dissociates himself from it as far as possible. He regards it as his task to brush history against the grain.

Here I will take an against-the-grain approach to a variety of tools and concepts. This is not just to seek out the "taint" of barbarism, but also because glimpses of earlier intellectual technologies, suppressed in religious, political, and technological upheavals of the past, are evident in our new-fangled futurist tools. We should strive to recognize the histories of our tools and reclaim valuable elements that have been suppressed. Know the history of your tools.

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[48] Walter Benjamin as quoted in Eagleton, Terry. *Against the Grain: Essays 1975-1985*. New York: Verso, 1986, front matter.

CHARLES S. PEIRCE LOST HIS WATCH IN 1879 & WHAT THIS HAS TO DO WITH ABDUCTIVE REASONING

Much of the intellectual apparatus of diagrammatic reasoning relies on Charles S. Peirce's concept of *Abductive Reasoning*. In 1879, Peirce left his watch and his overcoat on a boat and when he went back for them, they were gone: As Peirce later told the story in a letter to William James,[49] he summoned the boat's black waiters and interrogated them. Peirce accused at least one of the crime of theft. The story goes on for a bit; Peirce breaks into two black peoples' apartments—over the misgivings of the Pinkerton man whom he has in tow— terrifying the occupants, ransacking at least one apartment. As a friend put it, the anecdote Peirce was so proud of and Umberto Eco and Thomas Sebeok relayed uncritically to the semiotics audience in 1983, sounds like, as a friend put it, "H. P. Lovecraft on a bad day."

The moral of Peirce's anecdote—in which he claims to have gotten his stuff back—is the brilliance of Abductive Reasoning. Peirce wrote up a long version of the story in 1907 and submitted it to *The Atlantic*, where it was rejected.

My impression in passing of Peirce's relatively unguarded boasting is not that his brilliance rivaled that of Sherlock Holmes. Rather, Peirce's claimed thinking methods

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[49] Sebeok, Thomas A. & Jean Umiker-Sebeok. "'You Know My Method': A Juxtaposition of Charles S. Peirce and Sherlock Holmes" In *The Sign of Three: Dupin, Holmes, Peirce*. Umberto Eco and Thomas A. Sebeok, eds. Bloomington: Indiana University Press, 1983, pp. 11–54.

were used as cover and justification for spectacularly bad behavior. And that, after the fact, he was so proud of his narrative fabulation, it became part of his sales-pitch for his philosophical position and it fed a racist and classist sense of entitlement and propagated this same sense of entitlement in his listeners.

Even the frameworks of our frameworks should sometimes be scrutinized a bit. It is shocking that, in 1983, the sages of semiotics did not see what was wrong with Peirce's self-inflating story.

An Intellectual Provenance

In our course "Understanding Systems," the central apparatus was the *Systemic Design Toolkit*, intended to bring a systems approach to management consulting.[50] Many templates in this toolkit have analogs to be found in Alexander Roob's *Alchemy and Mysticism*[51], an art book chronicling the history of esoteric lore. Concentric circles are a common motif in whiteboard-play. For example, the Toolkit's *Actor's Map* visually resonates with an 1855 illustration for Dante's *Divine Comedy* depicting the path of a soul on its pilgrimage rising from Hell.[52] In the instance of the *Systemic Design Toolkit*,

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[50] Van Ael, Kristal; Ryan, Alex; Jones, Peter; Vandenbroeck, Phillipe, et al. *Systemic Design Toolkit*, 2019. https://www.systemicdesigntoolkit.org.

[51] Roob, Alexander. *Alchemy & Mysticism: The Hermetic Museum*. Taschen, 2019.

[52] Roob, 2019, p. 41.

the intellectual heritage of alchemy and mysticism appears to be filtered through Carl Jung.[53]

A particularly fascinating object is their systems tool which calls itself "Iterative Inquiry: Framing the System," which we were required to use at OCAD for a core assignment. Rendered as a clockwise square spiral, it features boxes the user is to populate by repeated questioning of an entity's context, function, structure, and purpose.

Narratively, the creators of this tool expect one circuit of the tool to leads logically to the next, progressing through levels labelled, "micro," "mezzo," "exo," and "macro." As a class, we did not experience this as a natural progression.

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[53] Jung, Carl G. *The Collected Works of C.G. Jung: Psychology & Alchemy. Vol. 12*, Princeton University Press, 1970.
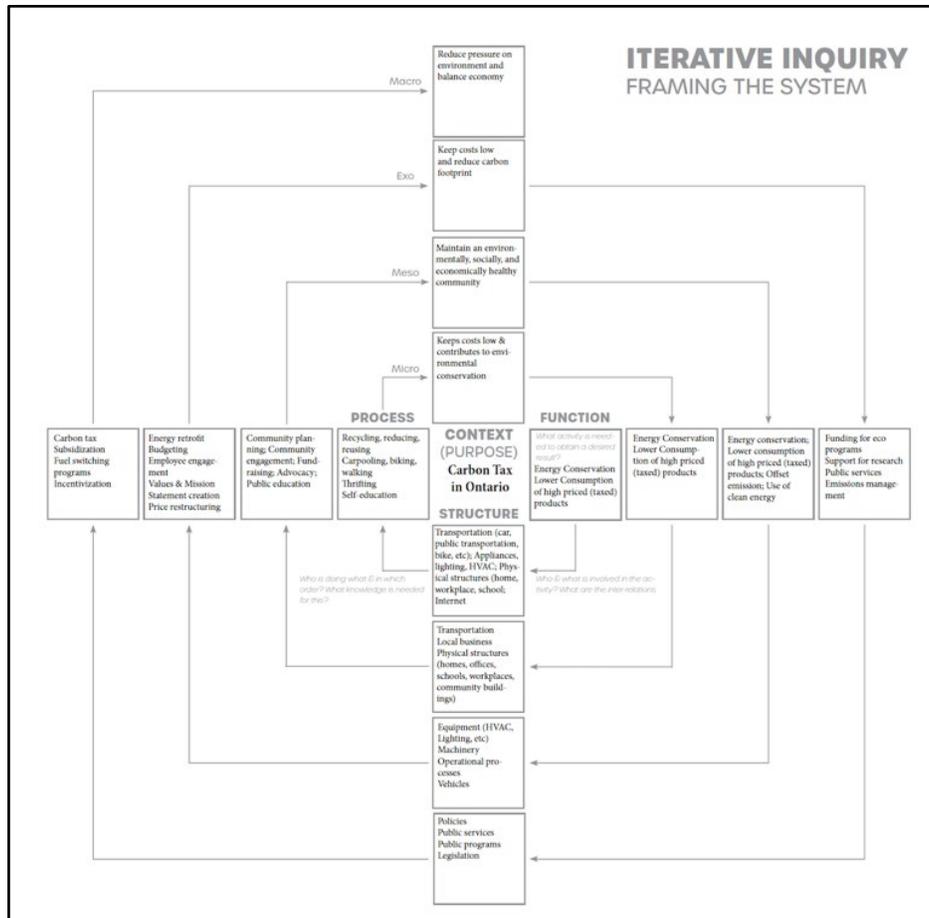
*Figure 7: Process photo of the design of the Iterative Inquiry worksheet from the Systemic Design Toolkit
in classroom use, recreated by Kathryn Cramer in InDesign*

The tool itself is a denatured labyrinth, an echo of labyrinths such as the one on the

floor of the Cathedral at Chartres, representing the spiritual quest of a pilgrim's journey

to the Holy Land.[54]

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[54] "Labyrinth at Chartres Cathedral." Atlas Obscura, 31 January 2013, www.atlasobscura.com/places/labyrinth-
chartres-cathedral.

Figure 8: A diagram of the labyrinth on the floor of Chartres Cathedral.[55]

Walking the labyrinth is symbolic of exploring the unconscious. Labyrinths figure extensively in Robert Macfarlane's *Underland: A Deep Time Journey*, as many subterranean landscapes are experienced as labyrinths.[56] Rinsing the origins off of thinking tools does not necessarily make them work better and can get in the way of their functioning.

I encountered the word "iteration" through the work of mathematician Benoît Mandelbrot who coined the term "fractal" and whom I interviewed for the University of

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[55] Recreation of the labyrinth of Chartres Cathedral by Wikimedia Commons User: Ssolbergj, 2012. Retrieved from https://en.wikipedia.org/wiki/Chartres_Cathedral#/media/File:Labyrinthus.svg on July 29, 2020.

[56] Macfarlane, Robert. *Underland: A Deep Time Journey*. New York: W.W. Norton, 2019.

Washington Daily as a student journalist in 1983 when he came to Seattle to speak about his book *The Fractal Geometry of Nature*.[57]

I re-engaged with the concept of iteration through Rudy Rucker's book *The Lifebox, the Seashell, and the Soul*.[58] Rucker's book led to Stephen Wolfram's *A New Kind of Science*[59] which describes Wolfram's computer experiments, systematically exploring the mathematical space of cellular automata, classifying these into four groups based on the interestingness of the results of iterative exploration, and proposing what this might mean for science.

An iteration is the repetition of a sequence of operations: compound interest is an example of iteration. Iteration does not mean the same thing as repetition. Iterations of the same operation over and over can have different kinds of outcomes. By running computer experiments iterating many mathematical procedures, Stephen Wolfram has determined that iteration has four types of outcomes, two of which are uninteresting, but the other two of which result in complex behavior from a set of simple rules. Hector Zenil explains, "Rule 30 [lower left] is capable of what Wolfram calls intrinsic randomness, even when starting from the simplest possible initial condition–a single black cell. Rule 54 has been conjectured to be Turing-complete …, just like another

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[57] Mandelbrot, Benoît B. *The Fractal Geometry of Nature*. San Francisco: W.H. Freeman, 1983.

[58] Rucker, Rudy. *The Lifebox, the Seashell, and the Soul: What Gnarly Computation Taught Me about Ultimate Reality, the Meaning of Life, and How to be Happy.* Thunder's Mouth Press, 2005.

[59] Wolfram, Stephen. *A New Kind of Science*. Champaign, IL: Wolfram Media, 2002.

class 4 [Elementary Cellular Automata], Rule 110 …, meaning that it is capable of simulating any other computer program." [60] Complex behavior of a system can arise from iteration of simple operations.
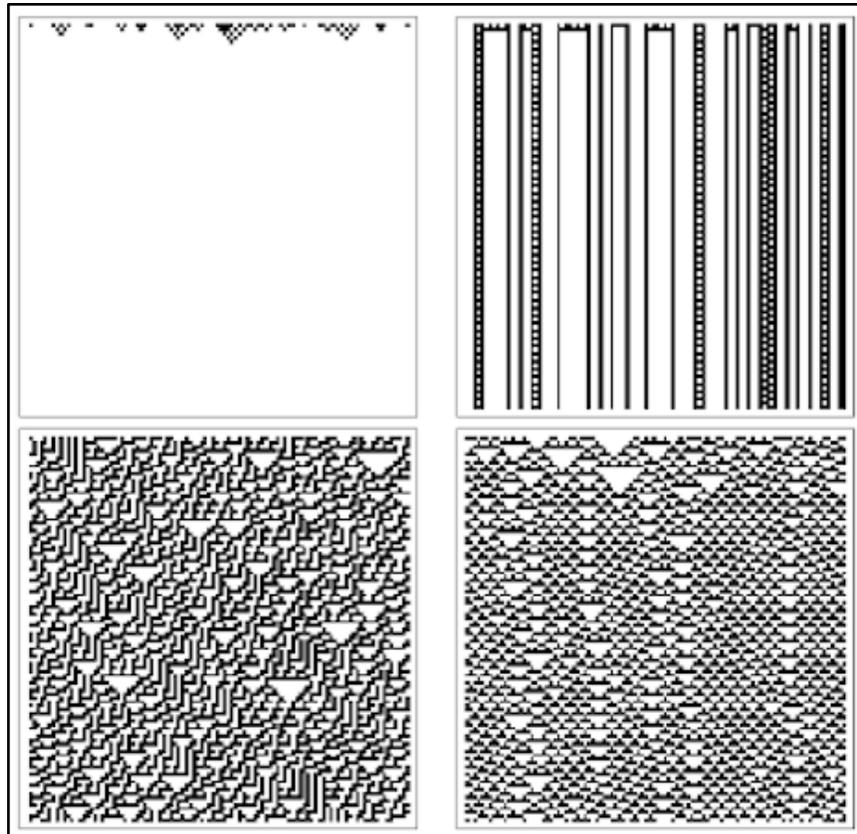
Figure 9: Archetypal cases of each of the 4 classes of behavior identified by Stephen Wolfram in computer programs. Hector Zenil explains: "Archetypal cases of each of the 4 classes of behavior identified by Stephen Wolfram in computer programs."

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[60] Zenil, Hector, "Quantifying Natural and Artificial Intelligence in Robots and Natural Systems with an Algorithmic Behavioral Test." arXiv:1412.6703v2 [cs.AI] 23 Dec 2014, p. 4. Caption in the original: "Archetypal cases of each of the 4 classes of behavior identified by Stephen Wolfram in computer programs." https://arxiv.org/pdf/1412.6703.pdf.

In the novel *vN,* Madeline Ashby explores the meaning of *iteration*, used here in a scene between clones, where their generations are like generations of software:

> Charlotte stood tall despite her damage. She beamed. It emanated from her face like the glow of a freshly polished lamp. "An iteration isn't a copy, Mother. It's just the latest version. I'm your upgrade. That's why I did what I did. Because I'm just better than you."[61]

I do not recognize the Systemic Design Toolkit's "Iterative Inquiry" as iterative in the sense of Mandelbrot, Rucker, Wolfram, and Ashby. Rather, it seems to be a denatured labyrinth, offering repetition rather than iteration. Even concepts when from quantitative inquiry crop up in foresight and design, they often seem a bit askew. (I can sort of see how asking the same questions over and over at different levels of scale might remind someone of fractals, but it seems a stretch.)

HAVE WE STOPPED PRACTICING DIVINATION?

Foresight research, futures studies, and science fiction are all secularized descendants of the ancient profession of divination. There are good reasons to be cautious about pushing one's visions of what the future will be like too hard. Waffling like a Wall Street financial analyst is intellectually dishonest.

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[61] Ashby, Madeline. *vN*. Nottingham: Angry Robot, 2012.

If you want to help people peer into the future, you should own the heritage of your discipline rather than whitewashing it with disclaimers. We tend to dismiss earlier methods of imagining the future without understanding what they were. In the introduction to *Eros and Magic in the Renaissance*, Ioan Couliano argues:

> The concept we moderns have of magic is very strange: we see it as merely a ludicrous heap of recipes and methods stemming from primitive, unscientific notions about nature.[62]

He continues on the next few pages:

> Magic and science in the last analysis represent the needs of the imagination, and the transition from a society dominated by magic to a predominantly scientific society is explicable primarily by a change in the imaginary. In that respect this book is innovative: it examines changes at the level of the imaginary rather than at the level of scientific discoveries; granted, of course, that a discovery is only made possible by a certain horizon of knowledge.
>
> Nowadays, if we can boast of having at our disposal scientific knowledge and technology that used to exist only in the phantasms of magicians, we must also allow that, since the Renaissance, our capacity to work directly with our own phantasms, if not those of others, has diminished. The relationship between the conscious and the unconscious has been deeply altered and our ability to control our own processes of imagination reduced to nothing.[63]

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[62] Couliano, Ioan P. *Eros and Magic in the Renaissance*. Trans by Margaret Cook. Chicago: University of Chicago Press, 1987, p. xvii.

[63] Ibid, pp. xviii-xix.

Not only does rejection of foresight's history in divination make for an awkward and fraught relationship with science fiction, it reinforces a colonialist mentality where cultural perspectives that did not undergo this same purging of the magical are suspect and perspectives that involve other ways of knowing are by definition marginalized and excluded. And yet practices for arriving at "foresight scenarios" or "understanding of systems" have their own rituals. Though they may have roots in the Tarot[64] or the spiritual practice of walking a labyrinth or Dante's *Inferno*, these practices are cleansed of these origins because our clients are corporate or government.

We live in an era where our beliefs are easily manipulated by corporations with a lot of data and the desire to fool us. In 2016, our collective "phantasms" seem to have been the target of Cambridge Analytica and similar political operations and will be again. News stories of early August 2020 tell of new election interference activities for the US's 2020 Presidential election too complex to go into here. The illusion we of Western culture have some superior hold on rationality is fast crumbling[65]. This need to move away from the hegemonic view is perhaps what Anthony Dunne and Fiona Raby were getting at with the declaration:

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[64] For example, the Systemic Design Toolkit's *Paradox* cards. I like these cards and want to own a set. But they do have obvious roots in Tarot. See https://namahn.com/tools/paradox-cards/

[65] Wylie, Christopher. *Mindf*ck: Cambridge Analytica and the Plot to Break America*. New York: Random House, 2019.

RECLAIMING THE IMAGINARY

In contemplating the possible reclamation of that which is missing in our tools, I am reminded of how Ioan Couliano framed the matter of the Reformation and its influence on how we engage with the imaginary and with ritual. Imagination is suppressed, but ritual remains:

> Modern Western Civilization is altogether a product of the Reformation—a Reformation which, void of its religious content, nevertheless kept its conventions and rituals.
>
> On the theoretical level, the pervasive censorship of the imaginary results in the advent of modern exact science and technology.
>
> On the practical level, it results in the advent of modern institutions.
>
> On the psychosocial level, it results in all our chronic neuroses, which are due to the entirely unilateral orientation on Reformation culture and the rejection of the *imaginary* on grounds of principle.[67]

Science fiction and related enterprises occupy a *liminal* zone where imagination, within limits, is allowed. In 1997, in the front matter to my anthology *The Ascent of Wonder*,

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[66] Anthony Dunne; Fiona Raby. *Speculative Everything: Design, Fiction, and Social Dreaming*. Cambridge, MA: MIT Press, 2014.

[67] Couliano, Ioan P. *Eros and Magic in the Renaissance*. [1986] Trans. by Margaret Cook. Chicago: University of Chicago Press, 1987, p. 222.

co-edited with David Hartwell, I called hard science fiction (the kind most engaged with science) "the religious art of science."[68] Science fiction provides a canvas onto which to project our imaginings about science, technology, futurity, and alternate realities. Outside of these protected zones such as science fiction, the *imaginative heritage* of our intellectual technologies may be suppressed.

But also, those steadying elements of the hard sciences, mathematics and physics, are much stranger places than foresight practitioners seem to imagine.

HYPERTEXT FICTION

In the early 1990s, during the period when David Hartwell and I were teaching science fiction, fantasy, and horror writing at Harvard Summer School, Sarah Smith, then an aspiring science fiction writer (now an established mystery writer), invited us to Eastgate Systems in Newton, Massachusetts. They were the makers of a hypertext writing environment called Storyspace and one of the few the publishers of "hypertext fiction." Sarah had a "hypertext novel" coming out called *The King of Space*, and our meeting with her and Eastgate's Chief Scientist, Mark Bernstein was intended to generate PR in the form of an article in *The New York Review of Science Fiction*. The meeting changed my life.

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[68] Hartwell, David G., & Cramer, Kathryn. *The Ascent of Wonder*. New York: Tor, 1997.

Not only did Sarah and Mark get their article in *NYRSF*, I left with a copy of Storyspace on which I soon began to write "In Small & Large Pieces," a dark fantasy hypertext that was later published by Eastgate. [69, 70] I went to work for Eastgate and moved to Newton, Massachusetts for a while.

COLLAGE THINKING

Collage thinking is a part of my personal practice that I have developed further while at OCAD. I have made several attempts to teach this methodology to others at OCAD. Although this document is written and not a work of visual art, the techniques of collage thinking are present throughout in the juxtaposition of sharp-edged word pictures that make each other mean, a texture of meaning that constructs arguments about systemic patterns, and the purpose and nature of visions of futurity, the texture of our contact with our future.

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[69] Cramer, Kathryn. "In Small & Large Pieces." In Eastgate Quarterly Review of Hypertext, 1994. Newton, MA: Eastgate Systems.

[70] Grigar, D. Rebooting Electronic Literature, Volume 2: Kathryn Cramer's "In Small & Large Pieces". 2019. Retrieved July 17, 2020, from https://scalar.usc.edu/works/rebooting-electronic-literature-volume-2/kathryn-cramers-in-small-and-large-pieces?path=index
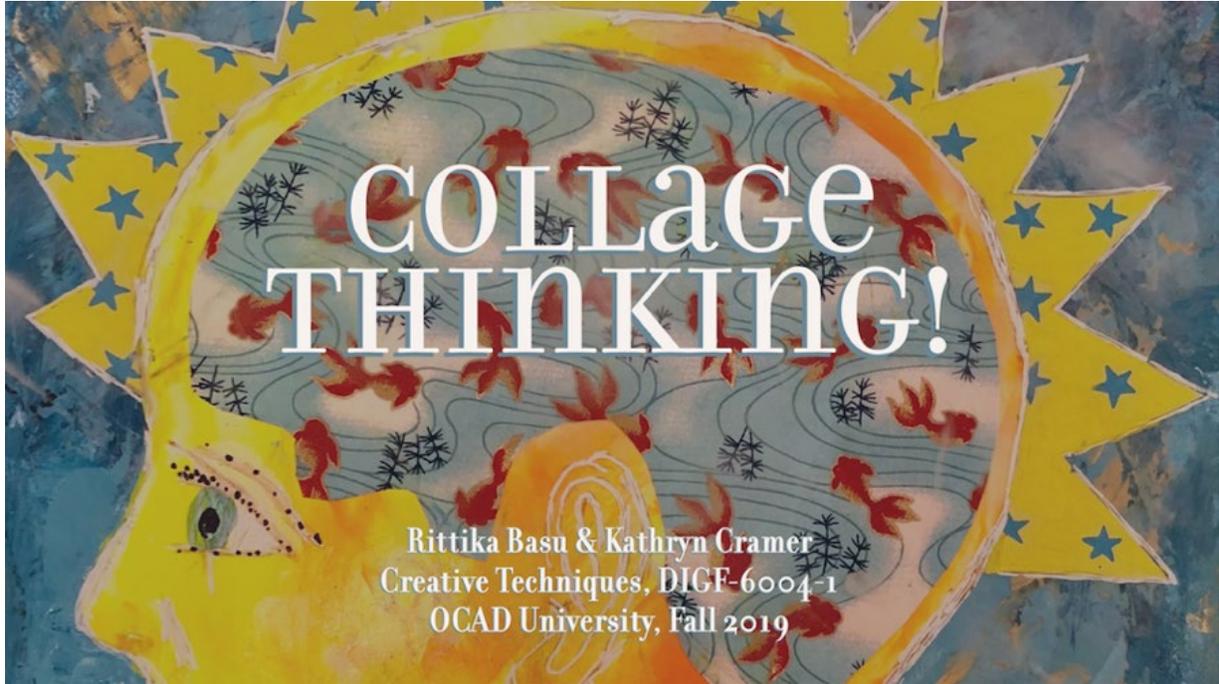
Figure 10: Collage Thinking! slide from a presentation by Rittika Basu & Kathryn Cramer. Collage by Kathryn Cramer.

These techniques have their foundation in the work of Max Ernst and the Surrealists. My own practice is influenced by both Nick Bantock and Rosamund Purcell. Collage artists combine and recombine motifs to create their meaning and that is central to my intentions here.

MAX ERNST

Max Ernst's works are foundational to both visual collage and collage thinking. The most accessible versions of his work are the two collage novels *Une Semaine de Bonté:*

A Surrealistic Novel in Collage[71] and *The Hundred Headless Woman*[72]. Ernst's work can also be sought out in museum exhibits.[73]

NICK BANTOCK

Artist and writer Nick Banktock's book *The Trickster's Hat: A Mischievous Apprenticeship in Creativity* (2014)[74] was important to extending my creative range with collage techniques and with collage as a thinking process. And his book *Urgent 2nd Class: Creating Curious Collage, Dubious Documents, and Other Art from Ephemer*a (2004)[75] with a strong emphasis on mail art was formative to my ideas about collage thinking. In September of 2017, I went to Victoria, BC and took a weekend workshop with Bantock.

ROSAMUND PURCELL

Rosamund Purcell was a collaborator of Stephen J. Gould's. She is a museum photographer and collage artist. I am especially partial to her photography books *Swift*

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[71] Ernst, Max. *Une Semaine de Bonté: A Surrealistic Novel in Collage* [1934] New York: Dover Publications, 1976.

[72] Ernst, Max. *The Hundred Headless Woman*. New York: George Braziller, 1981.

[73] Max Ernst: *Beyond Painting*. MoMA, September 23, 2017–January 1, 2018.
https://www.moma.org/calendar/exhibitions/3869?locale=en

[74] Bantock, Nick. *The Trickster's Hat: A Mischievous Apprenticeship in Creativity*. New York: Perigee, 2014.

[75] Bantock, Nick. *Urgent 2nd Class: Creating Curious Collage, Dubious Documents, and Other Art from Ephemera*.
Vancouver: Raincoast Books, 2004.

as a Shadow, on extinct and endangered species, and *Special Cases*, on medical oddities. Her best contribution to collage thinking is her book *Owls Head: On the Nature of Lost Things*,[76] a book on her long-term relationship with a particular junk dealer who had covered ten acres with *things* and how this contributed to her creative practice.

Other Influences

Like Nick Bantock Shaun Tan has illustrated for the science fiction field. His book *The Lost Thing*, and its Oscar-winning animated adaptation are aesthetic touchstones.[77]

Max Haiven I met at an event at OCAD in 2019. In his book *Art After Money, Money After Art*, Haiven introduced me to the idea collage and money are entangled in ways I should pay attention to.[78]

Maps are common to collage thinking, to foresight and systems, and to fiction writing. A book that helps bridge these disciplines is Jill Berry's *Personal Geographies: Explorations in Mixed-Media Mapmaking*.[79]

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[76] Purcell, Rosamond. *Owls Head: On the Nature of Lost Things*. Quantuck Lane, 2007.

[77] Tan, Shaun. *The Lost Thing*. Melbourne, Australia: Lothian, 2014.

[78] Haiven, Max. *Art After Money, Money After Art: Creative Strategies Against Financialization*. Toronto: Pluto Press, 2018.

[79] Berry, Jill K. *Personal Geographies: Explorations in Mixed-Media Mapmaking*. Cincinnati, OH: North Light Books, 2011.

My favorite book about poetry that contributes to my thinking about collage and language is Susan Woodbridge's *Poemcrazy* which speaks of hoarding language the way other people hoard possessions.[80]

One of my favorite things to do in Toronto has been to attend artist Deborah Wheeler's collage workshops at Gallery Arcturus.[81] She gathers about 20 people: for the first hour and a half, we sit with the available collage materials sorting and cutting out pieces from and then, for the other half of the time, we make the collages—a marvelous experience of parallel play.

Why does collage thinking work as a form of critical thinking? Because another word for cutting up things for the purpose of collage is *semantic chunking*, defining a "semantic chunk as the sequence of words that fills a semantic role defined in a semantic frame."[82] Semantic chunking is a way to separate things of interest into semantic units for later manipulation and recombination.[83]

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[80] Woodridge, Susan. *Poemcrazy: Freeing Your Life with Words* [1996]. New York: Random House, 2008.

[81] Gallery Arcturus. https://www.arcturus.ca

[82] Hacioglu, Kadri & Ward, Wayne. "Target Word Detection and Semantic Role Chunking using Support Vector Machines." Conference: Proceedings of the 2003 Conference of the North American Chapter of the Association for Computational Linguistics on Human Language Technology: companion volume of the Proceedings of HLT-NAACL 2003--short papers - Volume 2, 2003.

[83] Mariani, Massimo. *What Images Really Tell Us: Visual Rhetoric in Art, Graphic Design and Advertisement.* Barcelona: Hooaki, 2019.

Retrofuturism & Recombining Debris of the Past

The tactic of printing out and cutting up assigned readings in OCAD's graduate program is one I have occasionally attempted to teach my peers. I suggest it be part of the official curriculum to get students to engage more deeply with the readings in the official curriculum.

The net effect of these resources is the idea of cutting up images and text to see what they mean, of finding new meanings by combining fragments, and of retrofuturism: of finding hope for the future by finding lost things, by filter-feeding on fragments of the past, by re-appropriating them.

When you fragment text, not only do you find out who can write, you also find out a lot more about what they mean, and how those meanings can build on fragments of other things.

4   LITERATURE REVIEW: CHARACTERISTICS OF WRITTEN SCIENCE FICTION & FORESIGHT SCENARIOS

> To think in geological time is almost impossible.
>
> —Jennifer Baichwal, in *Anthropocene*[84]

Here I examine various aspects of science fiction and foresight scenarios, two types of narrative engaged with depicting the future.

One purpose of this section is to show how fiction is created and is thought about by its authors. This section compares and contrasts these two modes. I discuss how foresight methodologies appear to me as someone who looks through the lens of science fiction, from the point of view of an insider in the process.

Usually when one sets out to write about science fiction, one is obligated to ritually differentiate science fiction from other types of fiction. My favorite definition of the novel is Randal Jarrell's: "A novel is a prose narrative of some length that has something wrong with it."[85]

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[84] Baichwal, Jennifer. "Our Embedded Signal." In *Anthropocene* by Edward Burtynsky, Jennifer Baichwal, and Nicholas de Pencier. Toronto: Art Gallery of Ontario, 2018, p. 197.

[85] Jarrell, Randall. Introduction to Christina Stead's 1940 novel *The Man Who Loved Children*. [1965]. New York: Picador, 2001.

For the purposes of this project, what I mostly mean by science fiction (in contrast to scenarios) is fiction about the future, or about alternate pasts or presents, written and published by professional writers for a commercial audience. There is science fiction in other media, and, likewise, what I mean here by science fiction is that which is produced and distributed within the culture industry.

The strength of this analysis is that I have a deep knowledge both of the science fiction literature and of the process by which writers' ideas become published fiction. The weakness is I do not have a similar depth of firsthand practical knowledge of design, academic foresight research, or systems analysis, and am still a gawking tourist wondering why the locals do things the way they do.

I have, at least, tried out most of the techniques taught in Design School discussed here, whether I believe in them or not.

Written science fiction—itself a consumer product—is optimized to the needs of target markets. These needs involve world length, language, type of vocabulary, types of characters, stylistics, and more. Most of these have little bearing on the validity of the author's assumptions or ideas about the future.

MOTIFS

Motifs, which is to say concepts and ideas, have traceable histories through the genre, and some bibliographers, such as Everett Bleiler, have gone to considerable effort to trace them.[86] [87] The science fiction field has its own body of scholarship, much of which predates interest in science fiction from university English departments.

The history of motifs in science fiction is accessible if you choose to explore it. Good resources to traverse are *The Science Fiction Encyclopedia* by John Clute, Peter Nichols, David Langford, and Graham Sleight, that was initially a reference book, then a CD-ROM, and is now a website;[88] Brian Stableford's *Science Fiction and Science Fact: An Encyclopedia*;[89] Lloyd Currey's online book catalog at lwcurrey.com; Jost Hermand's *Old Dreams of a New Reich: Volkish Utopias and National Socialism*,[90] and Everett Bleiler's various motif indexes.

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[86] Bleiler, Everett F., & Bleiler, Richard. *Science-Fiction: The Gernsback Years: A Complete Coverage of the Genre Magazines Amazing, Astounding, Wonder; and Others from 1926 through 1936*. Kent, Ohio: Kent State University Press, 1998.

[87] Bleiler, Everett F. *Science fiction: The Early Years: A Full Description of More than 3,000 Science-Fiction Stories from Earliest Times to the Appearance of the Genre Magazines in 1930; with Author, Title, and Motif Indexes*. Kent, Ohio: Kent State University Press, 1990.

[88] Clute, John et al. *The Science Fiction Encyclopedia*, 3rd Edition. http://www.sf-encyclopedia.com

[89] Stableford, Brian. *Science Fact and Science Fiction: An Encyclopedia*. New York, New York: Routledge, 2006.

[90] Hermand, Jost. *Old Dreams of a New Reich: Volkish Utopias and National Socialism (Der alte Traum von neuen Reich)*. Trans. From the German by Paul Levesque and Stefan Soldovieri. Indiana University Press, 1992.

Motifs are a way of tracking the ideation within stories and understanding their history and referents. A much more in-depth discussion of the history and literature of motifs and their uses is in the chapter entitled "Praxis."

SCIENCE FICTION TOUCHSTONES

Professionally and personally—from the point of view of today's science fiction change-makers—I am irretrievably *Ancien Régime*. My career started in the mid-1980s. In broad outline, I am the widow of and was a creative partner of a book editor in the science fiction field and edited a Year's Best series for a decade.

There are certain classic science fiction stories that should be taught in Design School when issues of science fiction and scenarios are taught. Chief among them is Bob Shaw's story, "The Light of Other Days,"[91] which describes an invention called "slow glass" which slows down light as it passes through the glass, such that scenes of years past appear in windows made of slow glass. Were it not for the fact that writing a story like this is extremely difficult, this could be a model of what Design Fiction should look like.

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[91] Shaw, Bob. "Light of Other Days." Analog Science Fiction and Fact, August 1966.

Another touchstone is Henry Kuttner and C. L. Moore's 1943 story, "Mimsy Were the Borogoves," a story about alien educational toys that change the brain.[92] It speaks to the way designers think about material culture: that material culture can change how we think and who we are through the interaction of the user and the object.

THE NOVELIST & NARRATIVE RESILIENCE

Most science fiction writers with successful careers write novels. Writing a novel set in the future for a commercial publisher tends to be a high-risk proposition. The facts upon which the writer bases assumptions can and do change. One necessary professional skill is for the writer to have the flexibility of mind about plots and scenarios to be able to roll with it; narrative structures in novel-length science fiction must be resilient enough to survive the book's creation, which may take a year or more.

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[92] Kuttner, H. and Moore, C.L. writing as "Lewis Padgett." "Mimsy Were the Borogoves." Astounding Science Fiction Magazine, February 1943.

THE DISPROPORTIONATE INFLUENCE
OF FILM ON FORESIGHT

The disproportionate influence of film and TV on designers' view of what science fiction has to contribute has mostly to do with money and the size of audiences. The budget of a single "blockbuster" science fiction movie (about a hundred-million dollars US) is about the same size as the combined annual budgets of all US science fiction publishers taken together. Books are read by thousands. Hollywood movies are seen by millions.

The other basis for the disproportionate influence of film is that film studios employ designers who make sets and props. Film meets designers half-way by making prototypes, something prose fiction does not except inasmuch as such images appear on book covers commissioned by publishers or in story illustrations. Are the set designers of *Black Panther* invited to discussions of utopian design?

Anthony Dunne and Fiona Raby, in their book *Speculative Everything*, distinguish between design speculations and movie props:

> This is the main difference between film props and the fictional objects of design speculations. The objects used in design speculations can extend beyond a filmic support function and break away from cliched visual languages that prop designers are often obliged to use. Yes, it makes reading the objects more difficult but this process of mental interaction is important for

encouraging the viewer to actively engage with the design rather than passively consuming it. This separates design speculations from design for cinema.[93]

(Note that Anthony Dunne and Fiona Raby are an exception to my critique of a lack of print science fiction references. This may be the influence of Bruce Sterling on the project as described in their Acknowledgements.)

WHY LEARN LITERARY HISTORY?

By tradition, science fiction bridges the gap between what C. P. Snow called the two cultures, namely science and the arts.[94] It is a product of the cross-pollination of science and literature.

This is one of science fiction's sources of strength as a tool for understanding the future: tactics of integrating. Scientific knowledge and speculative ideas are built into its grammar. Science fiction has traditionally been a venue for imagining how societies can be different, and as a non-mimetic literature, it has been used to explore liberatory themes in ways which evade censorship.[95]

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[93] Anthony Dunne; Fiona Raby. *Speculative Everything: Design, Fiction, and Social Dreaming* Cambridge, MA: MIT Press, 2014.

[94] Snow, C. P. *The Two Cultures and the Scientific Revolution: The Rede Lecture 1959*. Cambridge: University Press, 1962.

[95] This is a feature of 1950s American science fiction, and was also a feature of Eastern European science fiction during the Cold War.

Newer science fiction writers are often accused by their elders as "not having read enough" and pressured to learn the history of the field. That is in part because the genre, as it has existed up until now, is this kind of conversation. A dark side of this aspect of the field is this expectation is also cultural gate-keeping. While one does not have to consult with science fiction's ancestors for permission to write and publish science fiction, neither can one avoid those cultural ghosts by not doing the reading. Science fiction is an ambient genre that permeates cultures, relayed efficiently in bowdlerized form—with much of its liberatory potential stripped away—through film, television, and now games. Science fiction as a literary mode has been used for subversion throughout its history.[96] American film executives, who make many of the decisions about what makes it to the screen are not your revolutionary comrades. And much of the game infrastructure has its roots in a game genre called "First Person Shooters." Written science fiction is comparatively less politically overdetermined.

A choice not to read dead white male science fiction writers and instead read only living writers or only writers of color does not free one from the influence of the likes of Robert A. Heinlein and John W. Campbell and H.P. Lovecraft. The influence of the architects of classic science fiction and fantasy is passed along as a literary heritage,

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[96] Shortly after the fall of the Soviet Union, I attended a panel of writers at the Frankfurt Book Fair about Eastern European science fiction. Panelists wondered aloud whether there was still any need for science fiction now that the government censors of East Germany and the Soviet Union were gone.

not by DNA. While I have devoted much of my science fiction career to curating the good parts of science fiction's literary heritage, for the purposes of design and foresight, the importance of knowing the history of science fiction is an awareness of moral hazard.

An example of moral hazard is the way *Jurassic Park* comes up every time a science writer goes to write about research into reclaiming extinct species. It is possible mammoths will never be brought back even if it becomes technologically possible because Michael Crichton and the movie made of his book make us collectively terrified that the disextinction of the mammoth would lead to mammoths that eat us. Historically, that shoe was on the other foot, which may be why they are extinct: *we* ate *them*.
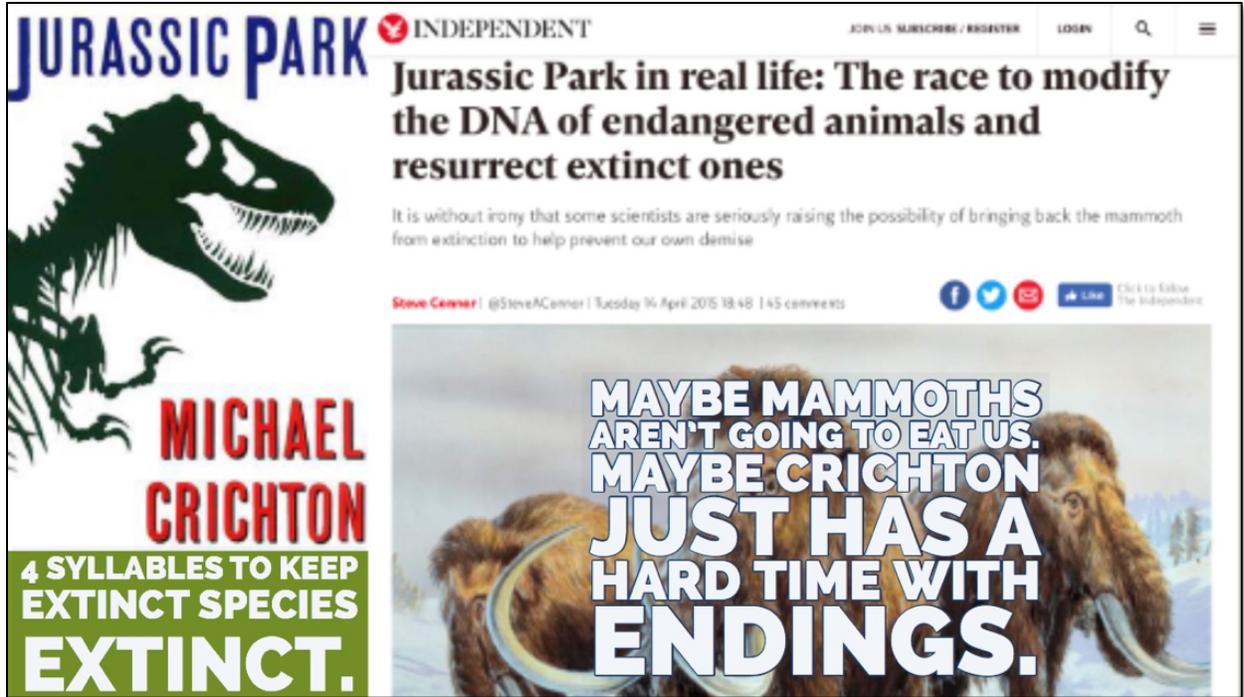
Figure 11: Slide by Kathryn Cramer from a presentation with Asia Clarke, Fall 2018. Collage design by Kathryn Cramer.

We are in the middle of an accelerating mass extinction, so the potential harm of the Jurassic Park truisms should not be underestimated.

REFERENTS THAT FLOOD THE CONVERSATION

In many scenarios, there will be no obvious fictional referent. Where there is, it can be very powerful in structuring the discourse, especially if they were made into movies.

Fictional referents that strongly structure discourse include *The Handmaid's Tale*, *Nineteen Eighty-Four*, *Jurassic Park*, *The Hunger Games*, *The Matrix*, *Lolita*, and *Jaws*. Julian Bleeker complains the film *Minority Report* makes it hard to do his job as a

designer because clients want design interfaces that look like in the movie.[97] The associated narrative can be so powerful, it is difficult to discuss the matter at hand in news articles or academic papers once the narrative archetype has been invoked.

CHOOSE YOUR INFLUENCES OR THEY CHOOSE YOU

"Choose your influences or they choose you," David Hartwell and I used to say to our students when we taught science fiction writing. If you get your science fiction exclusively through film and television, your view of the field is filtered by studio executives and movie distribution companies. While print science fiction is largely filtered by editors who act as gate-keepers, this gatekeeping is less intensive than that of the cultural products of Hollywood, in part because the publishing of fiction is much less capital-intensive than the making of movies.

It is a truism that science fiction's shiny futures gave us space travel and computer and robotics. As an anthologist who curated the good parts of science fiction, I know what we filtered out: professor's daughters included as the dumb character to whom the protagonist must expound; the idea alcoholism is hilarious; gratuitous violence towards children, women, and animals; stories with dreadfully written first paragraphs; bad anatomical descriptions, especially of the female body (and nipples in particular); men

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[97] Bleeker, Julian. "In A Design Fiction Evening, with Julian Bleeker, James Bridle, Nick Foster, Cliff Kuang and Scott Paterson." Wednesday, January 22, 2014 at IDEO. https://vimeo.com/84826827

killing Things with Big Machines; lots of stupid ideas; crackpot monetary theories; and of course unpalatable helpings of racism, militarism, and intellectual and nationalist arrogance. Stories such as these are described as "not aging well" when older. (The usual slush-pile tropes, such as "they turn out to be Adam and Eve" and "it was all a dream" and cringeworthy autobiography have mostly already been filtered from stories from which I have selected.)

An awareness of literary history helps us understand how writers of color such as Steve Barnes or Samuel R. Delany or Octavia Butler have navigated the cultural minefield that is genre history. It is worth knowing what they were up against and what existing genre frameworks they used. History can give a greater understanding of what the science fiction tool was *for*—whether it be defeating the Russians, avenging the German people on the French over the Treaty of Versailles,[98] or convincing readers of the need for eugenics. As Delany once said to me, "Bad ideas usually have a long history." I have been a guardian and defender of the science fiction field, but I find an ahistorical and unexamined appropriation of science fiction techniques for foresight rather terrifying. Bad ideas, unattended, reanimate themselves when you reuse the tools

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[98] Revanchist science fiction is its own subgenre of German science fiction. See, for example: Sontag, Franz. *Nie Wieder Krieg?! Ein Blick in Deutschlands Zukunft* von Junius Alter [pseudonym]. Leipzig: Verlag von K. F. Koehler, 1931. The title translates as "Never Again War?! A Peek at Germany's Future." See description in Lloyd Currey's catalog. https://www.lwcurrey.com/pages/books/133673/franz-sontag-junius-alter/nie-wieder-krieg-ein-blick-in-deutschlands-zukunft-von-junius-alter-pseudonym

used to create them. Unlike medical instruments, we have no good techniques for disinfecting literary tropes. Know the history of your tools.

DESIGN FICTION & RELATED TECHNIQUES

There is no adequate disciplinary scaffolding in Design Fiction, nor any of the related techniques such as Anthony Dunn and Fiona Raby's concept of Speculative Design, Brian David Johnson's concept of Science Fiction Prototyping[99], David Kirby' concept of Diegetic Prototypes,[100,101] or Stuart Candy's concept of Experiential Futures,[102, 103].What they have in common is they use the *let's pretend* aspect of science fiction. Speculative Design may be grounded in design disciples in ways that are invisible to me as a science fiction editor.

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[99] Johnson, Brian David, & Frenkel, James. *Science Fiction Prototyping: Designing the Future with Science Fiction*. San Rafael, CA: Morgan & Claypool, 2011.

[100] Kirby, D. "The Future Is Now: Diegetic Prototypes and the Role of Popular Films in Generating Real-World Technological Development." Social Studies of Science - SOC STUD SCI. 40. 41-70. 2010. 10.1177/0306312709338325.

[101] Sterling, Bruce. "Design Fiction: Diegetic prototypes." Wired, February 5, 2011. Retrieved November 2, 2018, from https://www.wired.com/2011/02/design-fiction-diegetic-prototypes/

[102] Candy, Stuart. *The Futures of Everyday Life: Politics and the Design of Experiential Scenarios, 2010*. 10.13140/RG.2.1.1840.0248.

[103] Candy, Stuart, & Watson, J. SituationLab, 2018. Retrieved October 19, 2018, from https://situationlab.org/

These practices needed to be scaffolded with disciplinary practices rooted somewhere else. In *Anxiety of Interdisciplinarity*, Hal Foster notes this is a common issue with interdisciplinary work.[104]

Foresight practitioners tend to reference science fiction without actually *using* its more refined techniques. In general, the problem with introducing the tactics for mass-producing fiction for the purpose of design exploration, as Brian David Johnson does, is that the wheels of fiction are greased through the use of cognitive bias, and so to use these for design is to introduce massive cognitive bias. Many strategies for writing fiction make use of cognitive bias. The easier it is to write, the more likely cognitive bias is involved.

I surveyed the bibliographies of design and foresight resources that claim inspiration from science fiction. What I found was not encouraging. Only a very small number of writers are claimed as inspiration, and the same writers come up over and over. Most of the writers referenced are older than me, and I am 58. They also tend to be the same small set of writers who get academic articles written about them.

Often, it is movies based on their works rather than the books or stories themselves that are the inspiration, and what is actually *referenced* is the uncredited creation of the designer of sets and props; we don't even know whose work was the actual inspiration.

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[104] Foster, Hal. *The Anxiety of Interdisciplinarity*. London: Black Dog Publishing, 1998.

Indulgence in science-fictional techniques as though they were themselves methodologies is rife with moral hazard. Science fiction writer Bruce Sterling popularized the concept of Design Fiction. In 2011, he characterized it like this:

> Design Fiction as she-actually-exists, as exemplified in Dunne + Raby "critical design" or the weirder tech musings in NEXT NATURE, isn't about world improvement. They are media interventions meant to delicately poise the viewer on the verge of future shock and moral freakout. But they're plenty "diegetic" in the sense that they imply new worlds that surround and support them, so the term still stands.[105]

From my perspective as someone who edited Year's Best volumes for a decade, the best examples of science-fiction-aware design fiction tend to have been written by Sterling, or by science fiction writers who are also OCAD Strategic Foresight and Innovation graduates: Madeline Ashby and Karl Schroeder.[106] There are design fiction things which are not stories. I tend to like the short stories best.

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[105] Sterling, Bruce. "Diegetic Prototypes." Wired, February 5, 2011. https://www.wired.com/2011/02/design-fiction-diegetic-prototypes/

[106] See, for example: Sterling, Bruce. "Sgt. Augmento." Motherboard, 2016. Retrieved from https://motherboard.vice.com/en_us/article/pgkmqz/sgt-augmento October 18, 2018.

MORAL HAZARD

To some extent, Design Fiction and related technique allows both creators and audiences to think through the implications of an idea in more detail. But to the extent they borrow from science fiction, they borrow only part of the intellectual technology but *all* of the moral hazard. As Stuart Candy remarks in a recent tweet:

> Playing 'real or not?' is an ethically fraught storytelling strategy in a 'fake news'-saturated mediasphere.[107]

Mimicry of the real is not always helpful. Misplaced realism can erode the distinction between what is real and what is not in ways that impair our collective ability to sensibly predict consequences.

My confrontation with the moral hazard of engaging in foresight-oriented science fiction projects was watching Peter Thiel's speech at the 2016 Republican National Convention in which he pitched the themes of Project Hieroglyph—a viewpoint he shares with Neal Stephenson[108]—to the rising tide of American gangster capitalism.

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[107] Candy, Stuart. Twitter post, August 14, 2020. https://twitter.com/futuryst/status/1294349136758812672

[108] Postrel, Virginia. "Peter Thiel Is Wrong About the Future: If nobody dreams big anymore, how come three— three! — billionaires are running their own space programs?" Bloomberg, October 8, 2014. https://www.bloomberg.com/opinion/articles/2014-10-08/peter-thiel-is-wrong-about-the-future

> When Donald Trump asks us to Make America Great Again, he's not suggesting a return to the
>
> past. He's running to lead us back to that bright future. Tonight, I urge all of my fellow Americans
>
> to stand up and vote for Donald Trump.[109]

I was shocked, horrified, mortified; this moment of horror made me rethink my ideas

about the moral hazards of futures-oriented science fiction.

The Moral Hazards of Audience

As Felix Salmon notes in a 2018 article in Wired, design provocation practices such

as Speculative Design can take on a very different meaning when the audience for them

is a powerful corporation and the provocation is not public, but rather is fenced in

behind an NDA.[110] This adds an additional layer of moral hazard. Regarding Salmon's

article about Google's use of Speculative Design, designer Cennydd Bowles remarks:

> … the episode should serve as a reminder that speculative design, *provocatypes*, and design
>
> fictions must be surrounded by proper ethical discussion and appropriately labelled as fiction, to
>
> avoid being confused for genuine plans in the event of a leak. Design fictions are not good

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[109] Thiel, Peter. Speech at the 2016 Republican National Convention, July 21, 2016.
https://time.com/4417679/republican-convention-peter-thiel-transcript/

[110] Salmon, Felix. "The Creepy Rise of Real Companies Spawning Fictional Design: Speculative design tasks
creators with building a better world through public thought experiments. But with companies like Google
adapting the practice, it can feel like a taunting display of power." Wired, May 13, 2018. Retrieved on August
13, 2020, from https://www.wired.com/story/the-creepy-rise-of-real-companies-spawning-fictional-design/.

artefacts to let loose unsupervised: the resulting conversation, not the artefact, is the point of the exercise.[111]

When audiences are governments, the moral hazard is even more intense, as will be discussed in the section, "On Science Fiction and 'Political Technologists.'"

MORAL HAZARD & BILLIONAIRES' PROVOCATYPES

In late August 2020, Elon Musk demonstrated a "Neuralink" implanted in pigs.

> Musk presented what he described as the "three little pigs demo." Gertrude, the pig with a Neuralink implant in the part of its brain that controls the snout, required some coaxing by Musk to appear on camera, but eventually began eating off of a stool and sniffing straw, triggering spikes on a graph tracking the animal's neural activity. … Musk said the company had three pigs with two implants each, and also revealed a pig that previously had an implant. They were "healthy, happy and indistinguishable from a normal pig," Musk said. Musk said the company predicted a pig's limb movement during a treadmill run at "high accuracy" using implant data.[112]

That this animal trial, or diegetic prototype, is ultimately intended for human use is not reassuring. Is Musk trolling the world with what he can do with his wealth, or is this serious medical research?

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[111] Bowles, Cennydd. *Future Ethics*. Hove, East Sussex, UK: NowNext Press, p. 108.

[112] Arevalo, Evelyn. "Elon Musk's Neuralink puts computer chips in animal brains." CBC, August 28, 2020. https://www.cbc.ca/news/technology/neuralink-musk-1.5706009

Cameron Tonkinwise, of the University of Toronto's Design Innovation Research Centre, remarked on Twitter:

> Musk's implant clown act means that Speculative Critical Design is no longer possible (if it still was in the era of fake news), that its posture of criticality has been exposed by Musk's unstoppably dangerous idiocy as a complete charade.[113]

Stuart Candy replied:

> Yes, it's a commonplace that recent politics has rendered satire & irony ineffective.
>
> Tech culture, same boat. The gleeful grotesque black mirror dystopian aesthetic is exhausted. Hasn't worked to warn or avert.
>
> Yet other uses of design/futures remain vital.[114] … Put another way, let's not throw out the baby with the NurturePod.[115]

Musk's brain implant project begs the question of whether Musk's initiatives for Mars exploration are likewise an imagemaking provocation—not unlike Vladislav Surkov's dalliances as a novelist—made possible by impossibly vast wealth.

US Patent number 3,803,463: Thomas A. Swift's Electric Rifle

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[113] Cameron Tonkinwise, @camerontw. Twitter, August 31, 2020.
https://twitter.com/camerontw/status/1300188809292738561

[114] Candy, Stuart. @futuryst. August, 31, 2020. https://twitter.com/futuryst/status/1300460322445242369

[115] Candy, Stuart. @futuryst. August, 31, 2020. https://twitter.com/futuryst/status/1300460992112066561

The most obvious patent to be aware of when contemplating the overlap between

fiction and design is US Patent number 3,803,463, John H. Cover's 1972 patent for the

Taser, inspired by a concept from a Tom Swift pulp novel.[116, 117] It illustrates the moral

hazard of the linkage between fiction and innovation: In *Tom Swift and His Electric*

Rifle, or Daring Adventures in Elephantland (1911), Tom Swift encounters elephants

and natives and dispatches them with his electric rifle that shoots bolts of electricity.[118]

Cover's patent on the taser came during the backlash against the Civil Rights

movement.

NEWT GINGRICH'S "HEALTH CHAIR"

In 1995, Joan Didion describes politician Newt Gingrich becoming a science fiction

author and his use of science fiction tropes to escape political responsibility, for

example proposing an imaginary "health chair" as a substitute for health care.[119]

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[116] Cover, John H. US Patent 3,803,463: "Weapon for Immobilization and Capture," 1972. Retrieved October 18, 2018, from https://patents.google.com/patent/US3803463.

[117] Stableford, Brian. *Science Fact and Science Fiction: An Encyclopedia*. New York, New York: Routledge, 2006. Need page number.

[118] Appleton, Victor. *Tom Swift and His Electric Rifle*. New York: Grosset & Dunlap. Note that "Victor Appleton" was a house pseudonym of the book packager, the Stratemeyer Syndicate, 1911.

[119] Didion, Joan. *Political fictions*. New York: Vintage International, 2002, Chapter: "Newt Gingrich, Superstar"; originally published as "The Teachings of Speaker Gingrich" in The New York Review of Books, August 10, 1995. Retrieved from https://www.nybooks.com/articles/1995/08/10/the-teachings-of-speaker-gingrich/ on October 18, 2018.

Science fiction provides scientists with the opportunity to throw around ideas in ways not possible within the context of their professions. Gingrich did it sort of like this: spinning out technocratic technological ideas, essentially using science fiction to present himself as what is now referred to as a "thought leader;" and also by writing alternate history, framing himself as a Student of History. This is similar to Russian "political technologist" Vladislav Surkov using his literary pseudonymous career to position himself. (More on this later.) Gingrich wanted to be seen as a visionary.

Gingrich was a controversial keynote speaker at the Nebula Awards in 1991. Many writers in attendance staged a walkout.[120, 121] I do not know exactly what he said, but the idea of Gingrich at the Nebulas reminds me a bit of the scene in Vonnegut's *God Bless You, Mr. Rosewater* in which Elliot Rosewater bursts in on the writer's workshop. Except Vonnegut's character Elliott Rosewater was a harmless nut, whereas Gingrich is not and was not harmless.

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[120] I did not attend the speech itself, but did attend that Nebula Awards weekend and sat in the hotel bar with the group of writers who had walked out as soon as Gingrich stood up to speak.

[121] Science Fiction Writers of America, Nebula Awards, 1991. https://nebulas.sfwa.org/award-year/1991/

SPECULATIVE TERMINOLOGY

Anthony Dunne and Fiona Raby's term Speculative Design arises from the term Speculative Fiction, popularized by science fiction writer and editor Judith Merril as an alternative to the term Science Fiction.

> Like Margaret Atwood's preference for the term speculative literature over science fiction, we prefer the term speculative design over design fiction. Although strictly speaking, we produce fictional designs, they have a broader purpose than the design fiction game allows. Another difference which separates design fictions from the kind of fictional design we are interested in is that they are rarely critical of technological progress and border on celebration rather than questioning.[122]

Speculative fiction de-centers science and engineering in favor of an emphasis on speculation and provocation. Speculative Fiction is anti-militarist, critical, feminist, progressive, values the social sciences, and stands in opposition to Hard Science Fiction.

Margaret Atwood got the term from Judith Merril who moved to Canada in 1968 in large part because of her opposition to the Vietnam War.[123] Reframing science fiction as speculative fiction has its roots in a political split between groups of science fiction

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[122] Anthony Dunne; and Raby, Fiona. *Speculative Everything: Design, Fiction, and Social Dreaming*. Cambridge, MA: MIT Press, 2014, p.2 .

[123] Merril, Judith, & Pohl-Weary, Emily. *Better to Have Loved: The Life of Judith Merril*. Toronto: Between the Lines, 2002.

writers in 1968 over the Vietnam war, that manifested itself in two full page ads, both of which were run in Galaxy on opposite pages. The opponents to the US presence in Vietnam tended to go later with the Speculative Fiction label.

Figure 12: Slide from Clark-Cramer presentation 2018; 1968: Origins of Science Fiction Speculative Fiction Split. Background shows the competing political ads in Galaxy

Dunne and Raby characterize Speculative Design as a tactic of Critical Design. Critical Design emphasizes problem-finding, design as a medium, social fiction, provocation, fictional functioning, citizens, ethics, and rhetoric.

> Critique is not necessarily negative; it can also be a gentle refusal, a turning away from what exists, a longing, wishful thinking, a desire, and even a dream. Critical designs are testimonials to what could be, but at the same time, they offer alternatives that highlight weaknesses within

existing normality … good design is critical. Designers start by identifying shortcomings in the thing they are designing and offer a better version. Critical design applies this to larger more complex issues. Critical design is critical thought translated into materiality. It is about thinking through design rather than through words and using the language and structure of design.[124]

Critical and Speculative Design tend to translate a verbal concept into materiality, which needs to be translated back into verbally articulated concepts to be fully understood. The primary rhetorical trope that tends to be deployed is hyperbole.[125] This is in part because this is a tactic of advertising:

> Verbal hyperbole … is a rhetorical figure that consists in exaggerating the description of reality through expression that amplifies its scope … In visual hyperbole an image presents an exaggerated aspect of reality … in a qualitative or quantitative way. … Hyperbole is widely used in advertising because its purpose is always to magnify the product.[126]

To some extent this hyperbole also derives from science fiction, which commonly asks, as part of its narrative strategy, "If this goes on …?"[127]

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[124] Anthony Dunne; and Raby, Fiona. *Speculative Everything: Design, Fiction, and Social Dreaming*. Cambridge, MA: MIT Press, 2014, pp. 34-35.

[125] I am indebted to Sebastian Campos-Möller for this insight.

[126] Mariani, Massimo. *What Images Really Tell Us: Visual Rhetoric in Art, Graphic Design, and Advertisement.* Barcelona: Hoaki, 2019, pp.48-49.

[127] Heinlein, Robert A. "If This Goes On—." Astounding Science Fiction, February 1940.

Critical Design's hyperbole instead extracts design from the relentless logic of capitalism and the marketplace, situating it instead in storytelling.[128] Matt Malpass, in *Critical Design in Context*, also notes that critical and speculative design make use of allegory.[129] In this way, they are more like folktales than like the short story.

In summary, although I tend to trust Bruce Sterling's judgement, these various techniques don't make much use of science fictions' own thinking strategies for exploration of futurity while at the same time they unreflectively inherit the moral hazards of science fiction.

SCIENCE FICTION'S WORKSHOP CULTURE

One of the things you will get from a good science fiction workshop is discussion of issues like these.

Science fiction writing has a strong workshop culture. In the science fiction field, we mean something different by the word "workshop" than is meant in design. In design, a workshop can be an hour. A writers' workshop is a larger commitment. Clarion West, which I attended in 1984, goes on for six weeks, full time. Most of the significant science fiction workshops have their origins in the Milford Writers' Workshop named

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[128] Malpass, Matt. *Critical Design in Context*. London: Bloomsbury Publishing.

[129] Ibid, p. 116.

for Milford, Pennsylvania where it was held, founded by Damon Knight, James Blish, and Judith Merril. Judith Merril brought that workshop culture with her when she immigrated to Toronto and it is part of the basis of Canadian science fiction.[130]

The Milford Workshop makes a cameo appearance in Kurt Vonnegut's novel *God Bless You, Mr. Rosewater*. In it, the possibly crazy millionaire Elliot Rosewater bursts into the workshop and gives a speech: "None of you can write for sour apples… but you're the only people trying to come to terms with the really terrific things which are happening today."[131] Vonnegut had been a science fiction writer earlier in his career and had attended.[132] [133]

These workshops, and the writing concepts that have evolved in them, are in large part the way science fiction writers learn to write. Some of this craft knowledge is codified in "The Turkey City Lexicon," named for the workshop in Austin, curated by Lewis Shiner and Bruce Sterling.[134]

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[130] Merril, J. and Pohl-Weary, E. *Better to Have Loved: The Life of Judith Merril*. Toronto: Between the Lines, 2002.

[131] Vonnegut, Kurt. *God Bless You, Mr. Rosewater*. New York: Holt, Rinehart and Winston, 1965.

[132] Vonnegut, Kurt. *The Sirens of Titan*. New York: Delacorte, 1959.

[133] "Science fiction's roots in Milford flower at festival." Times Herald-Record, September 21, 2018. https://www.recordonline.com/news/20180921/science-fictions-roots-in-milford-flower-at-festival

[134] "Turkey City Lexicon: A Primer for SF Workshops." Edited by Lewis Shiner. 2nd edition, ed. Bruce Sterling. https://www.sfwa.org/2009/06/18/turkey-city-lexicon-a-primer-for-sf-workshops/

The general procedure of these workshops is this: manuscripts of work to be considered are distributed to all workshop participants who then mark up the manuscripts in advance. Usually two or three manuscripts are workshopped in a session. The workshopping itself involves everyone seated in a circle. Each participant speaks for two to three minutes with their critiques. The author speaks last and is otherwise not allowed to talk except to answer questions. Then, after the circuit is complete, the author gets all the marked manuscripts to help with revision. To be a member of the workshop, you must regularly submit yourself to the process, which is to say you must turn in work. Some administration is necessary for scheduling and the distribution of manuscripts.

When Judith Merril founded a workshop in Toronto, with writers including Karl Schroeder and David Nickle, the group met weekly. Karl Schroeder described how Merril launched the workshop: Merril attended only the first session, to explain the practices and told them to learn to write from each other.

Clarion—founded in 1968 by Robin Scott Wilson and run for many years by Damon Knight and Kate Wilhelm—Clarion West (held in Seattle in 1971, and then from 1984 onwards), and Clarion South (that ran from 2004 to 2009) use similar procedures. The Clarions last for six weeks with one major writer, as mentor, leading the group for a week at a time. This allows for mentoring on the one hand, but on the other hand for the primary learning to be what the students learn from each other. In the Clarion model,

the workshop meets daily, two sessions a day, usually covering six manuscripts in a day, for six weeks. Alumni of the Clarion workshop include: Cory Doctorow, Octavia Butler, Ted Chiang, Nnedi Okorafor, Kim Stanley Robinson, Bruce Sterling, and Jeff VanderMeer.

I don't know how often Turkey City met. Ongoing long-term writers' workshops tend to meet somewhere between weekly and monthly. The critical mass of the workshop starts at about five participants and at more than about 18, it becomes procedurally difficult. The workshops meet with this intensity so that everyone gets the feedback they need.

The tone of the commentary varies widely and this is a way in which workshop subcultures differ. Critiques can become cruelly performative or counterproductively supportive. An important element of the group dynamic is managing the nature of the critiques to deliver the most value to the writer in ways that lead to successful publication of high-quality fiction. Workshops of publishing writers develop reputations, and writers are partly known based on the workshop company they keep.

VOLKSMÄRCHEN OR KUNSTMÄRCHEN?

In the study of German literature, there is a 19th-century distinction made between *Volksmärchen* (folktales) and *Kunstmärchen* (art tales). This distinction arose to distinguish widely told folktales with many variants from the artistic product version of

these published by literary figures. Volksmärchen are told to and by the people and do not have specific authors. Kunstmärchen have authorship, exist in published format, may have more complex and conflicted characters, and develop the characteristics that publishing markets require of them.

Jack Zipes argues there is a politics at work here as well:

> In discussing the connection between the Volksmärchen and the Kunstmärchen, it is vital that a further distinction be made between the bourgeois writers such as the romantics who "revolutionized" the folk tale at the end of the eighteenth century by endowing it with new forms and meanings in keeping with social and political changes, and the larger bourgeois audience which tended to negate the Utopian potential in the folk tales that was grounded in the common people's drive to realize their goals in conflict with their oppressor.[135]

While science fiction stories are clearly not folktales, as they have authors, publishing histories, and commercial audiences, because of the way motifs propagate through the genre, science fiction does inhabit a liminal zone between the two. It has what Pete Seeger called "the folk process."[136]

Foresight scenarios tend to lack an authorial presence, a set way in which the words of the story need to be ordered, and tend also to lack complex characters and a

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[135] Zipes, Jack. *Breaking the Magic Spell: Radical Theories of Folk and Fairy Tales* [1979]. Lexington, Kentucky: University of Kentucky Press, 2002.

[136] Barnes, Bart. "Pete Seeger, legendary folk singer, dies at 94." New York Times, January 28, 2014.

publishing history. Because they often go unpublished, they are ephemeral in a way that prose science fiction is not. In this way, they are more like Volksmärchen than Kunstmärchen.

With one big caveat. Directly or indirectly, foresight scenarios do have an audience, which is the client who pays for the work. Although there is a folk process involved, as evident in for example the "archetypes" of the future described by Jim Dator, the needs and interests of corporate and governmental clients will strongly contour the nature of the "future" described. Science fiction stories serve diffuse audiences of readers. The audience for foresight scenarios is much more focused and so more determining of the nature of the content. Foresight scenarios are potentially fairy tales for the industrial imagination.

Utopian longings, a term coined by German philosopher Ernst Bloch, are a feature of the folktale, that both science fiction and foresight scenarios intensify. (In German art and literature, Icarus is a symbol of the failed East German socialist republic;[137] this symbolism is an example of utopian longing.)

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[137] Spröer, Susanne. "How a 1976 Concert Shook the Berlin Wall: East German musician Wolf Biermann took the stage in West Germany in November 1976 with a performance that unleashed a chain reaction of criticism from both the communist state and its citizens." The Wire. November 5, 2019. A song Bierman performed was "Ballade vom preußischen Ikarus." https://thewire.in/the-arts/how-a-1976-concert-shook-the-berlin-wall The 1976 performance of the song in question is on YouTube at https://youtu.be/lFoXuxdSGJQ.

Foresight scenarios depicting what are called "preferred futures" are the distilled essence of utopian longing.[138] Tools exist for the study of the folktale and such tools should be used to better understand foresight scenarios. More on this later. Also, were we to invent *Foresightsmärchen*, which is to say foresight scenarios written consciously in this folk tradition, what would they look like? The two properties we would seek from Foresightsmärchen would be:

1. **Sagacity**, "The quality of being sagacious; quickness or acuteness of sense perceptions; keenness of discernment or penetration with soundness of judgment; shrewdness;"[139] and

2. **Utopian longing for change**. This is the property Jack Zipes most values in folktales: the seeds of change in story.

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[138] Zipes, Jack. "Ernst Bloch's Enlightened View of the Fairy Tale and Utopian Longing." In: *Ernst Bloch: The Pugnacious Philosopher of Hope* by Jack Zipes. New York: Palgrave Macmillan, 2019. https://doi.org/10.1007/978-3-030-21174-5_6

[139] Definition from an online version of the 1913 edition of Webster's Dictionary. http://www.websters1913.com/words/Sagacity

WRITTEN SCIENCE FICTION &
COLLABORATIVE IDEATION

Science fiction is a social field which results in an ongoing process of collective ideation, generating its motifs. While individual works of course have individual authorship, the literature as a whole is the product of intensive and relatively egalitarian interactions among writers and readers over the course of time. While the science fiction communities have their hierarchies, for the most part, the split between consumers and producers is much less intense than in most areas of the culture industry. Written science fiction has had a durable fan base for many decades which allows writers and their readers to mingle and discuss. Science fiction writers socialize a lot with each other. The genre is a conversation between writers and their works. Motifs such as space travel and time travel are worked out over many years through disparate writers' works as part of this genre conversation.

Even outside the tight-knit science fiction community, the collective ideation of a group of writers should be viewed through a sociological lens,[140] not as a matter of individual creative people coming up with concepts independently. However, when designers say their work is influenced by science fiction, they usually have been

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[140] Coser, L. A., Kadushin, C., & Powell, W. W. *Books: The Culture and Commerce of Publishing*. Chicago: The University of Chicago Press. Chapter 9: "Authors: A worm's eye view," 1985.

influenced by futuristic images from movies. Most of what I just described does not figure into it.

AUDIENCES FOR SCIENCE FICTION, FORESIGHT, & DESIGN

The designers' style of future studies or foresight work also has different audiences than prose science fiction. Their clients may be corporations or governments wanting to gain an edge by thinking more clearly about the future; or they may be organizations or community groups. The designers' target may be consumer goods or fashion. Or, foresight may be a core feature of an innovation process. Some types of forecasting are highly quantitative, though we have mostly not touched on that in OCAD's coursework.

In foresight practice, the written version tends to be presented in the form of a scenario and may be shown the client. In commercial fiction, a scenario tends to be understood as underlying concepts and assumptions that inform the written work.

WORLDBUILDING & WHETHER TO SHOW YOUR WORK

While professional science fiction writers may well have detailed research and elaborate ways to come up with the scenarios underlying their stories, the prose narrative is usually expected to stand on its own without the need to show one's work. For knowledge-based genres such as science fiction, fantasy, mystery and detective

fiction, and historical fiction, there is an expectation the author has done a lot of research, and that this authorial knowledge underlies the text. In the manner of a stage magician, authors tend not to reveal where truth ends and illusion begins, and this liminality is one of the pleasures of these genres.

Some authors would prefer to break this illusion and expose the underlying research. In 1993, in the early days of hypertext, Vernon Vinge arranged for an electronic book version of his novel *A Fire Upon the Deep*[141], that included 70,000 words of notes linked to the text in hypertext format.[142] As major publishers got into the act of publishing electronic books, this kind of innovation in the form and content of the Novel was strongly discouraged.

In contrast, foresight researchers are under more pressure to show their work and to establish some objective validity for the methods used to arrive at their scenarios. This leads to some confusion around the word "worldbuilding."[143] In science fiction, it refers to the underlying work that lays the ground for the resulting narrative to play out.

Leah Zaidi seems to use it more expansively to mean something like all the details used to realize the world of the story, and seems unaware they are using the term

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[141] Vinge, Vernor. *A Fire Upon the Deep*. New York: Tor Books.

[142] Templeton, Brad. "The Hypertext annotated version of "A Fire Upon the Deep"." From rec.arts.sf.written, June 23, 1993.

[143] There seems to be a semantic cross-over to the worldbuilding concept of fantasy role-playing games.

differently.[144] In prose science fiction, worldbuilding is mostly a feature of novel-writing rather than short-story writing because there isn't enough space in short stories to accommodate the information it generates. In the context of worldbuilding, Zaidi also writes of a "superstructure of culture," in science fiction writing. Zaidi references science fiction writers William Gibson, Samuel R. Delany, and Annalee Newitz. This concept, involving science fiction reading protocols, comes from Delany's various essays on science fiction collected in several books published by Dragon Press, especially *The Jewel-Hinged Jaw: Revised Edition: Notes on the Language of Science Fiction* (1977).[145]

The specifics of what Zaidi describes are a combination of the reading protocols Delany described, the cumulative library of motifs science fiction has accumulated over time, and the informal co-design process in which readers who participate in science fiction fandom have been involved in the transformations of those reading protocols and motifs over time. Zaidi argues for a broader dissemination of sciences fiction's cultural superstructure "for the collective good."

For good or ill, this has already happened. That such a diffusion has already happened was the main argument of David Hartwell's 1997 anthology *The Science*

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[144] Zaidi, Leah. "Worldbuilding in Science Fiction, Foresight, & Design [2019]." in Stuart Candy & Cher Potter's *Design and Futures*, Taipei: Tamking University Press, 2019.

[145] Delany, Samuel R. *The Jewel-Hinged Jaw: Notes on the Language of Science Fiction*. Pleasantville, New York: Dragon Press, 1977.

Fiction Century, the century in question being the 20th.[146] The difference in reading protocols Delany wrote about were markers of a genre divide and code for science fiction's own tribalisms, markers of what differentiates those with cosmic minds from those disdainfully referred to as "mundanes."[147] [148]

CHARACTERS & COMPOSITION

A key difference between science fiction writing and foresight scenarios is the role that character plays in the creation. Many writers subscribe to the belief that "all literature is character-driven": the fictional impulse arises from characters in settings and situations; fiction explores the nature of character with character as the spark. Inasmuch as writers perceive an alternative to "character-driven" fiction is that fiction might instead be "plot-driven." Neither character nor plot loom large in creating foresight scenarios.

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[146] Hartwell, David G. *The Science Fiction Century*. New York: The Book-of-the-Month Club, 1997.

[147] Hartwell, David G. *Age of Wonders: Exploring the World of Science Fiction*. New York: Tom Doherty Associates, 2017. First edition 1984. Revised 1996.

[148] The positions and arguments in Hartwell's books are closely associated with those in Delany's critical works. Hartwell's Dragon Press published the several volumes of Delany's criticism. And Hartwell, Delany, and I met weekly for many years, first to work on a poetry magazine called *The Little Magazine*, and later to work on *The New York Review of Science Fiction*.

Many writers are auditory in the composition methods and describe themselves as hearing what they write.[149] This character-driven process of writing fiction is very different from the way personas are used in the generation of scenarios. In her essay, "Designing Futures from the Inside," Anne Burdick discusses, from a design perspective, how these science fiction techniques might translate to a design process.[150]

There is a striking pair of sentences, from a very different context, in Ioan Couliano's *Eros and Magic in the Renaissance* that has some resonance here:

> In [Giordano] Bruno's poem it is not the narrative that matters but the characters. Now, these characters are statues of the artificial memory.[151]

Although superficially futuristic, science fiction partakes of older ways of reading. Even when a story's characterization may seem thin and not the point of the story, the iconography of those characters may be key to the meaning and the symbolic algebra of the visionary future they populate. Examples include the Slans of A. E. Van Vogt's

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[149] I am that kind of writer: I can hear a voice when I write. I hope you can hear it when you read.

[150] Burdick, Anne. "Designing Futures from the Inside." In *Design and Futures*, Candy & Potter, eds., 2019.

[151] Couliano, Ioan P. Eros and Magic in the Renaissance. Trans by Margaret Cook. Chicago: University of Chicago Press, 1987, p. 74.

novel *Slan*[152] and the People of Zenna Henderson's *The People* series.[153] This aspect of science fiction character is part of basis of cosplay.

THE WRITER'S VOICE

Taken together, the techniques of the fiction writer can be quite elaborate and take years of work and much practice to master. Further, techniques vary from writer to writer. This is a feature of the marketing of fiction: each writer is expected to have a unique voice to attract an audience of loyal readers. If you lack that, you probably don't have a career.

With respect to voice in design, Anthony Dunne and Fiona Raby argue that props and design speculations can also have a *voice* representative of character or the designer's own voice:

> We believe this is true for design props as well, that props can have multiple voices or languages, or more accurately, perspectives they can be designed from. The most interesting voice, or perspective to design from, for us, and probably most neglected, is the designer's own language.[154]

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[152] Van Vogt, A. E. *Slan*. Arkham House, 1946.

[153] Henderson, Zenna. The People series, started 1961.

[154] Anthony Dunne; Fiona Raby. *Speculative Everything: Design, Fiction, and Social Dreaming*. Cambridge, MA: MIT Press, 2014.

Science fiction stories tend to come with an aesthetic and these aesthetics have narrative consequences. An astronaut blasting into space is likely to meet a different fate in a J.G. Ballard story than in an Arthur C. Clarke story: both may die, but their deaths will have a very different valence. Ascribing a literary aesthetic to a scenario or to characters within a scenario is a flexible way to explore frameworks that might otherwise be too cumbersome to impose upon a scenario narrative. This may seem like an abstract point, but this choice of aesthetics has direct applications to decolonizing foresight. Designers Pedro J. S. Vieira de Oliveira and Luiza Prado de O. Martins ague that Latina American futurity has a cyclical relationship to time:

> The past becomes the present when the very oligarchs who have been in power for centuries in Latin America articulate themselves to seize power through whatever means necessary—a reality as much of the 1960s as it is of the 2000s. [1] History continues to repeat itself when a heavily militarized police intimidates self-organizing movements calling for quality education, public transport, fair distribution of land, or proper water supply. [2] Latin American reality, it seems, is constantly trying to catch up with time, but inevitably falls back to remain "ever more unknown, ever less free, ever more solitary," as Gabriel García Márquez once said. [3] The past repeats itself in the present, for our historicity and the lenses with which we look at reality were already decided for us by those who hold and enforce colonial power. Speculating about disaster in Latin

America is not an exercise of imagination when instability and violence are a part of daily life. Our colonial past is always prefiguring our future—or lack thereof. [155]

Nnedi Okorafor, a science fiction writer from Nigeria, engages with the question, "What if?" but from a different cultural and aesthetic frame of reference than science fiction's golden age touchstone writers.

I can best explain the difference between classic science fiction and Afrofuturism if I use the octopus analogy. Like humans, octopuses are some of the most intelligent creatures on earth. However, octopus intelligence evolved from a different evolutionary line, separate from that of human beings, so the foundation is different. The same can be said about the foundations of various forms of science fiction.

So much of science fiction speculates about technologies, societies, social issues, what's beyond our planet, what's within our planet. Science fiction is one of the greatest and most effective forms of political writing. It's all about the question, "What if?" Still, not all science fiction has the same ancestral bloodline, that line being Western-rooted science fiction, which is mostly white and male. We're talking Isaac Asimov, Jules Verne, H.G. Wells, George Orwell, Robert Heinlein, etc.

So what if a Nigerian-American wrote science fiction? Growing up, I didn't read much science fiction. I couldn't relate to these stories preoccupied with xenophobia, colonization and

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[155] Vieira de Oliveira, Pedro J. S.; and Prado de O. Martins, Luiza. "Decolonizing Ecologies of Time: Towards Speculative and Critical Design Practice in Latin America." Journal of the New Media Caucus 12, 2016

seeing aliens as others. And I saw no reflection of anyone who looked like me in those narratives.[156]

There is a reason why science fiction looks so American and British, and it has to do with literary export markets as a legacy of colonialism. There is a structure to how literary rights are sold: Despite the demise of Empire, the right to distribute books in "the British Commonwealth" persists long after. I will talk more on the effect of the US Culture Industry as an export product later.

SOME IMPRESSIONS OF FORESIGHT METHODOLOGIES

These reflections stem from my experiences in OCAD coursework trying out the techniques foresight researchers use to create foresight scenarios, that I view in contrast with how science fiction is written. In aggregate, while these techniques seem superficially more systematic, they have not seemed necessarily more useful.

ARE FUTURES "PREDICTIVE"?

Since science fiction writers produce a cultural product that has as its purpose to entertain and to be thought provoking, they are under different commercial pressures than those who practice foresight outside science fiction's umbrella. Most science

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[156] Morgan, Adam. "'My Science Fiction Has Different Ancestors' — Nnedi Okorafor at TED." Chicago Review of Books, November 2, 2017. Okorafor is quoted from a TEDGlobal talk in Arusha, Tanzania.

fiction writers will demure when asked if they predict the future. And we don't have to talk about it that much because we write *fiction*.

In contrast, a standard part of the foresight litany is to say there is more than one future, and to frame one's work as not a prediction. Brian David Johnson goes so far as to say, "I am a futurist who refuses to make predictions."[157]

I am a futurist who *does* make predictions. One of my predictions was that things were going to go horribly wrong with the United States during the Trump administration because of the way Trump vandalizes the US government, and, as a consequence, eventually large numbers of people would begin to die. And so, on the basis of that prediction, in January of 2018, I applied to graduate school in Canada. I suspect Johnson *does* make this kind of prediction, but as a matter of client-facing rhetoric denies it.

As Rudy Rucker points out, as the world unfurls its "slow computation," we make faster "mental shortcut computations," to secure "gains"[158]: we catch frogs, have children, make plays in football, invest in stock, buy houses, take shortcuts in traffic. All these things involve prediction. During the pandemic, every decision as to whether

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[157] Johnson, Brian David. "Food & Technology." Speech at Foodworx, 2013. YouTube, https://youtu.be/LTn-dn6RmQ4

[158] Rucker, Rudy. *The Lifebox, the Seashell, and the Soul: What Gnarly Computation Taught Me about Ultimate Reality, the Meaning of Life, and How to be Happy.* Thunder's Mouth Press, 2005, p. 415.

to leave the house involves prediction. Our big human brain's very purpose is prediction.

I wonder, though, who is this hypothetical person who thinks their foresight analyst is telling The Future? I'm not sure I've met this trusting soul. Is this disclaimer necessary? In a literal sense, it is not up to foresight practitioners or designers to sort whether there is one future or many or whether the "future" exists until it happens. No consensus of foresight researchers is able to establish whether or not The Future "exists." That is a matter for physicists.

The resistance of recent foresight practitioners to indulge in what could be labelled "prediction" might be understood as resistance to what Shoshana Zuboff calls the *prediction imperative* that is a feature of surveillance capitalism:

> Surveillance profits awakened intense competition over the revenues that flow from the new markets for future behavior. Even the most sophisticated process of converting behavioral surplus into products that accurately forecast the future is only as good as the raw material available for processing. Surveillance capitalists must therefore ask this: what forms of surplus enable the fabrication of prediction products that most reliably foretell the future? This question marks a critical turning point in the trial-and-error elaborations of surveillance capitalism. It crystalizes a second economic imperative—the *prediction imperative*—and reveals the intense pressure that it exerts on surveillance capitalist revenues.[159]

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[159] Zuboff, Shoshana. *The Age of Surveillance Capitalism: The Fight for a Human Future at the New Frontier of Power*. New York: Public Affairs, 2019, pp. 200-201.

I am unimpressed with Jim Dator's framing of futures studies as not "predictive," that predates most of the intensity of the predictive imperative, and which seems little different from the kind of legalese one gets with the prospectus for financial investments: preparation for excuses in the future when things don't turn out as anticipated.[160] Science fiction writers make similar disclaimers but have better excuses because we are writing fiction and are paid to entertain.

Or is it rather a coded declaration that *we're not Fortune Tellers*? From an imaginative standpoint, we do not have one unitary present, nor one unitary past. Why should anyone expect a unitary future? Science fiction invites its readers to imagine unilateral scenarios such as worlds without men, but these are understood to be *Gedankenexperiments*.

Where the real hazard lies, especially for near-future science fiction, is in hyper-realistic representations that give the impression that the authors are able to reveal more than is actually possible. This is one hesitancy I have about climate fiction. On the one hand I badly want to write climate fiction. On the other hand, it is so easy to write climate fiction badly. Vast complexes of data modelled by experts leads to the dark dystopian scenarios of a rapidly heating planet. Do we know exactly how many feet the

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[160] Dator, Jim "What Futures Studies Is, and Is Not," Future Studies, 1995.

sea level will rise in Manhattan by 2040? [161] No. Yet there are certain details that need to be nailed down by the author to write the story.

This makes creating a definite setting more complicated and incurs moral hazard when we are wrong. Climate fiction novels such as New York 2014 need to exist, but I am not yet seeing a *stable* literary model that can generalize and scale because of the need to get it right in the face of climate denialism, attacks on climate science, and the general prevalence of disinformation.

The past and the present—even though they represent a single reality—have no unified story. The future is not different. We should be promiscuous with our future imaginings. Imagining many possible futures is an excellent compositional strategy and an excellent way to overcome failures of imagination. We shouldn't need an existential discussion of whether the future exists every time out.

We have no direct access to signals from the future and can learn about it only indirectly. But our relationship with the present is contaminated with denialism and the failure to understand our own lives, except maybe in retrospect. And—lacking Truth and Reconciliation for a great many things—our collective relationship with the past is not much better.

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[161] Robinson, Kim Stanley. *New York 2040*. New York: Orbit, 2014.

Dator's Generic Archetypes of the Future

I have an enduring dislike for Jim Dator's four generic futures as described in his essay, "Alternative Futures at the Mānoa School,"[162] these being "continued growth," "collapse," "discipline," and "transformation." They are needlessly confining when one is trying to work out what a future might look like. Unless the future you are looking at is something simple like your family budget, any entity you look at is likely to be in a mixed state.

In 2020, we are currently in a "collapse" scenario. From early March when we had a stock market crash simultaneous with a rising pandemic it was evident we were in a collapse. The simplicity of the generic version contributes little information.

Like Trends and Signals, the archetypes described below are part of the current coding applied to scenarios. Again, what is different is that I propose a durable cataloging. There are several sorts of archetypes that have been discussed in our coursework. One is Jim Dator's generic archetypes of the future: continuation, discipline, collapse, and transformation.[163] Another is system archetypes.[164] These are cataloged variously as: Limits to Growth, Shifting the Burden, Eroding Goals,

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[162] Dator, Jim. Alternative Futures at the Mānoa School, 2009.

[163] Dator, Jim. "Alternative Futures at the Mānoa School." 2009.

[164] Brown, William. "The Systems Archetypes." 2002.

Escalation, Success to the Successful, Tragedy of the Commons, Fixes that Fail, Growth and Underinvestment, Accidental Adversaries, Attractiveness Principle.

Both the Dator archetypes and the systems archetypes are suitable for use for coding scenarios.

ENVIRONMENTAL SCANS

My most serious misgivings about the intellectual health of the future studies has to do with environmental scans[165] in which we find "signals" that could be built into "trends" which in turn are to be combined to create scenarios. Our scans of the future were highly subject to the idiosyncrasies of our media diet, which is to say they are subject to cognitive bias.

The procedures are highly bureaucratic and focused on the filling out of forms to justify our insights. Because most of the "signals" we source are from news stories, the quality of the information we were harvesting was of comparatively low quality.

Because of my experience as a science fiction editor married to a science fiction book editor, I know that working science fiction writers (at least the good ones) have a much higher throughput of information, which is to say they are much more efficient

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[165] Choo, C.W. The Art of Scanning the Environment. Bulletin of the American Society for Information Science. Feb/Mar, 1999, pp. 21-24.

information filter feeders. There was no appreciable improvement in the quality of the conclusions over just writing fiction and using footnotes.

Trends, as we learned to formulate them in the Foresight Studio class were entities with the properties of: Title, Trend Type (from Suzanne Stein's STEEPV[166]), Description, Signals (these tend to be in the form of news stories with URLs), Implications, Extrapolations, and Countertrends.

These are the canonical encodings of scenarios as foresight is practiced now. When we used these methods in class, a few trends were combined to generate scenarios. This coding is straightforward. It can be used for tagging scenarios in a larger tagging system. In addition, when a scenario is based upon specific non-fiction sources or events, these should be cataloged, preferably including bibliographic citations and URLs.

Fiction writers for the most part do not reveal the research that lies below the surface of the text. Film and television likewise mostly do not disclose source materials.

When working with foresight scenarios this information should be captured where possible.

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[166] STEEPV stands for: Social, Technical, Economic, Environmental, Political, Values.

HOW CAUSAL LAYERED ANALYSIS LOOKS TO A SCIENCE FICTION EDITOR

The methodology of Causal Layered Analysis (CLA) that we learn in Strategic Foresight and Innovation inspired a lot of thoughts about how science fiction fits with this, most of them not in support of the claims of the proponents of the methodology.[167] The categorization process is not unlike the tactics we learned in literature graduate school. The argument for the causality, the first word in the name of the method, seems dubious to me. My intuition, upon encountering the CLA methodology, was that it could be used to organize iconic science fiction and fantasy works that represent different futures and built worlds, and that this exercise would tell us something about the CLA methodology. I did this exercise on a whiteboard using Post-It Notes during an Experiential Futures class session taught by Suzanne Stein.

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[167] Inayatullah, Sohail. "Causal Layered Analysis: Poststructuralism as a Method." Futures, Vol. 30, No. 8, pp. 815–829, 1998.

Figure 13: Novel Layered Analysis. Design by Kathryn Cramer based on a composite by Ralph A. Clevenger.

In the Problem/Litany level—the part of the iceberg that is above the waterline, I put C.M. Kornbluth's *The Marching Morons,*[168] about a future were people are stupid, Bruce Sterling's *Heavy Weather,*[169] about increasingly violent weather, and Douglas Trumbull's 1972 movie *Silent Running,*[170] set after a climate apocalypse, as well as two stories from my anthology *Hieroglyph*, Neal Stephenson's "Atmosphæra Incognita," about building a giant tower to help us get to space, and Karl Schroeder's "Degrees of Freedom," which describes a very plausible tool for collective decision-making.

In the "Causes" layer, I put Cory Doctorow's *Little Brother,*[171] Philip K. Dick's *The Man in the High Castle,*[172] Gregory Benford's *Timescape,*[173] George Orwell's *Nineteen Eighty-Four,*[174] Frank Herbert's *Dune,*[175] and Margaret Atwood's *The Handmaid's Tale.*[176]

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[168] Kornbluth, C. M. "The Marching Morons" (1951) in *The Marching Morons and Other Famous Science Fiction Stories*. New York: Ballantine Books, 1959.

[169] Sterling, Bruce. *Heavy Weather*. New York: Bantam Spectra, 1994.

[170] Trumbull, Douglas (Director). *Silent Running.* [Motion Picture]. Universal Pictures, 1972.

[171] Doctorow, Cory. *Little Brother*. New York: Tor Books, 2008.

[172] Dick, Philip K. *The Man in the High Castle*. New York: G.P. Putnam & Sons, 1962.

[173] Benford, Gregory. *Timescape*. New York: Pocket Books, 1980.

[174] Orwell, George. *Nineteen Eighty-Four*. New York: Harcourt Brace & Co., 1949.

[175] Herbert, Frank. *Dune*. New York: Chilton, 1965.

[176] Atwood, Margaret. *The Handmaid's Tale*. Toronto: McClelland & Stewart, 1985.

I have placed these books in the various layers based on my feelings and opinions as an expert reader of the science fiction genre. These placements are subjective. The reader is invited to populate the chart with novels, stories, and films based upon their own experience. The fact that novels can be categorized this way is more interesting that my exact placements of specific books.

There is a fascinating moment in *Nineteen Eighty-Four* that resonates especially with the worldview of the Trump administration and the larger problem of Silicon Valley technologists. (The book is admittedly a target rich environment for such comparisons.)

> "But the whole universe is outside us. Look at the stars! Some of them are a million light-years away. They are out of our reach forever."
>
> "What are the stars?" said O'Brien indifferently. "They are bits of fire a few kilometers away. We could reach them if we wanted to. Or we could blot them out. The earth is the center of the universe. The sun and the stars go round it. … For certain purposes, of course, that is not true. When we navigate the ocean, or when we predict an eclipse, we often find it convenient to assume that the earth goes round the sun and that the stars are millions upon millions of kilometers away. But what of it? Do you suppose it is beyond us to produce a dual system of astronomy? The stars can be near or distant, according as we need them. Do you suppose our mathematicians are unequal to that? Have you forgotten doublethink?"

The idea here that the tools of crooked bookkeeping can change the universe is both startling and unsettlingly familiar from recent history: Corruption attempts to usurp

physical law as causation. The Worldview layer is the easiest to define and populate. In it I placed Joanna Russ's *The Female Man,*[177] Ursula K. Le Guin's *The Word for World Is Forest,*[178] Samuel R. Delany's *Dhalgren,*[179] Philip K. Dick's *Martian Time-Slip,*[180] and William Gibson's *Pattern Recognition.*[181] The "Myths and Metaphors" layer is the realm of *Star Wars*[182] and Tolkien. In this layer, I place Robert A. Heinlein's *Stranger in a Strange Land,*[183] Arthur C. Clarke's *Childhood's End,*[184] J.R.R. Tolkien's *The Hobbit,*[185] Stanley Kubrick's 1968 film *2001: A Space Odyssey*[186] based on Arthur C. Clarke's 1951 story "Sentinel of Eternity,"[187] and Gene Wolfe's *The Shadow of The Torturer.*[188]

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[177] Russ, Joanna. *The Female Man*. New York: Bantam Books, 1975.

[178] Le Guin, Ursula K. *The Word for World Is Forest* [1972]. New York: Berkley Putnam, 1976. (P. 105.)

[179] Delany, Samuel R. *Dhalgren*. New York: Bantam Books, 1975.

[180] Dick, Philip K. *Martian Time-Slip*. New York: Ballantine Books, 1964.

[181] Gibson, William. *Pattern Recognition*. New York: G. P. Putnam's Sons, 2003.

[182] Lucas, George (Director). *Star Wars*. [Motion Picture]. 20th Century Fox, 1977.

[183] Heinlein, Robert A. *Stranger in a Strange Land.* New York: G. P. Putnam's Sons, 1961.

[184] Clarke, Arthur C. *Childhood's End*. New York: Ballantine Books, 1953.

[185] Tolkien, J. R. R. *The Hobbit, Or There and Back Again.* London: George Allen & Unwin 1937.

[186] Kubrick, Stanley (Director). *2001: A Space Odyssey*. Metro-Goldwyn-Mayer, 1968.

[187] Clarke, Arthur C. "The Sentinel." Entered a BBC competition, 1948. First published, 1951, in *Ten Story Fantasy*, New York: Avon Periodicals.

[188] Wolfe, Gene. *Shadow of the Torturer*. New York: Simon & Schuster, 1980.

In his book *Underland*, Robert Macfarlane says of *The Word for World is Forest*:

> I remember Ursula Le Guin's angrily political novel, set on a forest planet in which woodland
>
> beings … are able to transmit messages remotely … signaling through the medium of trees. …
>
> the realm of the mind is integrated into the community of trees, and "the word for world
>
> is forest."[189]

From the standpoint of an anthologist and genre theoretician, what is particularly interesting tis the two middle layers talk to each other a lot and the top and bottom layer talk even more intensely, which is to say if I were to consolidate these four temporary subgenres into just two, they would be (1) Problem/Litany plus Myths & Metaphors, and (2) Causes and Worldviews. Causes & Worldviews would trend a lot more left-wing in its point of view than the other. When I place science fiction works into this schema, the dynamic is nothing like CLA theory would lead one to expect. Looking at this spectrum of works and how they interact, there is no particular expectation that they percolate up or that changing the bottom layer has a causal effect via the vertical access, on the layers above it.

What a "change" to the bottom layer would look like is an iconic blockbuster movie or a best-selling novel that defined an idea or image. In art and literature, cultural

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[189] Macfarlane, Robert. *Underland: A Deep Time Journey*. New York: W.W. Norton, 2019, p. 104.

change enacted by artists, writers, and filmmakers does not fit the CLA model. The mythic and the litany or problem level of the iceberg are closely tied together.

When I first learned the CLA method, I found it rather ominous. It did not seem to be more useful than tools of analysis learned in literature graduate courses for positive social change. But I wondered whether the CLA method had something to do with how Steve Bannon and Cambridge Analytica had gotten US conservative "values voters" to embrace the deep immorality of Donald Trump. I am not convinced that CLA works as described, but if it does, I am even less convinced that it is a tool for good.

Despite my agnosticism, one of the compositional principles of this document is to influence the reader via myth and metaphor. While I express skepticism, to some extent, I use the lessons of the tool.

There is another way to slice the Causal Layered Analysis iceberg, which I did in a separate graphic. The first one, I called "Novel Layered Analysis." The second, I called, "Literary Layered Analysis."
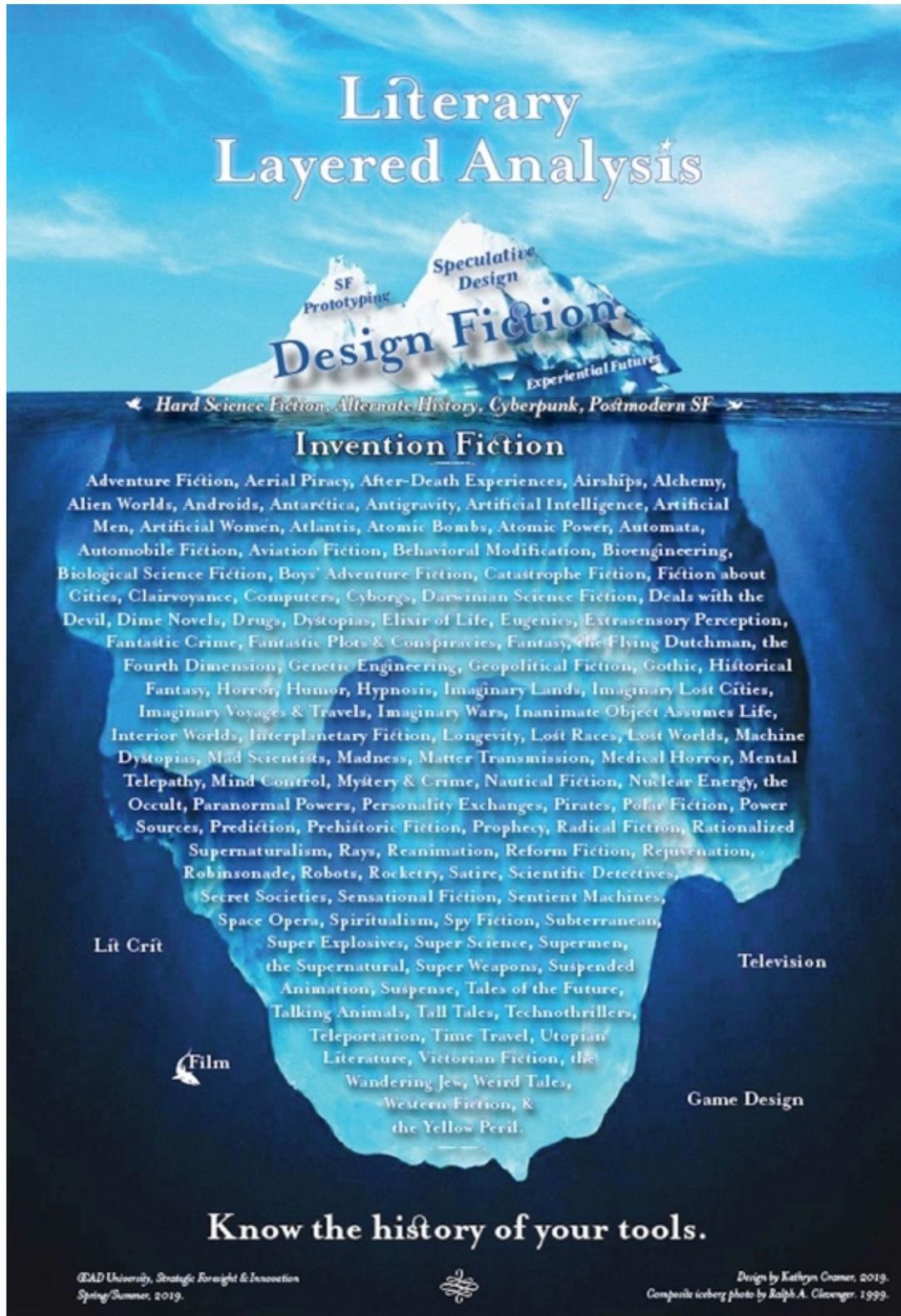
Figure 14: Literary Layered Analysis. Design by Kathryn Cramer based on a composite by Ralph A. Clevenger.

In the second one, oriented towards the worldview of Design, I put Design Fiction, Speculative Design, Science Fiction Prototyping, and Experiential Futures on the part of the iceberg above water. I made this graphic last year as a tool to discuss the subtexts of invention fiction with other students. The categorization comes from Bleiler's motif indexes, Lloyd Currey's online catalog, and other reference sources.

At the waterline, I put established fiction publishing subgenres: hard science fiction, alternate history, cyberpunk, and postmodern fiction. Just below the water line, I put the antiquarian genre of invention fiction. I covered the rest of the iceberg in tags associated with specific motifs within Invention Fiction.

In the pdf version of the graphic, each of these motifs is linked to a specific example book offered for sale in Lloyd Currey's book catalog as of 2019. In the original, you could click on a motif and see an example book and read one of Currey excellent book descriptions.

There are certain motifs from Invention Fiction that have endured and crossed over into foresight and design.

These categories include: artificial intelligence[190], catastrophe fiction[191], computers[192], dystopias[193], genetic engineering[194], longevity[195], radical and reform fiction[196], and robotics[197]. There are also motifs from Invention Fiction that have been

[190] Leiber, Fritz. "The Creature from Cleveland Depths." Galaxy Magazine, December 1962. Summarized by Lloyd Currey, it sounds startlingly prescient: "a story about the invention and marketing of the 'Tickler,' a bio/mech wearable personal assistant which evolves into a hive mind that turns its human hosts into zombies." See "Leiber, Fritz. *The Night of the Wolf*" catalog listing at LWCurrey.com. https://www.lwcurrey.com/pages/books/158004/fritz-leiber/the-night-of-the-wolf

[191] Balmer, Edwin & Philip Wylie. *When Worlds Collide*. New York: Frederick A. Stokes Company, 1933.

[192] Gallun, Raymond Z. *People Minus X*. New York: Simon and Schuster, 1957. This seems to not only anticipate computers, but also an Internet, reality TV, and social media stars. John Clute summarizes: "future history in which the population of Earth vicariously experiences the exploration of the solar system via weekly virtual reality broadcasts featuring the intrepid Hartwell family, climaxing in the invention of vitaplasm, which governs the plot of the sequel by making Androids possible." See *The Science Fiction Encyclopedia* at http://www.sf-encyclopedia.com/entry/gallun_raymond_z.

[193] Harbou, Thea von. *Metropolis*. Berlin: August Scherl G.m.b.H., 1926.

[194] Döblin, Alfred. *Berge Meere und Giganten.* Berlin: S. Fischer Verlag, 1924. Involves re-engineering of the human body.

[195] Atherton, Gertrude. *Black Oxen*. New York: A. L. Burt Company Publishers, 1924. Involves rejuvenation.

[196] Bellamy, Edward. *Looking Backward 2000 – 1887*. Boston: Ticknor and Company, 1888.

[197] Asimov, Isaac. *I, Robot*. New York: Gnome Press, 1950.

repressed: alchemy[198], boy inventors[199], Darwinian science fiction[200], eugenics[201],

ESP[202], lost races[203], paranormal powers,[204] reanimation[205], and the Yellow Peril[206].

Enormous mechanized farms are foreshadowed in early science fiction, for example

in Otfried von Hanstein's 1924 novel *Die Farm der Verschollenen* [The Hidden

Colony]. Everett Bleiler's plot summary describes a lost automated farm in the Yucatán:

> The narrator and Fräulein Aporius discover the gigantic farm grinding away by itself in
>
> remorseless automatic pseudo-life as a symbol of both perfectibility and destruction.[207]

[198] Hawthorne, Nathaniel. *Septimus Felton; Or the Elixir of Life*. Boston: James R. Osgood & Company, 1872.

[199] Trowbridge, John Townsend. *Three Boys on an Electrical Boat*. Boston and New York: Houghton, Mifflin and Company, 1894.

[200] Allen, Grant. *The British Barbarians: A Hill-Top Novel.* New York: G. P. Putnam's Sons, 1895.

[201] Craig, Alexander. *Ionia: Land of Wise Men and Fair Women*. Chicago: E. A. Weeks Co., 1898.

[202] Allingham, Margery. *The Mindreaders*. London: Chatto & Windus, 1965.

[203] Clock, Herbert & Eric Boetzel. *The Light in the Sky*. New York: Coward-McCann, Inc., 1929.

[204] Bester, Alfred. *The Demolished Man*. Chicago: Shasta Publishers, 1953.

[205] Renard, Maurice & Albert Jean. *Blind Circle.* Trans. from the French by Florence Crewe-Jones. New York: E. P. Dutton & Co., Inc., 1928.

[206] Carrel, Frederic. *2010*. London: T. Werner Laurie, 1914.

[207] Bleiler, Everett F., & Bleiler, Richard. *Science-Fiction: The Gernsback Years: A Complete Coverage of the Genre Magazines Amazing, Astounding, Wonder; and Others from 1926 through 1936*. Kent, Ohio: Kent State University Press, 1998, p. 170. Describes: Hanstein, Otfrid von. *The Hidden Colony* [1924]. Wonder Stories, January – March 1935. Translated from the German by Fletcher Pratt.

For the bulk of this iceberg, topics are listed alphabetically for simplicity of layout. Leaving this to the side, there is reason to expect upward percolation in this version of the iceberg. The Tom-Swifty Boy Inventor motif haunts the present, informing how Elon Musk and Mark Zuckerberg are covered by the press; why they are taken seriously when Musk monkies-about with the brains of pigs and Zuckerberg explains the impossibility of censoring the homicidal calls-to-arms of the Alt-right. All escapades and negligence are forgiven because boys will be boys. This brings to mind a line from Joanna Russ's feminist science fiction novel *The Female Man*:

As my mother once said: The boys throw stones at the frogs in jest. But the frogs die in earnest.[208]

Ideas about time travel, space travel, and super-science inventions percolate upwards in our iceberg. So, do ideas about psychic powers, race and ethnicity, gender, nationalism, conspiracies and secret societies, human evolution, life after death, and catastrophe. Avoiding prose science fiction does not make this percolation go away. Most speculative writing about the future is effectively a subgenre of science fiction.[209]

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[208] Russ, Joanna. *The Female Man*. New York: Bantam Books, 1975.

[209] For a more in-depth discussion, see Raven, Paul G. "The Rhetorics of Futurity: Scenarios, Design Fiction, Prototypes and Other Evaporated Modalities of Science Fiction." Foundation, vol. 45, no. 123, 2016.

Because science fiction is in part a literature of ideas, engaging with its history is an engagement with the history of ideas. Perhaps why I should have greater affection for the CLA Iceberg than I do: it invites us to go deep.

In *Underland*, Robert Macfarlane discusses the linguistic characteristics of dimensionality:

> An aversion to the underland is built into the language. In many metaphors we live by, height is celebrated, but depth is despised. To be 'uplifted' is preferable to being 'depressed' or 'pulled down. 'Catastrophe' literally means a 'downward turn,' 'cataclysm'' a 'downward violence.' A bias against depth runs through mainstream conventions of observation and representation. In his book *Vertical*, Stephen Graham describes the dominance of what he calls the 'flat tradition' of geography and cartography, and the 'largely horizontal' worldview that has resulted. We find it hard to escape the 'resolutely flat perspectives to which we have been habituated, Graham argues—and he finds this to be a political failure as well as a perceptual one, for it disinclines us to attend to the sunken networks of extraction, exploitation and disposal that support the surface world.[210]

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[210] Macfarlane, Robert. *Underland: A Deep Time Journey*. New York: W.W. Norton, 2019, p. 13.

THE UTOPIAN METHODS OF PROJECT HIEROGLYPH

Neal Stephenson intended for Project Hieroglyph to use an anthology to generate new motifs with the power to advance science and technology. For example, his story in *Hieroglyph*, "Atmosphæra Incognita," is about a giant twenty-kilometer-high steel tower that makes launching to space easier. Bruce Sterling's contribution to *Hieroglyph*, "Tall Tower," is a story about Neal's tower two hundred years after its construction.

Most iconic motifs are formed iteratively, through multiple authors and works over time and with much discussion. *Hieroglyph* was a technologically optimistic anthology of stories written by high-profile science fiction authors with the support of scientists and engineers, mostly affiliated with Arizona State University. It was administered by ASU's Center for Science and the Imagination which was founded around the initial creation of the project.

Project Hieroglyph was designed to have three components:

1. A website to facilitate collaboration between writers, scientists and engineers, and a visionary public.

2. An anthology of fiction intended to inspire innovation.

3. Public events organized by Arizona State University.

THE HIEROGLYPH PUBLISHING PLATFORM

The online platform was to be Stephenson's PULP publishing platform—which stood for *Personal Ubiquitous Literature Platform*.[211] A prototype was used for the collaboration involved in Stephenson et al.'s *The Mongoliad*.[212] This platform never made it out of beta testing, and for Project Hieroglyph to proceed, we created a pale shadow of what it was supposed to be using WordPress.

THE HIEROGLYPH ANTHOLOGY

The second component was an anthology. Neal Stephenson recruited some of the writers involved in the project, and I was mostly responsible for recruiting the rest. Ed Finn, my collaborator at Arizona State University, paired writers and scientists. One key feature of the project was that writers were assigned scientists to consult with to help get the details right.

THE HIEROGLYPH ROAD SHOW

Once the book was published, Project Hieroglyph had a series of high-profile public events in many cities in North America to provoke public discussion of the concepts we had generated. I participated in events in New York City; Washington, DC;

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[211] Sharwood, Simoon. "Fantasy cabal sells off novel-as-app platform: Neal Stephenson's Subutai splits into content and publishing software companies." The Register, 2012. https://www.theregister.com/2012/05/24/subutai_splits/

[212] Stephenson, Neal; et al. *The Mongoliad*. Subutai Corporation, 2011. Published as a website and an app. Defunct.

Silicon Valley; Los Angeles; Burlington, Vermont; Ottawa; and Tempe, Arizona. There were events in other cities as well, including Seattle and Toronto. This generated a lot of press coverage. There were over 100 news articles written about the project. The project was successful on those terms.

Dystoutopian Thinking:
Dystopia & Utopia Are Not Opposites

Optimism on its own is not valuable: As we have seen from the Trump administration's mishandling of the pandemic, false optimism kills. What we need is optimism coupled with truth. This may be accomplishable through fiction. Any "preferred future" has a point of view: preferred *by whom*? Utopias and dystopias are like that, too.

Bruce Sterling has an ongoing social media riff with the recurring line, "I blame science fiction dystopias." He is poking fun at Neal Stephenson's rhetoric connected to Project Hieroglyph and the general sentiment that dystopian thinking damages innovation and has other negative consequences. (Sterling was also a contributor to the *Hieroglyph* anthology.)

While I was working on Project Hieroglyph, a project of Arizona State University, occasionally the ASU PR department would send reporters my way. I quickly learned how to sidestep the usual questions attempting to elicit a denunciation of dystopias. I

explained to them that utopia and dystopia are not opposites, but rather are part of a single discourse. I told them, "You would not want to fly in an airplane that had been designed by someone who had never envisioned planes could crash." Utopian longings must be grounded in the potential of dystopia.

THE SAGACITY OF MELANCHOLICS

In *Madness and Civilization*, Michel Foucault begins the chapter "Aspects of Madness" with:

> In this chapter, we do not wish to write a history of the different notions of psychiatry in the seventeenth and eighteenth centuries, but rather to show the specific faces by which madness was recognized in classical thought. Faces still haunted by mythical figures, but which have often been essential in the organization of our practical knowledge.

Further down the page, Foucault quotes Thomas Sydenham, who in the seventeenth century authored *Observationes Medicae*, observing that melancholics are:

> … people who, apart from their complaint, are prudent and sensible, and who have extraordinary perception and sagacity. This Aristotle correctly observed that melancholics have more intelligence than other men.

In this psychic schema, *mania* is the dual pairing to *melancholia*. Let this caution us against over-reliance on utopianism, positive thinking, and "preferred futures."

On Science Fiction & "Political Technologists"

In her essay on worldbuilding, Leah Zaidi frames my own work on Project Hieroglyph (in collaboration with Neal Stephenson and ASU's Center for Science and the Imagination) as the benign twin to the fiction allegedly written by Vladislav Surkov under a pseudonym.

> The idea that science fiction can inform the design of a better tomorrow is becoming a movement. Recent initiatives such as Project Hieroglyph and The Verge's *Better Worlds* both offer positive images of the future to inspire a better world …. They encapsulate the same spirit as Ray Bradbury's *The Toynbee Convector* which posits that if someone shows us a brighter future and maps the path to it, we will all rush towards that outcome. … Since positive images of the future are "one of the main instruments of culture, providing both a vision of civilization and the tools for realizing it", the inclination to use science fiction in this way should come as no surprise. …
>
> In stark contrast, Russia uses science fiction as a political weapon of war. Vladislav Surkov—a "political technologist" and "Putin's grey cardinal"—allegedly writes science fiction under the pseudonym Natan Dubovitsky. …Commentators pore over his dystopian visions of a non-linear war in order to understand the Kremlin's vision for Russia.

The "non-linear war" Zaidi mentions is from a three-page "Dubovitsky" short story entitled, "Without a Sky," which reads more like a prophecy of Nostradamus than a science fiction story: symbolic, allegorical, and built for exegesis rather than conventional literary interpretation. Giving the story a literary interpretation, it is a threat that says, *we will so overwhelm you that we will destroy your brain's ability to*

understand nuance, and so you will do what we tell you, reminiscent of creepy notes from serial killers.[213] What precisely Surkov puts under threat is what Shoshana Zuboff calls *the right to the future tense*:

> No one has declared a "right to breathe" or a "right to bodily movement" because these elemental rights have not come under attack and therefore do not require formal protection. … I suggest that we now face the moment in history when the elemental *right to the future tense* is endangered by a panvasive digital architecture of behavior modification owned and operated by surveillance capital, necessitated by its economic imperatives, and driven by its laws of motion, all for the sake of its guaranteed outcomes.[214]

Surkov's pseudo-mystic vision is a cynical taunt from an architect of gangster capitalism. It is a fantasy of power.

Cory Doctorow is skeptical of Zuboff's argument concerning the *right to the future tense*: tech companies are not nearly as good at delivering on their promises of omnipotence and their sales pitches would lead one to believe. In "How to Destroy Surveillance Capitalism" Doctorow argues:

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[213] Dubovitsky, Natan. "Without Sky." Retrieved August 19, 2020, from http://www.bewilderingstories.com/issue582/without_sky.html

[214] Zuboff, Shoshana. *The Age of Surveillance Capitalism: The Fight for a Human Future at the New Frontier of Power.* New York: Public Affairs, 2019, p. 332.

The surveillance capitalism hypothesis—that Big Tech's products really work as well as they say they do and that's why everything is so screwed up—is way too easy on surveillance and even easier on capitalism. Companies spy because they believe their own BS, and companies spy because governments let them, and companies spy because any advantage from spying is so short-lived and minor that they have to do more and more of it just to stay in place.

As to why things are so screwed up? Capitalism. Specifically, the monopolism that creates inequality and the inequality that creates monopolism. It's a form of capitalism that rewards sociopaths who destroy the real economy to inflate the bottom line, and they get away with it for the same reason companies get away with spying: because our governments are in thrall to both the ideology that says monopolies are actually just fine and in thrall to the ideology that says that in a monopolistic world, you'd better not piss off the monopolists.

Surveillance doesn't make capitalism rogue. Capitalism's unchecked rule begets surveillance.[215]

While generally I agree with Doctorow's critique that data does not give companies powers of mind control except in very limited and specialized circumstances, they don't need to achieve mind control for Zuboff's dystopian vision to come to pass. The convergence of business practices in tech with those of hypercorporate agriculture are sufficient. It's not that we will lack free will If This Goes On. It's that it won't matter.

As anyone knows whose pig has gotten out and is eating the newly planted crocus bulbs from Gardener's Supply or whose chicken has decided to brood her eggs in the hedgerow instead of in the coops nest box: pigs and chickens have free will, too. It's

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[215] Doctorow, Cory. "How to Destroy Surveillance Capitalism." Medium, August 25, 2020. https://onezero.medium.com/how-to-destroy-surveillance-capitalism-8135e6744d59

just that the free will of farm animals can be managed and free will's effects can be minimized to the point that it doesn't matter what they think.

I have a digital copy Surkov's pseudonymous novel of *Close to Zero*[216] which I bought out of curiosity after reading Peter Pomerantzev's 2014 book *Nothing Is True and Everything Is Possible: The Surreal Heart of New Russia*.[217] The back cover of Surkov's *Close to Zero* reproduced in the e-book quotes a 2010 US Embassy Moscow cable, (as published by Wikileaks[218]) which says:

> Surkov maintains a high regard for his intellectual capabilities [and] view[s] himself as an unrecognized genius.

Surkov's political methodology as described by Pomerantzev is reminiscent of Ioan Couliano's description of how Machiavellian Renaissance magic worked in the context of politics, and not especially reminiscent of the mechanisms and techniques of science fiction.[219]

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[216] Dubovitsky, Natan. *Close to Zero*. 2008. This eBook I bought from Amazon.ca is no longer offered for sale and may be an illegal bootleg.

[217] Pomerantzev, Peter. *Nothing Is True and Everything Is Possible: The Surreal Heart of New Russia*. Public Affairs: 2014.

[218] US Embassy, Moscow. "The Evolving Role and Influence of Vladislav Surkov," January 27, 2010. Published by Wikileaks. https://wikileaks.org/plusd/cables/10MOSCOW184_a.html

[219] Couliano, Ioan P. *Eros and Magic in the Renaissance*. Trans by Margaret Cook. Chicago: University of Chicago Press, 1987.

I read at least the first few chapters of *Close to Zero*. (The title is sometimes translated as *Almost Zero*.) The cover on an edition available online describes it:

> Spanning decades of Russian history - from the repressive stagnation of the gerontocracy to the confused restructuring of the market to the global financial crisis of 2007 - ALMOST ZERO is at once a satire, a mystery, and a confession by Russia's notorious operative, the "Gray Cardinal." Bloody, hilarious, despicable, and intensely revealing, this is the first complete English-language translation of Surkov's novel and is a glimpse into the mind of one of the world's most insidious politicians.[220]

It isn't science fiction. Also, it isn't very good. While it does occasionally discuss "futures," the book's gangster characters tend to think of the word in its financial sense. The novel seems more a piece of political image-making—styling Surkov as a wry postmodern literary-political intellectual—than a "weapon of war." I have not seen the more recent novels published under the "Dubovitsky" pseudonym.

Hieroglyph was intended to inspire innovation, not to wield the tools of political power. Neither I nor any of my collaborators are figures comparable to Surkov. Surkov might better be compared to Steve Bannon—who *does* have a futurist past[221] and who was charged with fraud on August 20, 2020 for allegedly scamming Trump's own

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[220] InPatient Press. https://inpatientpress.bigcartel.com/product/almost-zero-by-vladislav-surkov

[221] Zimmer, Carl. "The Lost History of One of the World's Strangest Science Experiments: The hummingbirds were dying. Cockroaches were everywhere. And then Steve Bannon showed up." New York Times, March 29, 2019. https://www.nytimes.com/2019/03/29/sunday-review/biosphere-2-climate-change.html

followers through a private initiative to fund Trump's Wall. Newt Gingrich's dabbling in science fiction, as described and discussed by Joan Didion in 1995, is also close to the concept Zaidi is reaching for.

But there is a grain of truth to Zaidi's comparison. Doing *Hieroglyph*, backed by the full strength of the PR department of Arizona State University, we did, briefly, gain access to the Halls of Power: we had a meeting with the Obama-era White House Office of Science and Technology. Access to the highest levels of government and power should not be a goal of science fiction or foresight, because, as we see in journalism, being motivated by *access* is corrupting.

Toward the end of her essay, Zaidi asks,

> If the Kremlin can employ a political technologist who uses science fiction to create chaos, how might we create roles and capacities that allow society to envision and realize collective preferred futures through storytelling?

This is the *wrong* question. The American analog of a "political technologist" looks like a Brad Parscale, not a Neal Stephenson; a "political technology" would look like a QAnon[222], not a Project Hieroglyph. I agree that we need to *envision and realize collective preferred futures* and that storytelling has a role in it. What makes my hair

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[222] Kennedy, Bud. "A bizarre conspiracy fantasy creeps into Texas politics: Candidates promoting 'Q'." Fort Worth Star-Telegram, August 18, 2020. https://www.star-telegram.com/news/politics-government/article241960861.html

stand on end is the idea that such methods would be a twin or inversion or some kind of analog to the Surkov mode.

Science fictions' collective visions of the future have already been oversold by Hollywood, sometimes with a US nationalist purpose in mind, yielding what I call "ambient science fiction"—science fiction is ubiquitous in our cultural environments—and it is these visions of endless technological progress and dumb ungrounded dystopias that need to be counteracted.[223]

Thirdly, the intervention point for science-fictioning is not selling yet another shiny future or apolitical teenage dystopia to mass audiences, but rather to find a semantics to describe and create imagined futures where we might avoid ultimate catastrophe.

Post-catastrophe science fiction is built around the problem of nuclear weapons. Because of Hiroshima and Nagasaki, the consequences of dropping a nuclear weapon on a city are known; the entire Cold War World Order was conditioned by a collective understanding that hundreds of thousands of people die when a nuclear weapon is dropped on a city. We all know what a mushroom cloud looks like. Vast power structures were built around avoidance of the consequences of nuclear war. Certainly, there was disagreement and propaganda, denialism, disinformation and such. But the parameters of the consequences of nuclear war are definite in a way that the consequences of climate destruction are not.

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[223] Ambient science fiction may be what Riel Miller's techniques attempt to combat.

Destruction of the stability of climates results in climate volatility, which makes for interesting looking charts and graphs, but volatility is much harder to describe in a novel. Joanna Russ's 1970 novel, *And Chaos Died,*[224] contrasts two civilizations, one that did not take climate action, and another that did. A fascinating aspect of the Russ novel now, fifty years after its publication, is how climate decisions play themselves out in social behavior. Here Samuel R. Delany describes the novel in a review of a reissue:

> What kind of world is this Earth? Its surface seems to be mostly parks and recreational grounds. Much of life goes on below, and the subterranean aspect suggests the texture of life itself has somehow become oppressive. A generalized material sufficiency has led to leisure and a certain amount of violence in the search for meaning—a vision we can recall from Heinlein's *Beyond This Horizo*n (1941) and will see again in Varley's "The Phantom of Kansas" (1976). There are security booths scattered about, where citizens can take refuge from this public violence when it gets out of hand.
>
> At the climax of the novel, Jai Vedh and a new found friend, a fourteen year old boy named Ivat (who roams the streets with a hunting bow: when Jai breaks it, Ivat replaces it from a street-vending machine that dispenses deadly weapons to anyone who wants them), visits a kind of bacchanal, where rapine, murder, mutilation, and wanton destruction reign among a populace who are, by and large, so drugged they can hardly read their own physical sensations: one man, set on fire in a doorway, burns to death only aware of a peaceful drowsiness. Another, who has just pushed a nail into his remaining eye, exclaims in a "pleased" voice: "Ulch, I heard a 'ulch',," … which the surrounding crowd takes up as a listless chant.

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[224] Russ, Joanna. *And Chaos Died*. New York: Ace Books, 1970.

This huge destruction-party balances—and mirrors—the huge celebration party on the nameless utopian planet which climaxed the novel's opening movement. The first was a "celebration" of "healthy" people which left Jai himself—because of their play with gravity and the shape of matter in the physical world—disoriented, frightened, and confused; the last is a "celebration" of "sick" people which leaves Jai with a sense of his own power and autonomy.[225]

Her description of violence as a search for meaning resonates with our own time.

Bruce Sterling's *Heavy Weather*,[226] a novel about storm chasers and enormous tornadoes, attempts to go there. But even in non-fiction, such as David Wallace-Wells' 2019 book *The Uninhabitable Earth*[227], the act of pinning down what climate chaos looks like is a precarious high-wire act of trying to stabilize the narrative on unstable things. Climate scenarios burst out in many directions, most of them Not Good. From a writing composition standpoint, what this means is that we need to write a thousand scenarios, not just one good one. And a thousand scenarios is more than the science fiction market will bear.

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[225] Delany, Samuel R. "The Order of 'Chaos.'" Science Fiction Studies, #19 = Volume 6, Part 3, November 1979.

[226] Sterling, Bruce. *Heavy Weather*. New York: Bantam Spectra, 1994.

[227] Wallace-Wells, David. *The Uninhabitable Earth: Life After Warming*. New York: Tim Duggan Books, 2019.

WHY SCIENCE FICTION DIDN'T SAVE US

In a 2008 post on The Well, Bruce Sterling responds to a suggestion that science

fiction writers can lead us into the future:

> "You wanna know who I think has the stuff to lead us into the future? Sci-Fi writers."
>
> *Yeah, Newt Gingrich thought that. Gingrich is a science fiction writer.
>
> *Y'know, you don't wanna go there. Not really. Science fiction writers are not as bad as
> apocalyptic conspiracy theorists (except for the ones who ARE apocalyptic conspiracy theorists),
> but they're not the kinds of personalities you actually want in positions of power and authority.
> Science fiction writers like amazing and wonderful and freaky and dreadful stuff. They get bored
> with the dull stuff, like making sure your kids have shoes and plumbing and your population has
> civil rights.[228]

Sterling correctly observes that science fiction's fascination with novelty does not tend

to generate sound policy.

Both the US publishing industry and Hollywood are part of the US culture industry

that exports a lot more than it imports. Although it is hard in retrospect to gage the

relative impact, this is in small part due to efforts by the CIA to use the American

culture industry as a tool of US foreign policy. Joel Whitney explains in *Finks: How the*

C.I.A. Tricked the World's Best Writers:

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[228] inkwell.vue.317 : Bruce Sterling: State of the World, 2008 #24 of 116: Bruce Sterling (bruces) Fri 4 Jan 08 02:46
https://people.well.com/conf/inkwell.vue/topics/317/Bruce-Sterling-State-of-the-Worl-page01.html#post24

When the literary CIA got into the game—deploying cultural propaganda or psychological warfare techniques—it would use both positive and negative means, celebrating American cultural achievements on one hand and attacking Soviet ideas and policies on the other.[229]

US publishers were and are mostly unwilling to pay for translations of science fiction. Other countries and language groups also have science fiction and do translate from other languages. But the efficiency of US cultural exports combined with the parochial aesthetics of US publishers and audiences make it hard to earn a living or run a publishing line in science fiction outside the US and the UK. So, while there is science fiction written in other places and in other languages, this economic reality starve much of world science fiction of money to pay writers, impairing the development of local science fiction aesthetics. This dynamic has operated to some extent within the US, with publishers' reluctance to publish writers targeting a different audience than is standard for science fiction.

Despite all intentions, good and bad, in science fiction's near hundred-year history, despite all our stories about how one man in all the universe can save the world, science fiction has not saved us, will not save us, cannot save us.

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[229] Whitney, Joel. *Finks: How the C.I.A. Tricked the World's Best Writers*. New York: OR Books, 2016.

Infinite progress was too good a story, fit too well with American ideas of limitless frontiers. In *Colonialism and the Emergence of Science Fiction,* John Rieder frames science fiction's relationship to frontiers like this:

> Having no place on Earth left for the radical exoticism of unexplored territory, the writers invent places elsewhere.[230]

The futures science fiction built were mostly as generically white as the astronauts in Kubrick's *2001*, who in turn reflected people on 1950s science fiction covers. (In science fiction's defense, often these protagonists have been like the Observer stick figure in physics: intended mostly to establish a vantage from which to perceive the Cosmic.) That treasured relationship between writers and their readers led publishers to publish for white teenage boys of all ages, a self-perpetuating cycle in which the demographics of the audience are maintained by exclusion. Even within science fiction's whiteness and Americanness, there have been constraints of representation.

Science fiction narratives mostly did not allow narrative space for protagonists who were fat or disabled or who wore the costumes of the places they originated from before falling into the American melting pot. Science fiction mostly did not imagine that professor's daughters—at whom so much exposition was launched—might themselves

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[230] Rieder, John. *Colonialism and the Emergence of Science Fiction.* Middletown, CT: Wesleyan University Press, 2008, p.4.

have the genius ideas that would save the world, nor that the hero's mother might likewise make intelligent contributions.

For every one of these generalizations, there are exceptions; I speak here in rules of thumb. There have been major movements within science fiction to revolt against these tendencies, for example feminist science fiction and Afrofuturism. What I describe here is the prevailing currents against which such movements struggle.

Examples of feminist science fiction include Joanna Russ's iconic *The Female Man*[231] which involves similar women living in four different universes, Joan Slonczewski's eco-feminist hard SF novel *A Door into Ocean,*[232] Gwyneth Jones's post-apocalyptic novel *White Queen,*[233] and Suzy McKee Charnas's *Motherlines,*[234] on feminist separatist utopian themes. Afrofuturism overlaps with feminist science fiction. Octavia Butler's *Wild Seed,*[235] that engages with the race, sexuality, and the philosophy of power*,* falls into both categories.

Afrofuturism has spread widely across pop-culture and the arts. From its origins with such writers as Octavia Butler and Samuel R. Delany, and more recent generations

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[231] Russ, Joanna. *The Female Man*. New York: Bantam Books, 1975.

[232] Slonczewski, Joan. *A Door into Ocean*. New York: Arbor House, 1986.

[233] Jones, Gwyneth. *White Queen*. New York: Tor Books, 1993.

[234] Charnas, Suzy McKee. *Motherlines*. New York: Berkeley Books, 1978.

[235] Butler, Octavia. *Wild Seed*. New York: Doubleday, 1980.

of writers such as Nalo Hopkinson, N. K. Jemisin, and Nnedi Okorafor, it has also spread to film—*Black Panther*—and music—Janelle Monáe.

Fan fiction is a rebellion against the gatekeeping of control of narrative by publishers, authors, and corporate copyright holders. My children read more fan fiction that original fiction issued by publishers,

The larger culture gets its science fiction filtered through film and television. The entertainment executives who keep those gates tend to have conservative tastes and tend to screen out the more liberatory tendencies of science fiction. At the end of his book *Writing the Science Fiction Film*, Robert Grant reassures aspiring screenwriters:

> … despite my fervent desire that you'll strive to get the science right in your films, always remember that when it comes down to it, science fiction … is about people. You should write only as much science as you need, because science fiction is not about technology or space ships or planets or time travel. It's about plain, ordinary people, like you and me …[236]

White science fiction writers, and even literary agents, bent themselves into the mold of the kind of person they thought publishers and markets would want to hear from. As the *Science Fiction Encyclopedia* notes, pseudonyms have been used extensively in science fiction, and usually for some form of concealment.[237] Among

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[236] Grant, Robert. *Writing the Science Fiction Film*. Studio City, CA: Michael Wise Productions, 2013, p. 193.

[237] Clute, John et al. "Pseudonyms." *The Science Fiction Encyclopedia*, 3rd Edition. http://www.sf-encyclopedia.com/entry/pseudonyms

white literary agents, Arthur Feldman became Scott Meredith and Mildred Kidd became Virginia Kidd. Among white science fiction writers, Philip Klass became William Tenn; Judith Grossman became Judith Merril; Alice Sheldon became James Tiptree, Jr.; and we aren't sure who the heck author and publisher "Lester Del Rey" was.

The Cosmic Mind did not carry us nearly as far as we might have hoped. Because part of the secret of American normative whiteness is that it is never enough: To be a white American is to be insecure about it. There is always an accent to level, weight to lose, or a name or a hair-color or a religion to change. There are also anxieties about class, and science fiction is strongly infused with the Horatio Alger myth of the self-made man. This insecurity about race, appearance, class, and ethnicity was broadcast by the science fiction field along with our now-dominant ideas about futurity.

These mixed messages influenced the development of American tech culture, and we now see bizarre caricatures of science fiction's very pale smartest-guy-in-the-room heroes with unfathomably deep pools of wealth, making very bad decisions.

With the rise of Silicon Valley came the rise of the nerds. Being the smartest guy in the room became something which could be cool outside of science fiction and physics departments. This gave me much hope for America's future. Finally, smart people with a values system at least partly derived from reading science fiction could be in charge. This was one of the science fiction community's collective hopes. Now that Billionaire Nerds Walk the Earth and set their sights on Mars—moving fast and breaking things

just because they can—it is evident this technocratic scenario is not a future we should have wanted. On the *Hieroglyph* book tour in 2014, we visited both Google's headquarters and Facebook's. I used to proudly wear the t-shirt that Facebook PR gave me on that visit.

At the Nebula Awards banquet in 1991, it was obvious that technocrat Newt Gingrich, who gave a vacuous speech about the high frontier, was not truly visionary. But some of us have not been so quick to see through the gods of Silicon Valley. We had wanted them to be the science fiction heroes that they are not, because it would be so nice to see our stories validated.

In *Surveillance Capitalism*, Shoshana Zuboff gives us a startling example of using animals to think with. Zuboff tells the story of how the passenger pigeon went extinct. Live birds were attached to perches with their eyes sewn shut and would flap their wings in distress. Passenger pigeons were extremely empathetic creatures and would flock to the birds in distress, thus allowing commercial harvesters to catch them all at once by the thousands. Zuboff compares this to Facebook's business model:

> Facebook's applied utopistics are a prototype of an instrumentalized future, showcasing feats of behavioral engineering that groom populations for the rigors of instrumentarianism's coercive harmonies. Its operations are designed to exploit the human inclination toward empathy, belonging, and acceptance. The system tunes the pitch of our behavior with the rewards and

punishments of social pressure, herding the human heart toward confluence as a means to others' commercial ends.[238]

It is not merely that these men who instrumentalize our data are flawed human beings and not the plucky inventor heroes of science fiction archetype. Rather they are a different creature altogether for which we may yet lack an archetype, though Zuboff has provided us an unpleasant candidate: men who are instruments of extinction.

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[238] Zuboff, Shoshana. *The Age of Surveillance Capitalism: The Fight for a Human Future at the New Frontier of Power*. New York: Public Affairs, 2019.

An Ontology of Change

The challenge we face in looking at the future—regardless if the future is viewed from the science fiction field or from other disciplines—is how to break out of this bubble, how to break out of Cosmic Visions with wings clipped by insularity.

In the 2019 "A Manifesto for Decolonizing Design" published in the Journal of Future Studies, written by Danah Abdulla, Ahmed Ansari, Ece Canli, Mahmoud Keshavrz, Matthew Keim, Pedro Oliveria, Luiza Prado, and Tristan, the authors argue for a new ontology:

> Our goal here is ontological rather than additive change. It is not sufficient for design institutions to simply include greater diversity of actors or perspectives. This only goes to serve a delaying and offsetting demands for radical systemic change. While we support and defend measures to include marginalized subjects and our/their concerns in spaces from which they have been excluded or remain precarious, we also believe there is little point to diversify institutions, practices, and processes that ultimately sustain colonial imperatives. Our aim is not to direct our efforts to prop up existing power structures, or to sustain them through ameliorative measures. Rather, our aim should be nothing less than to seek the radical transfiguration of these structures through the critical eye of the programmatic imagination that dares to identify the possibilities and conditions that will give us alternatives to the now.[239]

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[239] Abdulla, Danah; Ansari, Ahmed; Canli, Ece; Keshavrz, Mahmoud; Keim, Matthew; Oliveria, Pedro; Prado, Luiza; and Schultz, Tristan. "A Manifesto for Decolonizing Design." Journal of Future Studies, March 2019, 23(3):129-132. In Candy & Potter's *Design & Futures*.

This key point is where most "futures" run aground. The existing ontologies of the future short-circuit the imagination we need to get past the Anthropocene. While the authors' overt agenda may be decolonization and some of us (me, for example) may look like colonizers, we *all* need this new ontology.

Because without breaking the systems that ontologically sustain the colonial imperative, all real imaginative solutions to the Anthropocene will look like a category error if we lack an ontology with which to comprehend them. And in this new ontology, colonization should be defined not just the taking of land from the commons, or the immediate and historical consequences thereof; but also the colonization of ontology itself—of the structuring of meaning—in these data cathedrals that define our lives. At stake is *the right to the future tense*.

Zuboff further elaborates on *the right to the future tense* in "'We Make Them Dance': Surveillance Capitalism, the Rise of Instrumentarian Power, and the Threat to Human Rights."

> In claiming the future as a potential field of self-determined action, the right to the future tense asserts the unbroken biography of will and action that founds [Hannah] Arendt's "right to have rights." The right to the future tense and the "right to have rights" are twinborn. Expressed in action and guaranteed by inclusion in the human group, the "right to have rights" already presupposes the future tense as the ground on which the inner organ of the will is made manifest in the shared reality of the human community. … I suggest that we now face the moment in history when the elemental condition in which we claim the future for autonomous action is

threatened by the laws of motion of a new economic order in which wealth derives from the

predictability of human behavior. [240]

Hannah Arendt coined the phrase, *the right to have rights* in 1949[241] and used it in her

book *The Origins of Totalitarianism.*[242]

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[240] Zuboff, Shoshana. "'We Make Them Dance': Surveillance Capitalism, the Rise of Instrumentarian Power, and the Threat to Human Rights." in *Human Rights in the Age of Platforms*, Rikke Frank Jørgensen, ed. Cambridge, MA: MIT Press, 2019, p. 38.

[241] Gessen, Masha. "'The Right to Have Rights' and the Plight of the Stateless." The New Yorker, May 3, 2018.

[242] Arendt, Hannah. *The Origins of Totalitarianism.* [1951] New York: Harcourt, 1973.

No *Corpus Callosum*

At any one time, there are about a thousand writers active in the science fiction field. Science fiction on the one hand and design and foresight studies on the other operate almost entirely independently from each other with almost no *corpus callosum*—the part of the brain that connects the brain's two hemispheres—to bridge the gap between them, that could allow these modes of thinking about the future to "generate a single seamless perception of the world."[243] Nor is it obvious how to go about constructing one.

Neither Design nor Foresight seems to feel the lack.

But I do. What is this space that scenarios occupy? How should we understand the stories that foresight scenarios tell? And how do we measure them against other stories we already know? What is this disconnect preventing us from seeing? What is it preventing us from saying? What should the intersection between science fiction and foresight scenarios look like?

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[243] Taylor, Jill Bolte. *My Stroke of Insight: A Brain Scientist's Personal Journey.* New York: Viking, 2006, p. 16.

ORCHARDS ARE GOOD TO THINK WITH

In 1987, when I studied math at Columbia University, Patrick X. Gallagher indulged my desire to do an independent study on trying to reason through literary metaphor using category theory. (He was patient with my eccentric request.)

The purpose of category theory is to build a system of mathematical metaphor so you can take a problem that is hard in one part of mathematics and translate it into another part where it is easy, and translate the solution back again. Loosely speaking, the narrative strategies of this document, with its long detour through agriculture, have some resemblance to this method.

Taking inspiration from category theory is more likely to work for things that are not mathematical than actually *using* category theory because mathematical definitions are too rigid to easily accommodate human narrative. Taking inspiration from a style of computation, rather than implementing actual computation, is in the spirit of recent movements in the Digital Humanities towards "Minimal Computing."[244]

Try to see the forest for the trees in hopes of comparing forests. This is what Category Theory is about.[245] So, now we go to the orchard.

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[244] GO::DH Minimal Computing Working Group "What is Minimal Computing? " http://go-dh.github.io/mincomp/about/

[245] Horst Herrlich, George E. Strecker. *Category Theory: An Introduction*. Berlin: Heldermann Verlag, 1979, p. 1. The authors speak of seeing "the forest" rather than "the orchard." I have adapted their metaphor.

5 **M**Y **7** **A**CRES, OR **R**EADING THE **L**AND

In any creative activity it can sometimes be very useful to go back to fundamentals.[246]

—Mark Ronan, *Symmetry & the Monster: One of the Greatest Quests of Mathematics*

Foolish as it sounds, David and I bought the house and orchard for science fiction. We didn't set out to farm. Rather, my husband wanted another house in which to store his very large collection of science fiction books; my parents wanted acreage for their agility dogs. The orchard also serves as a point of intergenerational connectedness. Over time, we have modified the house to make it more comfortable for three generations of us to inhabit at once. When we bought our orchard in December of 2009, we had a lot of decisions to make about what our practice of orchardry would be like. That was something we didn't expect.

The farm serves here as an object of contemplation, a text to be read. The strength of the method of this section is in engaging deeply with things that are real and already happened, rather than in ungrounded and hypothetical speculation. The patterns that emerge have a basis. The weakness is that this method of thinking is digressive, and that rhythms and patterns apparent in a single farm may not scale or generalize.

Like most American small farms, my orchard has intractable problems. There are a lot of practices that are standard, such as using pesticides, and people will tell you that

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[246] Ronan, Mark. *Symmetry & the Monster: One of the Greatest Quests of Mathematics.* Oxford: Oxford University Press, 2006.

you can't get by without them when growing apples in the Northeast. We had other ideas.

Christopher Alexander, et al., frame the language of how one constructs the concepts of a farm as a "pattern language." The elements of this language are called patterns. Each pattern describes a problem that occurs over and over again in our environment, and then describes the core solution, in such a way that you can use the solution a million times over, without ever doing it the same way twice.[247] It was through exploring the information about our farmland I could begin to understand the mechanics of pattern language: how religion, colonization, natural resources and persistent notions of what certain places are *for* contours their history. In our September 2019 meeting, Gamal Mohammed gave me insights as to where to dig. In particular, he suggested engaging with the matter of religion.[248] [249] It was a surprising suggestion. I

[247] Alexander, Christopher, et al. *A Pattern Language Towns, Buildings, Construction* [1977]. Oxford University Press, 2013, p. x.

[248] Mohammed, Gamal T., & Noha Mahmoud. "The Edge Environment in Cairo: An Approach to Reading the Social Pattern Language of the Middle Eastern Built Environment." *International Journal of Sustainable Built Environment*, vol. 1, no. 2, 2012, pp. 227–246., doia10.1016/j.ijsbe.2013.04.001.

[249] Mohammed, Gamal, and Noha Mahmoud. "An Urban Code in Traditional Middle Eastern Contexts: The Edge Environment as a Central Theme for Reading the Social Pattern Language of Historic Sites - Gamal Mohammed, Noha Mahmoud, 2019." *Sages Journals*, https://journals.sagepub.com/doi/full/10.1177/2158244019825604.

thought that probably wouldn't have much bearing on the matter of my orchard situated in such a rural area. I was wrong.

THE LAND CAN TELL YOU WHAT IT IS FOR

One cannot wander about in an orchard without constantly encountering myth, metaphor, and idioms. In the Book of Genesis, there is the tree that bears fruit of good and evil, frequently depicted as an apple. (While we do have serpents in our orchard, I have never seen one climb an apple tree.) There are windfall apples and bad apples that spoil the bunch. We pick the low-hanging fruit.

Figure 15: Kathryn Cramer while picking apples, September 10, 2010. Photo by David Hartwell.

Apples are also bound to American patriotism by the phrase "as American as apple pie," and the mythic story of Jonny Appleseed, aka John Chapman (1774–1845), credited with introducing apples to large parts of the northeast.

In the 21st century, our orchard in Westport is a bit of an absurdity: heavy use of pesticides and new modes of planting render obsolete the kind of orchardry intended when our orchard was planted in the 1980s. Laws requiring fresh-pressed cider to be pasteurized compound its unprofitability. Even those orchards 35 miles to the north planted to current standards have difficulty competing with cheap apples-juice concentrate that recently began to flow from China.[250] The orchard, as it is now, makes little commercial sense. But the land can tell you want sense it used to make.

The land my farm occupies has likely been farmed since the American Revolution because about that time the area sawmill was built over Stacey Brook at one corner of the current property.[251] [252] The first place they would have cut down all the trees would

[250] "China Ranks No. 1 in Apple Juice Exports." *Farm Progress*, 10 Dec. 2018, https://www.farmprogress.com/markets/china-ranks-no-1-apple-juice-exports. Two thirds of US apple juice is imported from China as concentrate; industry did not exist until the 1990s, 10 years after our orchard was planted.

[251] Royce, Carolyn Halstead. *Bessboro: A History of Westport, Essex County, New York*. Westport, NY 1904.

[252] National Register of Historic Places: Nomination of the Camp Dudley Historic District, OMB NO. 1024-0018, received by the United States National Park Service September 20, 1993. Nomination prepared by Jessica Roemischer Smith. Retrieved from https://catalog.archives.gov/id/75317758 September 7, 2019.

be right by the sawmill. Before that, for 150 years, my farm was part of New France.[253]

[254] The situation of the Champlain Valley is described by historian Collin Callaway, quoted by David Preston in *The Texture of Contact*, as: "… a veneer of French population and culture spread thinly over an Indian world." [255]

1642: Cole's Island & the Origin of the Word "Propaganda"

The deed for our farm records a view easement in which we are allowed to cut trees on the property across the street to provide a view of Cole's Island in Lake Champlain. The significance of Cole's Island is that it is allegedly where St. Isaac Jogues, canonized in the 1920s, was tortured by the Mohawk in 1642.

As alleged by the *Congregatio de Propaganda Fide* (Congregation for Propagating the Faith) the Mohawk mutilated Jogues' fingers there by biting his fingertips.

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[253] Coolidge, Guy Omeron. *The French Occupation of the Champlain Valley*. Fleishmanns, NY: Purple Mountain Press, 1985.

[254] Stevens, Scott Manning. "The Historiography of New France and the Legacy of Iroquois Internationalism," Comparative American Studies an International Journal, 11a2, 148-165, 2013.

[255] Preston, David L. *The Texture of Contact: European and Indian Settler Communities on the Frontiers of Iroquooia, 1667 – 1783*. Lincoln, Nebraska: University of Nebraska Press, 2009, pp.58 – 59.

Jogues was killed a few years later in 1646 by the Iroquois after a crop failure, having been accused of witchcraft.[256][257] The publications of the Catholic church, a few years after his death, told the tale.[258] The narratology of Jogues' story is very complex.[259] The stories of his torture were part of the justification for the militarization of the Catholic church's presence in the New World.

The manner of publication is part of the origin of the word "propaganda."[260][261] The Mohawk and the Iroquois have never entirely lived down the reputation established by those publications, and it has been used as justification for their poor treatment ever since.

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[256] Talbot, Francis. Saint Among Savages: The Life of Saint Isaac Jogues. [1935] San Francisco: Ignatius Press, 2002.

[257] Scott, Martin (1928). *Isaac Jogues: Missioner and Marty*r. New York.

[258] Randall, Catherine. *Black Robes and Buckskin : A Selection from the Jesuit Relations*. New York: Fordham University Press, 2010.

[259] Perron, Paul J. *Narratology and Text: Subjectivity and Identity in New France and Québécois Literature.* Toronto: University of Toronto Press, 2003. See Chapter Six: "Narrating and Reading the Body: The Martyrdom of Isaac Jogues."

[260] Greer, Allan, ed. *Jesuit Relations: Natives & Missionaries in Seventeenth Century North America.* New York: Bedford, 2010.

[261] Preston, David L. *Texture of Contact: European and Indian Settler Communities on the Frontiers of Iroquoia, 1667-1783*. University of Nebraska Press, 2009.

Figure 16: Father Isaac Jogues, allegedly tortured on Cole's Island in 1642.
This slide incorporates a portion of a 19ᵗʰ century painting of Jogues widely used on Catholic websites.

This story is still very much alive for the Catholic church. See for example, a cosplay re-enactment of Jogues' torture posted on YouTube by Catholic Online in which a costumed teen acts the scene of ripping out Jogues fingernails with his teeth.[262]

The story of Cole's Island may be the basis for Algernon Blackwood's 1889 story "A Haunted Island."[263] Isaac Jogues also appears as a character in William Vollman's historical novel *Father's & Crows*[264] about Jesuits in New France.

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[262] Catholic Online. "Saint of the Day: The North American Martyrs." No date. YouTube. https://youtu.be/dxHZlB0coI8

[263] Blackwood, Algernon. "A Haunted Island" (1889). A short story originally published in Pall Mall Magazine Vol. 17, No. 72, in 1899. Its first appearance in a collection was in Blackwood's 1906 *The Empty House and Other Ghost Stories*.

[264] Vollman, William. *Fathers & Crows*. New York: Viking, 1992. It is the second in his series entitled, Seven Dreams: A Book of North American Landscapes.

1762: On the Map

The earliest published map of Lake Champlain and Lake George, from 1762, includes, unlabeled, Stacey Brook. It is identifiable on the map based on other nearby landmarks and the fact that it branches about a mile inland. Surprisingly, the 18th century cartographer knew this.[265] The immediate area was essentially woods with few, if any, inhabitants prior to the building of the mill at Stacey Brook.

The map identifies various other natural resources in the area such as marble and iron, so although the specifics of the brook are unlabeled, it was known as a fine water source: that is what the spring up the brook was known for later and this spring is the current source for the farm.

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[265] Brassier, William, A Survey of Lake Champlain, including Lake George Crown Point and St. John. Surveyed by Order of His Excellency Major General Sr. Jeffrey Amherst. [1762] London: Sayer and Bennett; August 5, 1776 [but 1777.] Downloaded from Boston Rare Maps, an on-line auction gallery: https://bostonraremaps.com/inventory/brassier-antique-map-lake-champlain-brm2090/. See also https://www.masshist.org/maps/2732_atlas_35/2732_atlas_35.html#. What is most interesting for our purposes is that it is easy to situate our farm on this early map, since it includes Stacy Brook (unlabeled) adjacent to our farm. In fact, Brassier, the draftsman, appears to have been aware that Stacy Brook branches a mile inward, something I was able to verify with 21st century maps. This is apparently the first printed map of Lake Champlain.
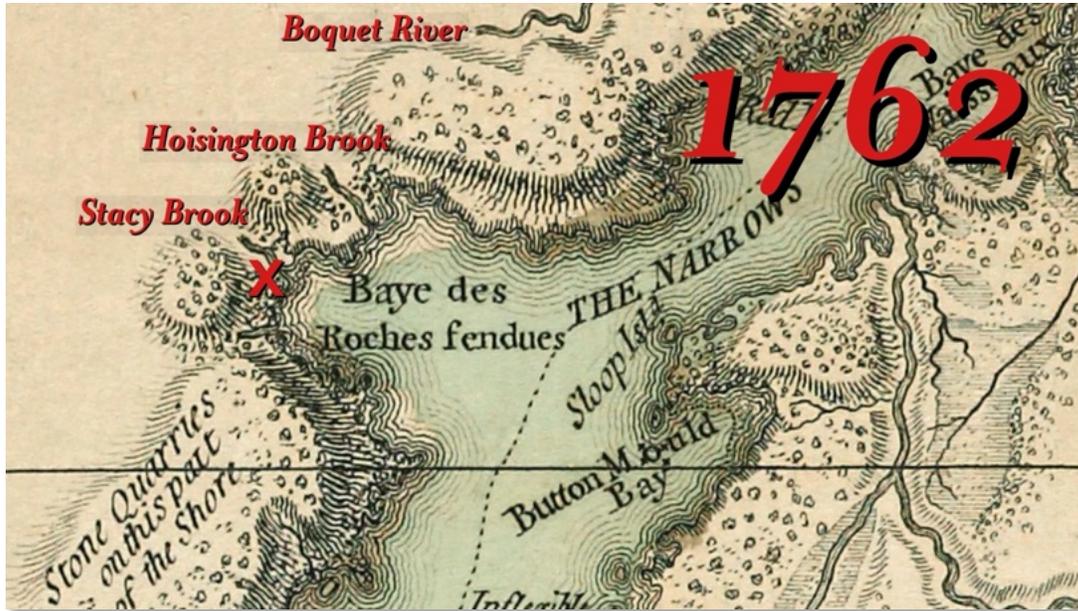
Figure 17: A close-up of the 1762 map of Lake Champlain and Lake George.
The brooks and river on the Adirondack side are partly identifiable by the location of Button Bay.

By 1750, the Champlain Valley was "militarized."[266] The spring up Stacey Brook

was likely a resource known of in that context. Compared to other areas of what is now

the US northeast, the area was among the most "culturally integrated" and

"interdependent," and consequently had less violence between settlers and Indigenous

peoples.[267]

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[266] Preston, David L. *The Texture of Contact: European and Indian Settler Communities on the Frontiers of Iroquooia, 1667 – 1783*. Lincoln, Nebraska: University of Nebraska Press, 2009, p. 150.

[267] Preston, David L. *The Texture of Contact: European and Indian Settler Communities on the Frontiers of Iroquooia, 1667 – 1783*. Lincoln, Nebraska: University of Nebraska Press, 2009, p. 181.

1908: WESTPORT FARMS

Our farm used to be the location of the owner's farmhouse on Westport Farms, one

of the largest farms in New York State, owned by James McKinley Graeff (1862–1908),

a Republican politician who made money in wool and also ran a dairy. He died of

appendicitis in 1908. [268]

Figure 18: 1908 Real Estate Ad: The "Westport Farms" for Sale.[269]

I came across one of the ads his widow ran trying to sell the farm in 1908.

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[268] "James McKinley Graeff (1862-19080" Find a Grave, https://www.findagrave.com/memorial/21648566/james-mckinley-graeff.

[269] Graeff, Mrs. James McKinley. Advertisement, Albany, NY: The Country Gentleman, Volume 73, p. 952, October 1, 1908.

The "Westport Farms" For Sale. In Northern New York. Borders on Lake Champlain shores one mile with natural harbors for boats and bathing; sandy beaches; 1200 acres under highest cultivation; splendid pastures well-watered & shaded. Owners' residence, two cottages, three farmhouses, twenty-three barns, a large private creamery, grist mill, blacksmith shop, over 1000 young bearing apple trees, the purest water piped to all houses and cattle barns from mountain springs.[270]

We own only 7 acres of the 1,200. The "Owner's residence" was torn down in 1985 when our current house was built. The site was on what's now our front lawn. The water system described in the ad is the origin of the Graeff water system, a private system that still supplies the water for the neighborhood. We have one of the barns, a lovely slate-roofed post-and-beam barn that we rehabbed to stabilize it in 2010. The dairy was associated with one of the farms behind us. The mill was located diagonally across the intersection of Napper Road and Route 9N, on the other side of Stacey Brook that runs along the north side of our property. The ad has a description of the water system as "the purest water piped to all houses and cattle barns from mountain springs."

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[270] Graeff, Mrs. James McKinley. Advertisement, Albany, NY: The Country Gentleman, Volume 73, p. 952, October 1, 1908.

APPLES, WOLVES, & SHEEP

Apples were brought to New France by the Jesuits. Initially, when the Jesuits arrived, apples were a Biblical metaphor. They were a food for the French immigrants. They were also a food for the Iroquois. And, in accounts I found difficult to read, the soldiers would come and destroy those trees to starve them out.[271]
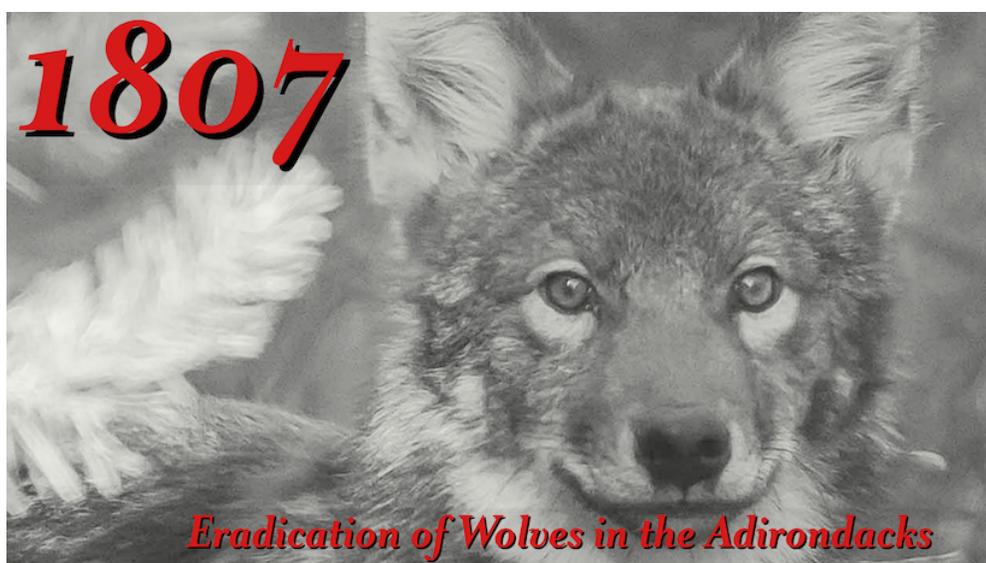
Figure 19: 1807, the Eradication of Wolves in the Adirondacks. Wolf photo from Adobe stock photography.

Wolves were eradicated in the Adirondacks to the early 19th century, a precursor to the largescale farming of sheep that made the former owner of our land a rich man.[272]

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[271] Humphries, Helen. *The Ghost Orchard: The Hidden History of the Apple in North America.* New York: HarperCollins, 2017.

[272] Alberti, Andrew and Anita Deming. *From Forest to Fields: A History of Agriculture in New York's Champlain Valley.* Westport, NY: Cornell Cooperative Extension of Essex County, NY and Lakes to Locks Passage, Inc., 2010. https://files.lakestolocks.org/portal/ltlDJT843IFV95342790/pdf/content/ltl72D173882D4aEBDDC.pdf.a

This eradication was not purely pragmatic. The primary Catholic Church sources recounting the torture of Isaac Jogues described the Iroquois as "wolves."[273] On a mythic level, the eradication of apex predators was not entirely separate from Indigenous genocide.

Earlier, I discussed the idea that animals are "good to think with". Something that is less obvious is that private, corporate, and governmental ideas about how to treat animals are a form of collective unconscious of what they would do to human beings, were it permissible. This metonymy is evident in the US slaughter of buffalo in the 1870s, phrased as "Kill Every Buffalo You Can! Every Buffalo Dead Is an Indian Gone."

It is uncomfortable to reflect that in the late 1960s when we played "Cowboys and Indians" with cap-guns in our Seattle back yard, we were rehearsing Indigenous genocide from 100 and 200 years earlier.[274] In 1871, William "Buffalo Bill" Cody "made a contest of the [buffalo] hunt" intended to yield Indigenous starvation.[275]

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[273] Perron, Paul J. *Narratology and Text: Subjectivity and Identity in New France and Québécois Literature.* Toronto: University of Toronto Press, 2003, pp. 105 – 106.

[274] Isenberg, Andrew C. *The Destruction of the Bison: An Environmental History, 1750-1920*. New York: Cambridge University Press, 2006.

[275] Phippen, J. Werston. "'Kill Every Buffalo You Can! Every Buffalo Dead Is an Indian Gone': The American bison is the new U.S. national mammal, but its slaughter was once seen as a way to starve Native Americans into submission." The Atlantic, May 13, 2016. https://www.theatlantic.com/national/archive/2016/05/the-buffalo-killers/482349/

In the Adirondacks, the niche of apex predator has not gone unfilled. These days there are foxes and coyotes who take down my chickens and turkeys. There's no getting rid of them really, because the brook is a wildlife corridor between the Adirondack mountains and Lake Champlain.

The management of the predator/poultry relationship remains one of the unsolved problems of our orchard. Creatures that eat chickens have a role to play in an orchard: they eat vermin that might otherwise overrun the orchard, given the orchard's abundance.

When we first bought the orchard, in December of 2009, there had been heavy snow. Our first morning, we saw coyotes out the window eating drop apples under an apple tree in the snow. The locals call them "coydogs." They are either Eastern Coyotes or a coyote-red wolf hybrid. I hadn't known they eat apples.

I did once hire a man with a gun to spend the day at the farm with the idea of shooting foxes. (Foxes were showing up several times a day, structuring their sleep schedules, apparently, around when we opened the chicken coops.) The man with the rifle did not see any foxes. I presume the foxes were there that day but were astute enough to recognize a rifle, and so hid.

One of my kids cracked their iPhone screen whacking a fox on the nose when it was trying to grab a beautiful young hen with a crest and pale orange, almost peach-colored, plumage. (The fox got the hen a week later.)

The most destructive chicken massacres seemed to involve fox families with kits. The kits are cute.

The fault for all of these deaths is my own for foolishly envisioning glorious chickens patrolling the entire property for orchard pest insects, and for inadequately securing chicken coops, sometimes by accident, sometimes by failure of design, and sometimes because I lost an argument with a bird. Birds who get their own way about where they sleep at night, in such arguments, are almost always dead in 48 hours.

There are many design problems implied by these conflicts. To me, having an orchard is in part about learning to share.

THE BEAUTY OF ROOSTERS

I mail-ordered my chickens straight run (i.e., with no gender screening) from Greenfire Farms, a hatchery that specializes in European heritage breeds: half of my chicks were male. What farmers are supposed to do is kill off enough roosters to get the gender ratio to about one rooster to ten hens. I didn't do that. Partly because we have enough space to rearrange chickens to avoid the worst consequences of a 50/50 gender split: these are that roosters fight, and the problem of too many roosters trying to mate with too few hens; the hens can be injured. Roosters are gorgeous and funny and brave and have wonderful personalities.

Figure 20: Svarthöna rooster July 2016. Photo by Kathryn Cramer.

My purpose for the chickens was more insect control than eggs. There would have been no pressing need to kill roosters. Yes, there was a certain amount of cock fighting, but mostly we could work it out.

In his essay "Deep Play: Notes on the Balinese Cockfight," anthropologist Clifford Geertz described cock fighting in Bali:

> …the cocks fly almost immediately at one another in a wing-beating, head-thrusting, leg-kicking explosion of animal fury so pure, so absolute, and in its way so beautiful, as to be almost abstract, a Platonic concept of hate.[276]

Although on our farm we did not set out to have cock fights, we did have some. The fights are gorgeous and a bit like the battles in Shakespeare plays. The roosters, for the most part, don't actually hate each other, although it can be difficult to get certain roosters to stop attacking certain other roosters. (Roosters entered my farm as young birds. I never tried to bring in adults.) I can see why it is a form of entertainment, though I needed to find ways to make them stop.

Roosters will attack you. When they attack you, it doesn't mean they hate you. Don't engage with rooster aggression, because that brings you into their discourse. The solution turns out to be putting on my thickest pair of Tractor Supply padded overalls and heavy boots and ignoring them when they attacked me. When ignored, they lose

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[276] Geertz, Clifford. *The Interpretation of Cultures*. New York: Basic Books, 1973.

their nerve and look around as though pretending it must have been the other guy who just tried to sink his spurs into your ankle. Roosters get embarrassed.

When I had a lot of roosters (maybe 35?) they would form patrol gangs of about 5 to 7 birds and patrol the farm eating bugs and presumably ready to take on creatures that like to eat chicken. I had not expected the rooster camaraderie. I saw a lot more rooster friendships than hatreds.

The *best* thing about having so many roosters was the chorus. They would start at 3:30 AM, pick up again around 4:30 when the freight train went by, responding to the whistle, and the most sustained crowing was around dawn. Groups of roosters organize their calls by hierarchy, with the highest-ranking birds going first and call and response in order.

It is beautiful and marvelous and was one of my favorite parts of having a farm. Since so few people end up with 35 roosters near their bedroom window, I have never heard of this from anyone else.

I remember lying in bed in Westport while recovering from brain surgery, listening to my glorious roosters, and wondering if dinosaurs crowed to greet the dawn.

The Making of Chicken Coops

Figure 21: Chickens at my orchard, 2016. Photo by Kathryn Cramer.

We have a lot of geodesic domes at the orchard[277] and it has been my conviction for a while that no one should get through a design program focused on foresight without the experience of building a geodesic dome at human scale with the intention of using it for something, and seeing how this fails.

If your design can't keep a chicken alive, why should you design for humans?

One of the truths about chickens, even expensive chickens, is that chickens are cheap; it's the housing that is expensive. This fact of poultry economics dooms most chickens to a short and dreadful life.

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[277] "Zip Tie Domes." *Zip Tie Domes | Geodesic Dome Greenhouse Kits Chicken Coop Kits for Sale*, https://www.ziptiedomes.com/. These are the geodesic domes we tend to for the housing of poultry and sometimes pigs.

Corporate egg farms commonly pack six chickens to a cage. Many "free-range" operations are like giant crowded chicken convention centers, with chickens nearly as densely packed as in those awful cages, except they are all together.

Chickens have certain characteristic ways of expressing social stress. One of these is pecking each other. If there is a spot of blood on a chicken, the other chickens tend to peck at it. This leads where you think it does.

To avoid this, if you order baby chicks online in the US, and if you order from a big commercial hatchery, you have the option to order your chicks "debeaked." This practice is banned in at least six European countries.

Most male chicks live only long enough for the hatchery to discover their gender.

Baby poultry from hatcheries in the US are mostly shipped by US mail and have been for a hundred years. In the summer of 2020, when Trump's Postmaster General sabotaged the functioning of the US Postal Service, chicks died by the thousands undelivered. Postal workers in warehouses could hear them peep-peep-peeping but could not save them.[278]

Chickens are wonderful, fascinating birds with complex social behaviors and individual personalities. Judging chickens' collective character by how they behave in

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[278] Healy, Jack. "Chicks in the Mail? Rural America Faces New Worries with Postal Crisis." New York Times, August 21, 2020. https://www.nytimes.com/2020/08/21/us/postal-service-mail-rural.html

concentration camp conditions is about as defensible as judging humans as a species when kept in similar conditions.

Chickens are not dumb. Their thinking is just, sort of, *pixelated*. You can see it in the way they move. Chickens have the misfortune, as a species, to be adaptable enough to live in concentration camp conditions and still yield food humans will eat.

Chickens see more colors than you do.[279] They perceive and know things that you don't.[280]

In principle, those of us who have backyard chickens can give them a much better life. When one shops for chicken housing, there are a lot of coops you can buy that accommodate up to about eight or dozen birds. After that, there is much less on the market. A very different kind of housing, the technologies of factory farms, becomes available at about 100 birds. There is this awkward zone where there is not a lot of housing commercially available for the number of birds you have.

Setting up your backyard chicken coop—whether you bought it or made it—is rather like setting up Barbie's Dream House, except Barbie and her friends live inside

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[279] "Chickens 'one-up' humans in ability to see color." Science Daily, 2010. Retrieved August 10, 2020 from https://www.sciencedaily.com/releases/2010/02/100216101159.htm.

[280] Marino, Lori. "Thinking chickens: a review of cognition, emotion, and behavior in the domestic chicken." Animal Cognition 20, 127–147, 2017. Retrieved August 10, 2020 from https://link.springer.com/article/10.1007/s10071-016-1064-4.

Alfred Hitchcock's *The Birds*.[281] [282] Projection is the psychological trick of the movie. The people hiding out in the house are made to live like chickens in a coop actually do live: creatures are constantly trying to get in to kill them and sometimes those creatures succeed.

Geodesic domes are one of the cheapest ways to get square footage for your birds. You can cover the domes in chicken wire and tarps. This is ugly and probably isn't what Buckminster Fuller had in mind when sketching lovely visions of geodesics. In principle, one could sew these tarps into coverings pleasing to the eye. That's a lot of sewing for something the sun and wind will destroy in six weeks, and every seam is a potential point of failure.

"Chicken wire" presumably protects chickens. Except it doesn't do it very well, both because coyotes and bears can tear it, but also because it rusts and gets metal fatigue and develops holes that need to be patched. Instead, to protect chickens, you are supposed to use something called "hardware cloth" that isn't cloth but instead is a heavy gage wire mesh. Because of all the weird angles of geodesics, you have to use chicken wire anyway. (This involves a lot of zip ties to make it secure.)

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[281] Hitchcock, Alfred. (Director) *The Birds*. [Motion Picture.] Universal Pictures, 1963/

[282] Strangely, someone offers a Birds Special Edition Barbie for sale on Amazon. Barker, John P. "Love Your Barbie the Alfred Hitchcock Way." InventorSpot.com. No date. Retrieved August 2, 2020, from http://inventorspot.com/articles/barbiethe_alfred_hitchcock_way_21290.

Chickens need a lot of ventilation and need to be kept dry, so you can't just close everything up. There are a lot of specific needs of chickens that are not the same as yours.

Figure 22: Chicks and turkey poults in my garage, May 2016. Photo by Kathryn Cramer.

Do not be tempted to bring them inside to live in the house. Chickens make dust and are messy in ways that are very hard to clean up after if they have spent a month in your garage. It is no fun to find poultry mites in your bed clothes.

It turns out designing for chickens—for the benefit of the chicken—is hard and worth attempting.

I have a cute little book called *Pet-tecture: Design for Pets*[283] that ought to occupy

this niche but doesn't. Instead, the gaze of the book is one of consumer fetishism, in

which the animals are objectified as lifestyle accessories that need further elaboration

through architect-designed housing: These animals and their housing becomes décor

within our houses. A characteristic confection from this book is a coffee table with both

space to store magazines and a bed for your dachshund:

> The design is perfect for the dog that wants to be in the center of a living area or close to its
> owner. (P. 209)

On page 159, there is an "indoor coop" for chickens that was included in an exhibition

at Geneva School of Art and Design from an exhibit called *The Animal Party* that

"examined the role of animals in our society." The coop seems to have been designed

by someone who does not know chickens that poop. It is an object of almost pure

fantasy. What is wanted here is a design that imagines chickens leading fulfilling

chicken lives while living a natural chicken lifespan: the chickens as subjects with

agency.[284]

Designing around geodesics is hard. Geodesics have no conventionally vertical

surfaces onto which to mount egg boxes. Every vertex is a possible point of failure for

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[283] Wainwright, Tom, *Pet-tecture: Design for Pets*. London: Phaidon, 2018.

[284] Sort of like Temple Grandin, except the birds don't have to die at the end of the chute.

materials. If you put tarps on a geodesic coop, in a high wind, the tarp will act like a sail and lift your coop off the ground. (You need to tie it down to unsightly cement bricks or jugs of water so it doesn't fly up in the air and land on your darlings.) And it has no floor, so creatures that can dig can and do tunnel under.

My coop with the highest survival rate is a geodesic dome 16 feet in diameter that is large enough to put some smaller coops inside. I use children's rope ladders with wooden rungs as bird perches, and for winter we put a ring of bales of hay around the inside, both because they block the wind but also because they slowly compost, releasing a little heat.

My biggest geodesic dome has the highest survival rate because it has a lot of head space for the birds to get away when—not *if*—predators get in.

There is a solar-powered electric fence around the coop. Foxes can jump over it; skunks seem undeterred. I once arrived at dusk, to close up that coop, to discover inside there were already three skunks.

I chase away foxes. I did not chase the skunks.

That you should assume a predator is already inside and ask yourself how the chicken will survive is a design principle of chicken coops that was not obvious at the outset. It is a design principle that scales.

CHICKEN SEMANTICS

After a while of listening to chickens and trying to keep them alive, I found I had begun to process all birdsong as speech. One thing I know is chickens have a vocabulary and they use modifiers. One of the most important chicken words to know if you are trying to keep birds from dying is the word for *predator*, a sort of cackling noise. It was inflected differently depending on the bird's degree of alarm. Chickens warn each other.

Once I heard a white hen named Diva, a beautiful Isbar who laid blue eggs, make the predator noise, pause, and then do a *caw-caw-caw* sound, followed by the predator noise again. I looked up where the chicken had been looking and there was a large crow passing overhead flying low. I realized not only had I correctly understood that the chicken was warning of a predator, but I had also just heard the chicken specify the species.

There are people who study the meaning of chicken vocalizations to improve farm practices.[285] That chicken language is being studied sounds sweet, but the involvement of machine learning suggests these technologies will be deployed in factory farms. An

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[285] Jabr, Ferris. "Fowl Language: AI Decodes the Nuances of Chicken 'Speech': How machine learning can translate chicken chatter and improve farming." Scientific American, December 11, 2017. https://www.scientificamerican.com/article/fowl-language-ai-decodes-the-nuances-of-chicken-ldquo-speech-rdquo/

article in Scientific American concludes with the quote from one of the researchers, Wayne Daley:

> *"In Georgia poultry is a big industry, and almost every company that raises chickens has a presence here," Daley says. "We've talked with a lot of them and they all think it would be useful. The ecosystem to do this already exists. We just need to perfect the technology."*

The "I Love New York" Commercial

The single most profitable day of our orchard, since we have owned it, was October 4th, 2013. Our orchard was used as the venue for about 7 seconds of a 15-second I Love NY ad.

Figure 23: A screen capture from the I Love New York ad. The barn is real.

The orange leaves are fake. The people were paid actors. One is a child of a friend, but the others responded to a casting call. The 1940s tractor was rented by the film company from a man in town. The bales of hay and pumpkins were brought in by the film company. The apples, Red Cortlands, are real, but they are not from the trees in the picture which are Paula Red trees. The apples were attached to the trees with wire. The film company paid people to spend two days doing that. The apples on the trees further in the distance were red tissue paper. Thus is "movie magic" made.

The concept was that this guy was sitting in his office in Manhattan and sees an apple on a conference room table; he is suddenly possessed by the desire to go to upstate New York and pick apples. The film company encountered the problem that 21st-century orchards don't look like the nostalgic ideal any more. The trees are smaller, nearer together, trellised like grapes. Our orchard, planted in the 1980s, has old-school charm.

The rows where the film company wanted to shoot—with the view of our charming post-and-beam barn—had, however, already been harvested. In preparation for filming, people paid by the film company spent two days wiring apples we had already harvested (Red Cortlands) onto the Paula Red and Jonna Mac trees. The film company brought hay bales, pumpkins, and fake autumn leaves. The rented from a man in town a vintage tractor and a vintage pickup truck. The orchard made money both on the venue rental (I

should have charged more) and on apples sold to the film company. Various local kids were recruited to be in the commercial.

The commercial itself is no longer available online. It is fascinating to look at the image-making of the film company now, as a way of seeing what people see in orchards and what ideas they project onto them.

Argentine Organic Apples in the North American Apple Season

We grow our apples organically but we are not certified organic.

In the ten years we've owned the orchard, we have sprayed only dormant oil (which is an oil that prevents bug eggs from hatching), Surround (kaolin), neem oil (an insect repellent), and maybe garlic oil. All of these are allowed under organic protocols.

Our crop is inconsistent. Some years we have almost no apples. Other years we have so many that the trees bow down to the ground. We have mostly stopped spraying altogether.

Pest pressure has seemed to go down. No conventional pesticides or herbicides have been sprayed on the orchard since the summer of 2009, shortly before we bought it. The ecology has had ten years to recover.

There was an old sprayer—a bright yellow rectangular tank-thing—that came with the farm. The last person to use it had not cleaned it, so it was clogged with jellied

pesticides. It is hard to overstate the repulsiveness of the smell. I could not stand to be within ten feet. It was hauled away for scrap metal around the time we rehabbed the barn.

We have instead addressed the issue of pests by having free-ranging chickens to eat bugs,[286] and pigs to eat drop apples. We believe grazing the pigs under the trees (called *silvopasture*) has improved the soil, and with that improved the trees' immune systems.

Figure 24: Working Pigs at the orchard. Photo by Kathryn Cramer.

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[286] Unfortunately, a lot of things like to eat chickens, so we have a lot fewer chickens than we did at the height of this experiment.

We had our first big harvest in 2013. At the height of apple season, the apples from the big orchard in Peru, New York, 35 miles away dropped below $1/lb. in the local grocery store. I noticed the organic apples for sale, retailing at $4/lb., were imported from New Zealand. This past year in October, some of the organic apples at the Middlebury Coop in Middlebury, Vermont were imported from Argentina.

While we do grow organic, we lack regular pickers, sorting systems, distribution systems, and specialized cold storage. It would be difficult for us to reliably partner with stores.

While it was less surprising that the chain grocery store in Elizabethtown, the county seat, would be selling imported organic fruit when apples are in season because of the ways mass distribution systems are entrenched, the Middlebury Co-op deals directly with many of Vermont's orchards.

Our trees produce a highly desirable commodity that is much fresher than the New Zealand and Argentine apples that make it into our stores. (Given that these places are in the southern hemisphere, those apples were probably picked four or five months earlier.)

Between 2013 and 2016, the situation has improved some. When I looked around in 2013, none of the organic apples I saw were grown in the US.

In 2019, only some are from the southern hemisphere. There were also some imported from Washington State. While that is thousands of miles away, at least the apples were from this season.

OLD APPLE TREES

Figure 25: Old apple tree formerly on southern Dudley Road. Photo by Kathryn Cramer.

There are a lot of old apple trees in the Champlain Valley, especially along roadsides. There was an old apple tree on the southern part of Dudley Road around the corner from our orchard. It was knocked down in a storm late last year. I took this photo of it when I went for a walk on July 4, 2019.

Apple trees are not native to North America. They originated in Kazakhstan and followed the Silk Roads to Europe and other parts of Asia. The Jesuits brought the apple to New France in the seventeenth century.[287]

In *The Ghost Orchard*, Helen Humphries explains how one reads roadside apple trees.

> Driving back to Canada, I look at all the stray apple trees along the side of the road, the blossom flashing white, and I think of how trees operate as a kind of code language into the past. A few trees clumped together signal an old orchard, while a single tree by the side of the road could be from an apple tree flung from a moving vehicle; a lone tree in a cow field is perhaps the result of an apple being eaten and excreted by a cow. The past is all around us if we look carefully and can figure out a way to read it.[288]

Humphries describes at some length the orchards of Indigenous peoples in North America, including destruction of some of the orchards.

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[287] Daley, Jason. "How the Silk Road Created the Modern Apple; A genetic study shows how wild Kazakhstan apples dispersed by traders combined with other wild species to create today's popular fruit." Smithsonian Magazine, August 17, 2017.

[288] Humphries, Helen. *The Ghost Orchard: The Hidden History of the Apple in North America.* New York: HarperCollins, 2017, p. 33.

In 1779, Major John Sullivan was sent by George Washington with a large army to the Finger Lakes region. They destroyed large orchards, some with more than 1,500 trees that had been in production for at least fifty years.

> Sullivan's army eliminated the Seneca food source by girdling the apple orchards and burning the crops.
>
> To "girdle" a tree is to cut a width of bark from its circumference, thus preventing the sap from rising to the branches. It is an effective way to kill a tree—and a cruel one, as the tree still looks alive, in that it is standing and any blossoms or fruits or leaves on it at the time of girdling remain. It was favored as a method of destruction by armies because it requires a lot less effort than cutting down a tree, saving the strength and energy of the men.

Many of the families whose trees had been destroyed starved or froze to death the following winter.[289]

I am reminded of the apocryphal story of George Washington and the cherry tree I was taught in the first grade on the occasion of George Washington's birthday in February of 1969. It originates with the 1809 edition of Mason Locke Weems' *The Life of George Washington ; with Curious Anecdotes*:

> "George," said his father. "Do you know who killed that beautiful little cherry tree in yonder garden?" This was a tough question ; and George staggered under it for a moment ; but quickly

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[289] Humphries, Helen. *The Ghost Orchard: The Hidden History of the Apple in North America*. New York: HarperCollins, 2017, pp. 18 – 21,

recovered himself: and looking at his father, with the sweet face of youth brightened with the inexpressible charm of all-conquering truth, he bravely cried out, "I can't tell a lie, Pa ; you know I can't tell a lie. I did cut it with my hatchet." "Run to my arms, you dearest boy," cried his father in transports, "run to my arms; glad am I, George, that you killed my tree ; for you have paid me for it a thousand fold. Such an act of heroism in my son is more *worth than a thousand trees*, though blossomed with silver, and their fruits of purest gold."[290] *(italics mine)*

The 4,000 soldiers Washington sent in 1779 to destroy the Seneca agricultural system would have mostly been in their fifties at the time this was published thirty years later. Men reading aloud this most insipid of all stories of American history to their children and grandchildren might themselves have been among the genocidal destroyers of the Seneca orchards.

I do not know how the many roadside apple trees in the Champlain Valley came to grow there, or who planted them, but they are abundant.

At the back of Humphries' book, there is a glossary with a list of apple varieties that are presumed extinct. "Extinct" apple varieties are occasionally rediscovered.[291]

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[290] Weems, Mason Locke. *The Life of George Washington ; with Curious Anecdotes*. [1809] Philadelphia: J. B. Lippincott, 1858, p. 16.

[291] Fox, Alex. "Ten Apple Varieties Once Thought Extinct Rediscovered in Pacific Northwest: The 'lost' apples will help restore genetic, culinary diversity to a crop North America once produced in astonishing variety." Smithsonian Magazine, April 17, 2020. Retrieved on August 31, 2020, from

Pigs at the Orchard

Once there was an orchardist with no orchard who wanted to experiment with using pigs in an orchard for cleanup. She asked if she could use our orchard as a venue for this experiment, and we said yes. She drove to Maine to pick up American Guinea Hog piglets. She'd said she had only enough money to buy three. We'd kicked in some money and told her to buy two more. She came back from Maine with five piglets.

So. Once upon a time there were five little pigs.

Figure 26: Five little pigs. Photo by Kathryn Cramer.

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https://www.smithsonianmag.com/smart-news/10-apple-varieties-once-thought-extinct-are-rediscovered-pacific-northwest-180974694/

She told us they were a special kind of pig that didn't root, which means dig up the grass. We put the big plastic crate in the dog run and let them out. They were terribly cute, and they liked having their bellies rubbed. Immediately, they began to root.

After a day or so, she set up the electric fence and put the piglets inside the fenced area under the trees. A while later, we checked on them. The piglets were gone. Nowhere to be found. Just as it was getting dark, a line of little pigs trotted out of the woods across the street, apparently returning from the brook. They went back into their crate and went to sleep. There is a longer story here. Over the course of a few months the piglets got out a lot and had to be caught and coaxed back inside the electric fence.

But here is an important moment regarding pig cognition; it is one thing to read that pigs are smart, and another to see a thought leap from pig to pig:

The piglets would frequently run out of water because they would tip over their water dish to make mud to bathe in. We bought them a big rubber tub that was too big for them to overturn and I filled it with water. They didn't know what to make of it.

I put my hand in the water and went *splash, splash, splash* to show them they could get at water there. One piglet looked at me intensely and put its front trotters up on the edge of the tub and went *slash, splash, splash*. One piglet after another got the idea. Soon, all five were gathered around the tub and all five were slashing their front trotters in the water. This went on for what seemed like about five minutes. Then they all stopped, and went back to grazing under the tree.

A few weeks later, we came to a parting of ways with the orchardist who took the piglets to Virginia and we never saw them again.

While we did form attachments with the litters from new pigs later, the mamas would guard their babies and we never became quite as friendly with them as we did with the very first piglets who arrived motherless.

Mass Incarceration & the Adirondack Utopia: An Example of Dystoutopia

Although it does not figure into how I run my orchard, we are indirectly subsidized by mass incarceration because it reduces local taxes. The State of New York addressed the economic issues involved in the creation of the Adirondack park with its strict environmental laws by building prisons: Inasmuch as there are jobs to be had in the Adirondacks, those prisons provide a lot of them.

Most governmental entities in the Adirondacks meet their budget numbers by using prison labor for some tasks. Prisoners plant shrubs for the schools. Prisoners clean up Lake Champlain's beaches in May and shovel snow in January. Prisoners erect buildings on the Essex County Fairgrounds. It keeps our taxes down.[292]

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[292] Hall, Clarence Jefferson. *Prison in the Woods: Environment and Incarceration in New York's North Country*. Forthcoming in November 2020, from the University of Massachusetts Press. I am familiar with the book's arguments through conversation with the author.

I engaged with the matter of the Adirondacks and mass incarceration in my story "Am I Free to Go?"[293]

THE MYTHOS OF THE AMERICAN HOMESTEAD

The family farm is a symbolic semantic category related to American identity. It is the mythos of the American homestead.[294] It is about self-reliance in a globalized world where true self-reliance is, for the most part, no longer possible.[295] It is about growing your own organic apples while the organic apples sold in your local grocery store come from Argentina or New Zealand. It is about survival in the face of adversity.

The possibility you can make your small farm profitable[296] is the last stand of a crucial piece of American national identity.

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[293] Cramer, Kathryn. "Am I Free to Go?" New York: Tor.com, December 12, 2012.
   https://www.tor.com/2012/12/12/am-i-free-to-go/

[294] McLeod, Brett. *The Woodland Homesteads How to Make Your Land More Productive and Live More Self-Sufficiently in the Woods*. North Adams, MA: Storey Publishing, 2015.

[295] Storey, John & Martha. *Storey's Basic Country Skills: A Practical Guide to Self-Reliance*. North Adams, MA: Storey Publishing, 1999.

[296] Macher, Ron. *Making Your Small Farm Profitable*. North Adams, MA: Storey Publishing, 1999.

6 FARMING THE FUTURE

Because when time ends, the birds and hippos and lions and deer at Disneyland

will no longer be simulations, and, for the first time, a ^{real} bird will sing.

—Philip K. Dick[297]

Farming is an unlikely vehicle of futurism. Farming is usually thought of as a relic of the past, of the lifestyle our ancestors lived before modernity brought them to the city. And yet we all eat food grown on farms, and so will our descendants.

Farming has become for much of the "developed" world a technological unconscious through which a mostly unexamined futurity is expressed. This is in part because farming has become globalized and our food comes from remote parts of the world, and in part because farming is conducted by large corporations using big machines worked by people from elsewhere who have little voice in our societies. Farming has a lot to tell us about the future.

Because of the globalization of the world's food economy, the economic frame of reference where our orchard was planted is never coming back. Neither minor tweaks, nor drenching the trees in neurotoxins will restore the farm to break-even. Our orchard has no obvious future within a capitalist framework.

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[297] Dick, Philip K. "How to Build a Universe that Doesn't Fall Apart Two Days Later." The speech was written in 1978. According to Lawrence Sutin, the speech was probably never delivered. It was first published in *I Hope I Shall Arrive Soon* (1985)." *The Shifting Realities of Philip K. Dick*, Lawrence Sutin ed., 1995. Speech retrieved August 2, 2020, from https://web.archive.org/web/20080125030037/http://deoxy.org/pkd_how2build.htm.

The changes I had made before Covid-19 and before the closing of the US border involved barter: having a free U-pick arrangement in which people would give us half of the fruit they picked. We started this as a way to work with the Amish and generalized it.

Figure 27: An anonymous thank-you note from a family that picked apples. Photo by Kathryn Cramer.

We tried a co-production arrangement for hard cider with the local micro-brewery.

These represented a shift to managing the farm as a community resource rather than as a "business" that might turn a profit. Those were interesting ideas, but taken together they did not form a plan.

These incomplete notions are problematized further by Covid-19. As this document is being completed, there are ripe apples on the trees and we are trying to find out what

New York State's regulations are for running a U-pick operation. Meanwhile, there has just been an outbreak of over 40 cases in the town adjacent Westport. What fragile concepts we had may not currently be feasible.

In *A Pattern Language*, Christopher Alexander, et al, remark about the enclosure of farms:

> Farms, when treated as private property, rob people of their natural biological heritage—the countryside from which they came.[298]

In the case of orchards, this biological heritage consists not only of a beautiful place with views of mountains and the lake and with meadows of beautiful wildflowers, and apple blossoms in the spring, but also of access to fruit that otherwise will likely fall to the ground and be fed to the pigs. It engenders a situation where food insecurity and fruit on the ground co-exist in the same town. Farms like mine beg the question of whether property is theft.

Alexander, et al., imagine the creation of "stewardships of people, families and cooperatives, with each stewardship responsible for one part of the countryside."[299]

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[298] Alexander, Christopher, et al. A Pattern Language Towns, Buildings, Construction [1977]. Oxford University Press, 2013, p. 37.

[299] Ibid, p. 39.

In *Pattern Language*, "Fruit Trees" are pattern 170. Alexander, et al., ask us to:

> Imagine a community gradually being able to produce a portion of its own need for fruit, or cider, or preserves. In the beginning, it would be a small portion indeed., but it would serve as a beginning. There is not much work involved if it is tackled communally, and the satisfaction is great.[300]

But with industrially produced apples so thoroughly devaluing the fruit, it is hard to envision this seeming to people worth the effort. More diversified farms in the area form CSAs[301] where community members can buy food on subscription. We have only one core crop, so the CSA model isn't feasible for us. Let us instead consider my farm as a canvas onto which to project our utopian longings, visions of an agrarian future.

MY FARM AS A CANVAS

Because we have never used commercial pesticides on the trees in the ten years we have had the orchard, we are already a few steps towards agrarian utopia: when you stop using pesticides it takes several messy years for the ecology to adjust. We now regularly have a nice crop with no pesticides.

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[300] Ibid. p. 795.

[301] CSA stands for Community Supported Agriculture.

The book that, perhaps, most closely characterizes what we have already done is Bill Alexander's *The $64 Tomato*, subtitled *How One Man Nearly Lost His Sanity, Spent a Fortune, and Endured an Existential Crisis in the Quest for the Perfect Garden.*[302] We have spent a lot of money, tried a lot of solutions that didn't work, and have not solved the underlying problems.

HAZY VISIONS OF AGRITOPIA

The orchard has an ecology, that is part wild, part tame. We are accepting of the existence of this ecology, but don't understand the levers for balancing it. The approach that looks most enticing is some variant on rewilding. While providing for a diverse ecosystem, we need to provide for the growing of food.

The books that give us a glimpse of the promise of the farming future are books on agroecology. One of the most pattern-language-like is Bill Morrison's *Permacultures: A Designers' Manual*. It has a lot of interesting ideas, but most are for climates different from my own.[303]

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[302] Alexander, Bill. *The $64 Tomato: How One Man Nearly Lost His Sanity, Spent a Fortune, and Endured an Existential Crisis in the Quest for the Perfect Garden.* Chapel Hill, NC: Algonquin Books, 2007.

[303] Morrison, Bill. *Permacultures: A Designer's Manual.* Tagari Publications, 2012.

One of the up-and-coming ideas in progressive earth-friendly farming is silvopasture, which means grazing animals under your trees.[304] It figured in Drawdown[305] and other resources on reducing our carbon footprint. We are already grazing pigs under our apple trees, and may even be doing it now, though I am not there to see it because the border is closed. What I could never figure out is whether you have to eat the pigs to get the climate benefits. I seem to have simultaneously too many and too few pigs to manage the agritopia. How do I determine what is the right number of pigs?

The upshot of What Is to Be Done is to layer plants under trees in canopies,[306] emulating a rainforest,[307] to graze animals under the trees both to keep the understory in check (without destroying it) and to dispose of the fallen fruit on the food forest floor.

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[304] Gabriel, Steve. *Silvopasture: A Guide to Managing, Grazing Animals, Forage Crops, and Trees in a Temperate Farm Ecosystem*. White River Junction, VT: Chelsea Green Publishing, 2018.

[305] Hawken, Paul, ed. Drawdown: *The Most Comprehensive Plan Ever Proposed to Reverse Global Warming*. New York: Penguin, 2017. See also Project Drawdown at https://www.drawdown.org.

[306] Frey, Darrell & Czolba, Michelle. *The Food Forest Handbook: Design & Manage a Home-Scale Perennial Polyculture Garden*. Gabriola Island, BC: New Society Publishers, 2017.

[307] Hemenway, Toby. *Gaia's Garden: a Guide to Homescale Permaculture, Second Edition* [2000]. White River Junction, VT: Chelsea Green Publishing, 2009.

Figure 28: Apple trees with an understory. Photo by Kathryn Cramer.

Trees should be pruned regularly, and the prunings should be converted to biochar (a fancy word for charcoal)[308] which should be mixed with compost to charge it with nutrients, and should be buried near the trees to enhance the soil. This is a form of carbon sequestration,[309] though it is hard to tell what positive effect on soil and climate we might have by practicing this.

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[308] Bates, Arthur and Draper, Kathleen. *Burn: Igniting a New Carbon Drawdown Economy to End the Climate Crisis*. Chelsea Green Publishing, 2019.

[309] Wu, Ting, et al. "Carbon Sequestration by Fruit Trees - Chinese Apple Orchards as an Example." *PLOS ONE*, Public Library of Science, https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0038883.

In an orchard, one can do a lot of conceptually engaging things with fungi that may or may not work but which leave you with the satisfying image of a fungal Internet underground, beneath your feet relaying messages between plants.[310] I have made extensive use of these narrative possibilities in my story "Am I Free to Go?" and my screenplay, in collaboration with Ted Cornell, "You, in Emulation."

Large expanses of grass should be converted to meadows of wildflowers to support pollinators[311][312]. We have a 22-foot flower circle that comes back every year in front of our farm house. We seem to have had a lot more pollinators since we planted it.

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[310] Stamets, Paul. *Mycelium Running: How Mushrooms Can Help Save the World*. Berkley, CA: Ten Speed Press, 2005.

[311] Mader, Eric et al. *Attracting Native Pollinators: Protecting North America's Bees and Butterflies: the Xerces Society Guide*. Storey Publishing, 2011.

[312] Heller, S., Joshi, N.K., Leslie, T. et al. "Diversified Floral Resource Plantings Support Bee Communities after Apple Bloom in Commercial Orchards." Sci Rep 9, 17232, 2019.

Figure 29: Flower Circle 22 feet in diameter, planted in 2010 and slightly enlarged by a few feet in 2015.
Its practical purpose is to attract pollinators. But it is also very pretty and right in front of the farm house. Photo by Kathryn Cramer.

The farm should be patrolled by assertive though not aggressive free-range poultry who somehow manage not to be eaten by foxes, coyotes, racoons, minks, weasels, fishers, skunks, bears, owls, hawks, osprey, bald eagles, bobcats, snakes, other people's dogs, and poultry mites. (Pretty much anything with binocular vision has a taste for chicken, as well as a few things that don't.)

This agritopian farming could go well or badly, cost a little or a whole lot (probably the latter), and would benefit the environment in ways that are difficult to quantify but the whole enterprise would probably be emotionally gratifying.

Approaching the matter qualitatively doesn't give enough information to reveal whether a plan is a good idea because where most farming comes to grief is cold, hard numbers and a relationship with the Man from the Bank. Unlike many farmers, we do not have agricultural loans.
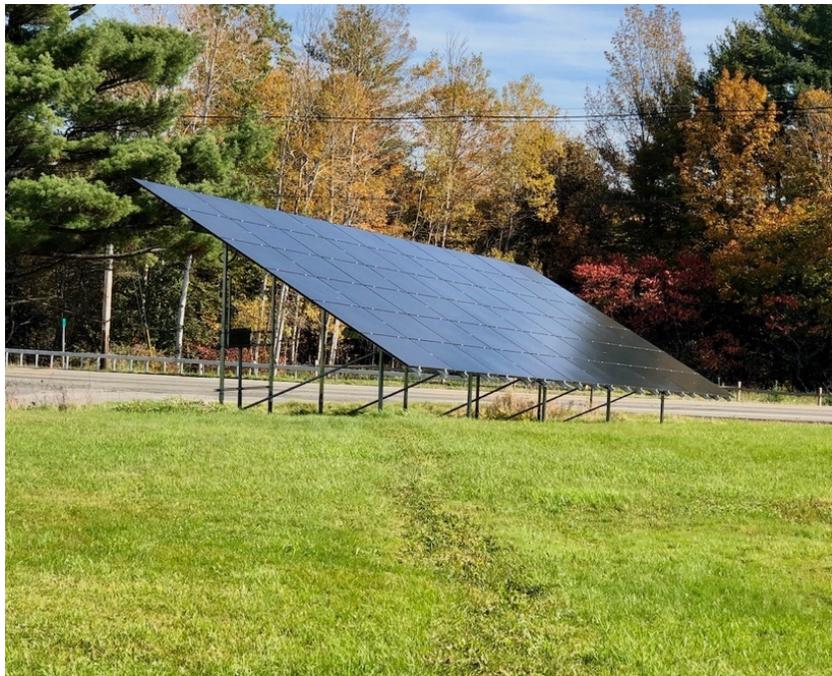
Figure 30: Solar collectors in the northeast corner of the property. Photo by Kathryn Cramer.

While I could get a hazy view of what an agritopia would look like, I could not determine how far we were from a good plan. I probably would have ended up more

enthusiastic about the vision of converting a family farm to a food forest if I had not had to ponder how this utopian retrofit might be paid for.

I am not alone in this predicament of not knowing enough to feel like I am making sound decisions about farming. Farming badly is expensive. Those of us foolish or courageous enough to try it strive for prudence when trying something unorthodox. At the end of Mark Shepard's book *Restoration Agriculture* there is a rousing call to action that speaks to this dilemma:

> We can no longer afford to wait for the universities or governments or any other "them" to get started. We can no longer afford to wait for more "research" to be conducted or for the ultimate varieties to be developed. We can't wait for incentives and cost-sharing programs that may never happen and would bind us with bureaucratic red tape. We can't relinquish the revolutionary power of one and wait for a hoped-for perfect organization to form. We are the ones who must so do this, and we must do it starting now. [313]

Mark Kimball of Essex Farm in Essex, New York, frames this appealingly insurmountable opportunity in a post on Instagram:

> … third rule of thumb: if you want to play the great game of farming against the corporate agriculture giants, you will not win if you use their language, their money, or their ethics. You

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[313] Shepard, Mark. *Restoration Agriculture: Real-World Permacultures for Farmers*. Greeley, CO: Acres USA, 2013, p. 293.

must shift your entire outlook. Most importantly, we have to connect to people on a personal level and remind them that getting packaged breakfast cereal is a crime.

Fourth rule of thumb: when a system is perceived broken by everyone involved, do not pretend that you will be helpful in that system. Sick sheep seldom survive![314]

This is an essential articulation of a retrofuturist stance: a rejection of dysfunctional modernity for its own sake and a vision of how to farm a future. This sentiment resonates with what Dunne and Raby call "New Realities."

As we rapidly move toward a monoculture that makes imagining genuine alternatives almost impossible, we need to experiment with ways of developing new and distinctive worldviews that include different beliefs, values, ideals, hopes, and fears from today's. If our belief systems and ideas don't change, then reality won't change either. It is our hope that speculating through design will allow us to develop alternative social imaginaries that open new perspectives on the challenges facing us.[315]

What these utopian longings most reveal is the depth and the breadth of the chasm that separates where we are now from where we want to be, a lacuna we lack words to describe.

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[314] Kimball, Mark. Instagram post by FarmerKimball, dated July 29, 2020. It accompanied a short video of pear trees with pears on them. https://www.instagram.com/p/CDO-TA8ppVL/

[315] Anthony Dunne; Fiona Raby. *Speculative Everything: Design, Fiction, and Social Dreaming*. Cambridge: MA: MIT Press, 2014.

As Kim Stanley Robinson points out, although a lot of the agritopian techniques sound impractical, they are perhaps less impractical than more technocratic means of addressing climate change.[316]

ECOSEMANTICS & OUR COLLECTIVE APHASIA

The time since the advent of the industrial revolution has not just been a period of mass extinction for living things, but also for words and languages. More than 230 human languages have gone extinct since 1950. There are 3,000 languages in danger of extinction.[317]

Even when some knowledge of languages is retained, the gaze of those keeping the records may be predatory. The preface to a 1903 Ojibway dictionary explains:

> This is the sixth edition in various forms published by the above Mission for the benefit of the Ojibway Indians, designed to assist them in acquiring a better understanding of the English language and the Holy Scriptures.[318]

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[316] Robinson, Kim Stanley. "There Is No Planet B: It's up to us to craft the shape of the future." Sierra Club, December 18, 2018. Retrieved August 14, from https://www.sierraclub.org/sierra/2019-1-january-february/feature/there-no-planet-b-kim-stanley-robinson.

[317] UNESCO. "Endangered languages," UNESCO, 2016. Retrieved August 6, 2020, from http://www.unesco.org/new/en/culture/themes/endangered-languages/atlas-of-languages-in-danger/.

[318] *A Concise Dictionary of the Ojibway Indian Language*. Toronto: International Colportage Mission, 1903.

In When Languages Die, K. David Harrison describes this loss of language and our collective loss of knowledge:

> Language disappearance is an erosion or extinction of ideas, of ways of knowing, and ways of talking about the world and human experience. Linguist Ken Hale, who worked on many endangered languages up until his death in 2001, told a reporter: "When you lose a language, you lose a culture, intellectual wealth, a work of art. It's like dropping a bomb on a museum, the Louvre." Even Hale's metaphor does not go far enough. We simply do not know what we stand to lose with the loss of a single language.[319]

Even within the languages of the British Isles, there are a lot of words for the natural world that are disappearing. Robert Macfarlane's book *Landmarks* attempts to reclaim some of what is being lost. In the book's opening chapter, Macfarlane discusses the deletion of words pertaining to nature from a new edition of the *Oxford Junior Dictionary*.

> The substitutions made in the dictionary—the outdoor and the natural being displaced by the indoor and the virtual—are a small but significant symptom of the simulated life we increasingly live. … A basic literacy of landscape is falling away up and down the ages. A common language—a language of the commons—is getting rarer. And what is lost along with this literacy is something precious: a kind of word magic, the power that certain terms possess to enchant our relations with nature and place. As the writer Henry Porter observed, the OUP deletions removed

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[319] Harrison, K. David. *When Languages Die: The Extinction of the World's Languages and the Erosion of Human Knowledge.* New York: Oxford University Press, 2007, p. 7.

the 'euphonious vocabulary of the natural world—words that do not simply label an object or action bit in some mysterious way become part of it.' Landmarks is a celebration and defense of such language.[320]

Landmarks includes such words as *èit*, a Gaelic word describing the "practice of placing quartz stones in moorland streams so that they would sparkle in the moonlight and thereby attract salmon to them in the late summer and autumn"; and *zwer*, a word from Exmoor meaning the "whizzing noise made by a covey of partridges as they suddenly break from cover"; and the hydrological word *frazil*, the "loose, needle-like crystals that form into a churning slush in turbulent super-cooled water, for example in a river on a very cold night."

A "DESECRATION PHRASEBOOK"

In the 2016 edition of *Landmarks*, Macfarlane quotes Rajendra Shende's commentary on Landmarks and the role of landscape language in social justice.

> Early in 2015, a landmark year for Climate Change, British naturalist Robert Macfarlane published a book, 'Landmarks'. In that searching book, Macfarlane passionately presents the way we deploy and destroy words and phrases connected to our ecosystem. "We have forgotten 10,000 words for our landscapes…." he stated, adding that we are using increasingly impoverished language to describe nature.

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[320] Macfarlane, Robert. *Landmarks*. London: Penguin UK, 2015.

Macfarlane is known for his exploration of avenues of nature and the languages that describe them. It is not sure if he has explored the language of hopes and despair deployed by the negotiators during the global climate negotiations. South Asia, one of the loci of poverty and milling impoverished humanity, is the living example of how along with vanishing language of environmental justice, even the landscape and landmarks too get lost.

Has Robert Macfarlane included in his book vanishing words like archipelago of Maldives and Sunderban of Bangladesh? And what about phrases like Khumbu Glaciers of Nepal, Ganges Delta and white tigers of Bangladesh?[321]

Macfarlane published a response to Shende in New Scientist:

…there was another kind of glossary I needed to assemble: a dark twin to the hopeful word lists of Landmarks. This would be a glossary of the Anthropocene: a lexicon recording the particularities of the environments and phenomena that our actions as a species are bringing into being. It would gather terms that describe a heavily harnessed or drastically deranged "nature": a "Desecration Phrasebook", as it were.

Such a glossary would need to record details of the topographies of toxicity and dereliction that we have made, the phenomena of pollution, corruption and extinction we have caused, and the coming miracles of geoengineering.

It would acknowledge human activity as a telluric force with an immense legacy. It might document, for instance, the "trash vortices" that swirl in the gyres of the world's great oceans; aspects of the pale hills of radioactive mine-tailings that rear above Johannesburg (gold mining as orogeny); or terms for the deep geological repositories in which we have entombed nuclear waste.

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[321] Shende, Rajendra. "South Asia: A Region that can change the climate of Paris summit." Indian Defense Review, 2015. http://www.indiandefencereview.com/south-asia-a-region-that-can-change-the-climate-of-paris-summit/

Is there a word yet for the post-natural rain that falls when a cloud is rocket-seeded with

silver iodide? Or an island newly revealed by the melting of sea ice in the North-West Passage?

Or the glistening tidemarks left on coastlines by oil spills?[322]

This "Desecration Phrasebook" Macfarlane hypothesizes is a kind of Truth and

Reconciliation document for humanity's relationship with the landscape. And in deed

genocide and ecocide, as I have argued earlier, are not truly separate subjects.

ANIMACY & LANGUAGE

In the chapter entitled "Learning the Grammar of Animacy" in *Braiding*

Sweetgrass, Robin Wall Kimmerer tries to unpack for English-language readers how an

understanding of animacy, of a different relationship between people and their

environments, can infuse Indigenous languages. The portion of her explanation I found

most illuminating was the section describing the relative proportion of nouns to verbs,

comparing English and European languages to Potawatomi.

English is a noun-based language, somehow appropriate to a culture so obsessed with things.

Only 30 percent of English words are verbs, but in Potawatomi that proportion is 70 percent.

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[322] Macfarlane, Robert. "Desecration phrasebook: A litany for the Anthropocene: For good or ill, we are remaking
Earth. What new words will be needed to describe the planet in the age of humans?" New Scientist, December
15, 2015. https://www.newscientist.com/article/mg22830523-200-desecration-phrasebook-a-litany-for-the-
anthropocene/

Which means that 70 percent of the words have to be conjugated, and 70 percent have different cases and tenses to be mastered.

European languages often assign gender to nouns, but Potawatomi does not divide the world into masculine and feminine. Nouns and verbs are both animate and inanimate. You hear a person with a word that is completely different from the one with which you hear an airplane. Pronouns, articles, plurals, demonstratives, verbs—all those syntactical bits I never could keep straight in high school English are now aligned in Potawatomi to provide different ways to speak of the living world and the lifeless one. [323]

What is implied by the linguistic differences Kimmerer describes is a difference in the semantics of how systems work, especially living systems, and what constitutes a living system.

In his book *Underland*, Robert Macfarlane responds:

Like Kimmerer, I wish for a language that recognizes and advances the animacy of the world, 'the life that pulses through pines and nuthatches and mushrooms … well[ing] up all around us.' Like Kimmerer, I relish aspects of discourse that extend being and sentience respectfully and flexibly beyond the usual bearers of such qualities. Like Kimmerer I believe that we need, now, a 'grammar of animacy.' A modern predisposition to regard animacy as an anomaly runs through what the poet Jeremy Prynne once called 'mammal language', by which he meant the language that is used by humans, encoding intent, agency and muscular power deep in its grammar. [324]

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[323] Kimmerer, Robin Wall. *Braiding Sweetgrass: Indigenous Wisdom, Scientific Knowledge, and the Teaching of Plants*. Minneapolis, MN: Milkweed Editions, 2013, p. 53.

[324] Macfarlane, Robert. *Underland: A Deep Time Journey*. New York: W.W. Norton, 2019, p. 112.

We have lost more than 230 languages since 1950. We do not know what we have lost. Anthropologist Roy Wagner's posthumous book *The Logic of Invention*[325] gives a glimpse into the surprising sophistication of thought present in what anthropologists have viewed as "primitive" cultures. Anthropology seems, superficially, to give us a guide to the general outlines of what kinds of thinking might have been contained in languages we have lost, and languages we are losing. But the truth of it is there is much we don't understand.

There is, however, an emerging field of ecolinguistics that aims to deploy language in service of the environment. In the introduction to the *Routledge Handbook of Ecolinguistics*, Alwin Fill explains:

> Ecolinguistics … is about critiquing forms of language that contribute to ecological destruction and aiding in the search for new forms of language that inspire people to protect the natural world.[326]

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[325] Wagner, Roy. *The Logic of Invention.* Chicago: HAU Books, 2018.

[326] Fill, Alwin F. *The Routledge Handbook of Ecolinguistics*. New York: Routledge, 2017.

REWILDING

In George Monbiot's book *Feral*, he puts forward the idea of rewilding as an alternative to the concept of environmental conservation. From Monbiot's point of view, environmental conservation is about preserving a past, whereas rewilding is about reclaiming a future for the ecology.[327]

> The ecosystems that result are best described not as wilderness, but as self-willed: governed not by human management but by their own processes. Rewilding has no end points, no view about what a 'right' ecosystem or a 'right' assemblage of species looks like. It does not strive to produce a heath, a meadow, a rainforest, a kelp garden or a coral reef. It lets nature decide. The ecosystems that will emerge, in our changed climates, on our depleted soils, will not be the same as those which prevailed in the past. The way they evolve cannot be predicted, which is one of the reasons why this project enthralls. While conservation often looks to the past, rewilding of this kind looks to the future.[328]

Isabella Tree, in her book *Wilding: Returning Nature to Our Farm*, describes an enactment of this concept. In particular, Tree discusses the role of wolves as apex predators, a subject we will return to later.

> The word 'rewild' was coined in the 1980s by the American conservationist Dave Foreman, one of the founders of the group Earth First!, who went on to help establish the Wildlands Project

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[327] Monbiot, George. *Feral: Rewilding the Sea, Land, and Human Life*. Chicago: University of Chicago Press, 2015.

[328] Ibid, p. 10.

(now the Wildlands Network) and the Rewilding Institute in the United States. It first occurred in print in Newsweek, in an article titled "Trying to Take Back the Planet" in 1990. It was subsequently adopted by American biologists Michael Soulé and Reed Noss who, in a Wild Earth article in 1998, refined it as conservation based on the 3 Cs – 'Cores, Corridors and Carnivores'. They emphasized the importance of ecological networks – joining up hotspots of biodiversity and isolated patches of wilderness so that natural processes can function on a significant scale again. And they championed the role of apex predators in the system – something that the father of modern conservation and, arguably, the first 'rewilder', the American author and ecologist Aldo Leopold, had identified half a century earlier. Yellowstone National Park has since become a flagship example of the rewilding movement in the States ever since it was seen that the reintroduction of wolves in 1995 led to a staggering increase in biodiversity – a phenomenon that has become known as the 'apex predator trophic cascade'. [329]

Rewilding is a deeply appealing idea. Individual experiences with this in practice will vary widely. And part of the point is relinquishing control and letting nature take its course and rebalance. It is a central motif of Karl Schroeder's 2019 novel *Stealing Worlds*. [330] He discussed rewilding a decade earlier in a 2009 speech. [331]

On my own farm, the cessation of the spraying of pesticides was a subtle kind of rewilding. And I have contemplated the project of converting my family farm to a food

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[329] Tree, Isabella. *Wilding: Returning Nature to Our Farm*. New York: New York Review Books, 2018, Tree, Isabella, pp. 153-154.

[330] Schroeder, Karl. *Stealing Worlds*. New York: Tor Books, 2019.

[331] Schroeder, Karl. "OSCON 09: Karl Schroeder, "The Rewilding: A Metaphor" YouTube, June 25, 2009. https://www.youtube.com/watch?v=qb7pkohj6wE

forest. During the agricultural phase, the working title of this document was "Family Farm to Food Forest." A food forest is interplanting food plants with natural ones in configurations that mimic natural plantings.

But also, there are other natural processes that give pause. For example, the spreading of Poison Parsnip, already abundant on friends' farms, if we were to stop mowing. Rewilding is a very attractive abstraction that does, however, carry more risks than just unprofitability.

7 FARMING SEMANTICS AS DYSTOPIAN LITERATURE

> "When a pig looks at a pig, it sees a human being, but when it looks at a human being it sees another pig."[332]

—from The Logic of Invention by Roy Wagner

My own vision of the Farm of the Future involves starting from the idea of a family farm as a desirable place to be and an expression of patterns of human habitation that have persisted for millennia reimagined as something that might mitigate climate change. Big Ag tech has very different views of what the future of agriculture should look like.

I fell down this dystopian rabbit hole of agricultural semantics by accident. One of the sales pitches of the devices I saw articulated in a news article was that it could reduce illegal immigration, as "illegal aliens" would no longer be needed to pick the fruit.[333] The dependency on migrant labor is an artificiality induced by market forces

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[332] Wagner, Roy. *The Logic of Invention.* Chicago: HAU Books, 2018, p. 25. The full quote reads, "Perhaps the most influential rhetorical incorporation of perspectival reciprocity was recovered by Tânia Stolze Lima (1999) from the Yudjá (Juruna) indigenes of eastern Brazil: "When a pig looks at a pig, it sees a human being, but when it looks at a human being it sees another pig."

[333] Editorial Staff. "This Fruit-Picking Robot Could Help End Illegal Immigration: Robotic Automation Could Help American Orchards Compete Without Migrant Labor." National Economics Editorial, May 18, 20017.

and globalization.[334] It was disturbing to encounter an argument for robotics motivated by American ethnonationalism.

The method of this section resembles the foresight methodology of signals and trends, though I have been less formal. As such, the strength of relying mostly on news reports is that it is vivid. The weakness is I don't know whether parts of it are just link-bait and vaporware, of whether they really exist.

ORCHARD SEMANTICS & HOW MACHINES SEE TREES

In December, while imagining a semantics for orchardry, I googled the term "orchard semantics." What turned up mostly pertained to orchard automation and robotics. While we were not shopping for robots, I did have a look at robotic approaches to issues we have at our orchard. Orchard-oriented semantics tends to be about how machines see trees,[335] and how they might recognize an apple so as to pick it.[336] GV (formerly Google Ventures) has invested ten million dollars in the

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[334] Lunsford, Mackensy. "Local Farms Feel Migrant Labor Pinch." Citizen-Times, 14 Mar. 2017.

[335] Dong, Wenbo, Pravakar Roy, & Volkan Isler. "Semantic Mapping for Orchard Environments by Merging Two-sides Reconstructions of Tree Rows." Journal of Field Robotics 37.1 (2019): 97–121.

[336] Pravakar Roy, Abhijeet Kislay, Patrick A. Plonski, James Luby, Volkan Isler,
Vision-based preharvest yield mapping for apple orchards,
Computers and Electronics in Agriculture, Volume 164, 2019, 104897, ISSN 0168-1699,
https://doi.org/10.1016/j.compag.2019.104897.

development of a robotic apple-picking system.[337] [338] The picking arms are vacuum

cleaner tubes reminiscent of Robby the Robot, which has roots in the Tom Swift series.

The apple-picking robot requires much adaptation of trees to meet the needs of the

robot. (This is reminiscent of how we have hunched over our laptops during quarantine

to meet the needs of the technologies of online education.) To a large extent,

commercial orchards have already adapted to mechanized spraying, etc. so it's not that

big of a leap.[339] [340] The distortions of trees to meet the needs of agricultural engineering

solutions make the trees vulnerable in a way conventional orchards are not,[341] opening

up the possibility that with certain kinds of economic collapses, this kind of orchard

could collapse in its ability to produce apples after only a few years. Because of the

way in which the new planting patterns transmit contagious diseases, the high-density

[337] Kolodny, Lora. "Abundant Robotics rakes in $10 million for apple harvesting robots." TechCrunch, May 3, 2017. Retrieved from https://techcrunch.com/2017/05/03/abundant-robotics-rakes-in-10-million-for-apple-harvesting-robots/?guccounter=1 on July 22, 2020.

[338] GoodFruitGrower, "Robotic apple picker trials continue in Washington." YouTube, 2016. Retrieved from https://www.youtube.com/watch?v=mS0coCmXiYU&feature=youtu.be July 22, 2020.

[339] "The Orchard of the Future: Higher Tree Densities, More Automation." Fruit Growers News, November 2, 2015. https://fruitgrowersnews.com/article/the-orchard-of-the-future-higher-tree-densities-more-automation/

[340] Henke, Jodi. "Trellising Apple Trees." Successful Farming, 4 Dec. 2019, https://www.agriculture.com/family/living-the-country-life/trellising-apple-trees

341 Robbins, Jim. "Fire Blight Spreads Northward, Threatening Apple Orchards." New York Times, 2 Dec. 2019, https://www.nytimes.com/2019/12/02/science/fire-blight-spreads-northward-threatening-apple-orchards.html?action=click&module=Well&pgtype=Homepage§ion&fbclid=IwAR2EvQMY25RUVECDwiUYIYphI7dQ88Xp1TVWwMENDGKnqYaPji_64KMR6z4·

plantings could take other kinds of agriculture down with them in the event of a tree pandemic.

SWINE ROBOTICS

We also have pigs and poultry on our farm. I checked out pig- and chicken-related robotics. To help with the pigs, there is the Boarbot from Swine Robotics.[342] A human handler clips a sturdy rope onto its harness and the Boarbot leads the boar to a different pen. The key trick of this is the harness. A harness like the one they show is probably much more practical in controlled indoor environments with cement floors. How do they adjust it as the boar grows? In principle, if one solved the problem of getting your pigs to all wear harnesses, a lawn tractor could be substituted for the Boarbot itself.

HOW TO TRAIN A BOAR

I googled something like "how to train a boar." We have a lot of boars. A website called Pig Progress has an article entitled, "How to train boars? On-farm boar manual."[343] It shows a thing that looks like an ironing board. The idea is you teach the pig to mount it and mate with it, and it collects boar semen, that can be offered as a

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[342] Swine Robotics. "BoarBot from Swine Robotics." YouTube, 2011.
https://www.youtube.com/watch?v=W4Zqvemqhmk&feature=youtu.be

[343] Pedersen, Trina Lund. "How to train boars? On-farm boar manual." Pig Progress, 2019.
https://www.pigprogress.net/Sows/Articles/2019/10/How-to-train-boars-On-farm-boar-manual-491867E/

farm product. While I am certainly familiar with the concept of the sales of boar semen

for artificial insemination, as noted earlier when I discussed the piglets, pigs are very

intelligent (in the same ballpark as dogs and chimpanzees[344]), and the idea that training

a boar at all should lead immediately here seems, well, obscene.

This is in part a problem with the values underlying Google's search engine. As

noted by Safiya Noble, the Google results for search terms involving words for people

of color are at least as bad.[345] Search engines amplify defects in the collective values

system. (Meanwhile, Google is offering Artificial Intelligence Ethics consulting

services, as the fox sits at the door of the henhouse graciously offering to guard.[346])

Nonetheless, assumptions about what boars should learn are also implicit in the PR

from the Danish manufacturer and the framing in the agricultural magazine.

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[344] Marino, L., & Colvin, C. M. "Thinking Pigs: A Comparative Review of Cognition, Emotion, and Personality in *Sus domesticus*." International Journal of Comparative Psychology, 28, 2015. Retrieved from https://escholarship.org/uc/item/8sx4s79c

[345] Noble, Safiya Umoja. *Algorithms of Oppression: How Search Engines Reinforce Racism*. New York: New York University Press, 2018.

[346] Simonite, Tom. "Google offers to help others with the tricky ethics of AI: Services to include spotting racial bias, developing guidelines around AI projects." Ars Technica. August 29, 2020. https://arstechnica.com/tech-policy/2020/08/google-offers-to-help-others-with-the-tricky-ethics-of-ai/

Further to the matter of swine semantics, in China in 2019, they were attempting to use facial and voice recognition technologies developed for humans to combat pig pandemics. This sentence when written in 2020 has deep and tragic reverberations.[347]

INDOOR PASTURED POULTRY

There are robots that aerate and litter in chicken barns and use machine vision to see where they are going.[348] And there are self-propelled robotic chicken tractors that can hold up to 200 birds for raising "pastured poultry" which slowly roll across your farm without ever letting the pastured poultry outside until slaughter.[349]

The robotic chicken tractor looks cool. But this $35,000 device that claims it can raise up to 200 chickens at once does not look fox-proof to me. If a fox or other predator got in, there's not a lot of headspace for the birds to escape. How do you clean it? What if the chickens get poultry mites? Do you throw the thing away and start over?

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[347] Wee, Sui-Lee Wee and Chen, Elsie. "China's Tech Firms Are Mapping Pig Faces: As a devastating disease afflicts the country's swine, companies are scrambling to roll out facial and voice recognition and other unproven ways to save them." New York Times, February 24, 2019. https://www.nytimes.com/2019/02/24/business/china-pig-technology-facial-recognition.html?smid=em-share

[348] Octopus Robotics. "Octopus Poultry Safe and Scarifier in ACTION" YouTube, 2018. https://www.youtube.com/watch?v=HpxZQ9H8smg&feature=youtu.be

[349] Ukkö Robotics. "It's not a barn, / It's not a coop, / It's a ROVA / The world's 1st autonomous, self-moving barn for livestock pasture farming."
https://ukkorobotics.com/meet-rova/

ROBOTIC "SUPER MONSTER WOLF"

For farm protection, there are robotic wolves, with flashing red eyes, intended to protect farms against deer and wild boar.[350] (Perhaps in future upgrades, the robot wolf could page the Boarbot to come get the boar and bring it to slaughter.) The robotic wolf replaces an apex predator that has gone extinct in Japan. Because it doesn't appear to kill anything, it is not truly a replacement. It is merely a substitute for a big dog.

But still, the idea of robots occupying ecological niches of extinct species is a tragic vision of the future. To be precise, it is Philip K. Dick's tragic vision of the future from *Do Androids Dream of Electric Sheep*[351], the book that was the basis of the movie *Bladerunner*[352].

This moment is deeply PhilDickian in another way: it calls into question whether real animals, in this case wolves, would be allowed back in if they could manage to return. The answer is likely, no. In his 1978 speech "How to Build a Universe that Doesn't Fall Apart in Two Days," Dick speculated what would happen if the robotic animals at Disney were replaced with real ones:

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[350] Sommerlad, Joe. "Robotic 'Super Monster Wolf' Deployed to Protect Japan's Crops from Wild Boars: What could possibly go wrong?" Independent, 2018. https://www.independent.co.uk/life-style/gadgets-and-tech/news/robot-wolf-japan-crops-wild-animals-farming-robotics-wolves-boars-deer-pests-a8247726.html

[351] Dick, Philip K. *Do Androids Dream of Electric Sheep*. New York: Doubleday, 1968.

[352] Scott, Ridley. (Director) *Bladerunner*. (Motion Picture). Warner Brothers, 1982.

In my writing I got so interested in fakes that I finally came up with the concept of fake fakes. For example, in Disneyland there are fake birds worked by electric motors which emit caws and shrieks as you pass by them. Suppose some night all of us sneaked into the park with real birds and substituted them for the artificial ones. Imagine the horror the Disneyland officials would feel when they discovered the cruel hoax. Real birds! And perhaps someday even real hippos and lions. Consternation. The park being cunningly transmuted from the unreal to the real, by sinister forces. For instance, suppose the Matterhorn turned into a genuine snow-covered mountain? What if the entire place, by a miracle of God's power and wisdom, was changed, in a moment, in the blink of an eye, into something incorruptible? They would have to close down.[353]

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[353] Dick, Philip K. "How to Build a Universe that Doesn't Fall Apart in Two Days." The speech was written in 1978. Retrieved August 2, 2020, from https://web.archive.org/web/20080125030037/http://deoxy.org/pkd_how2build.htm.

THE CORPORATIZED AGRICULTURAL GAZE & THE TRANSFER OF LAND OWNERSHIP

One thing that is so dissonant, so dislocating, to me about this tech tour is how utterly unlike my own are the purposes described by these devices. What I was seeking was semantics that might describe ecological purposes of future orchardry and instead found elements for a dystopian farm movie and a desire to remove humans from the process of farming all together.[354] [355]

Though it may seem like all this is a technological bonanza that will help farmers, the system of agricultural innovation is not structured to benefit farmers as we conventionally understand the concept. Rather, it is structured to get farmers into situations where they feel they have to buy expensive automation and so are (even more) leveraged to the hilt. The consequences is a long-term transfer of land ownership

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[354] Engwerda, Jan. "Artificial Intelligence Perfectly Able to Grow Crops." Future Farming, 25 Nov. 2019, https://www.futurefarming.com/Tools-data/Articles/2019/11/Artificial-intelligence-perfectly-able-to-grow-crops-504141E

[355] Shiffler, Amanda. "10 Companies Using Robotics to Disrupt the Agriculture Industry." *Disruptor Daily*, Disruptor Daily, 22 Jan. 2018, https://www.disruptordaily.com/10-companies-using-robotics-disrupt-agriculture-industry/

from what we would consider farmers to large corporations. Right now, about half of

American farms operate at a loss.[356]

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[356] McGinnis, Mike. "Over Half of U.S. Farms Lose Money, USDA Study Shows." *Successful Farming*, Successful

Farming, 3 Aug. 2018, https://www.agriculture.com/over-half-of-us-farms-lose-money-usda-study-shows.

WHEN IS A CHICKEN JOKE NOT FUNNY?

In the course of this research, I encountered Austin Stewart's experiential futures site "Second Livestock" about using VR to create "virtual free-range" to dupe chickens into believing they were free range.[357] It uses terms like "Animal- Centered Design."

Initially, because of what I had just been reading, I could not tell it was parody. I muttered, when encountering the phrase, "Profound Innovation," something like, "This *profoundly* misses the point." I had temporarily lost grip on my sense of humor.

Though parody, "Second Livestock" is not funny because this dystopia is already here: The same underlying values reflected in the chosen gaze of agricultural semantics also inform the semantics of the large information systems deployed on humans. The deployment of facial recognition on pigs, and more recently cows,[358] seems especially uncanny: semantic practices jumping the species barrier.

"Second Livestock" seems emotionally dissociated in a way I find dislocating and disconcerting. The reader/viewer is intended to be reassured by the fact that the object of the experiment is a chicken.

But here is the 21st century, the distinction between humans and livestock is becoming increasingly unclear. Consumers, prisoners, protestors, immigrants, and many

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[357] Stewart, Austin. "Second Livestock." 2012. https://www.secondlivestock.com.

[358] Fifield, Anna. "Orwell's nightmare? Facial recognition for animals promises a farmyard revolution." Washington Post, August 24, 2020.

other classes of persons are treated as a prey species by predatory organizations, such as the Department of Homeland Security, in possession of Big Data. Understand my creeping horror here by mentally substituting a toddler in ICE custody for the chicken in this image.

I find Dunne and Raby's sections entitled "Living in Extreme Times" and "Lab > Market > Everyday Life" on meat and changes in biotechnology similarly disconcerting. Although they include platitudes like, "They have huge consequences for what it means to be human, how we relate to each other, our identity, our dreams, hopes, and fears," Dunne and Ray seem disengaged from what is at stake.[359]

Class Conflict & the Nature of the Gaze

This inquiry into farming semantics brings to mind the gaze of aerial photography of the 1940s: It's the way someone looks at you when they are planning to kill you.

To be clear, the gaze of orchardry and farming as such has always been tinged with class warfare; the farmers vs. the hunter-gatherers. The relics of this are visible in the way apples and orchards are used as literary metaphors.

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[359] Anthony Dunne; Fiona Raby. *Speculative Everything: Design, Fiction, and Social Dreaming.* Cambridge, MA: MIT Press, 2014.

In Willa Cather's *My Antonia*, the uprightness of the trees of an orchard is a metaphor for the uprightness of the people who tend it.

> But she still had that something which fires the imagination, could still stop one's breath for a moment by a look or gesture that somehow revealed the meaning in common things. She had only to stand in the orchard, to put her hand on a little crab tree and look up at the apples, to make you feel the goodness of planting and tending and harvesting at last. All the strong things of her heart came out in her body, that had been so tireless in serving generous emotions. It was no wonder that her sons stood tall and straight. She was a rich mine of life, like the founders of early races.[360]

In contrast, there are many literary references to stolen fruit. The poet Archibald MacLeish, for example, notably said, "A real writer learns from earlier writers the way a boy learns from an apple orchard—by stealing what he has a taste for, and can carry off."[361] Leigh Hunt's 19th-century poem "Song of Fairies Robbing an Orchard" triumphantly declares "Stolen, stolen, be your apples."[362] And perhaps, most obviously, eating fruit off of trees that they had been forbidden to touch is what got Adam and Eve kicked out of Eden.

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[360] Cather, Willa. *My Ántonia*. Boston: Houghton Mifflin, 1918.

[361] MacLeish, Archibald. *A Continuing Journey*. Boston: Houghton Mifflin, 1968, p. 229.

[362] Hunt, Leigh. "Song of Fairies Robbing an Orchard." Poetry Foundation.

Bringing the enduring class conflict into focus: The initial purpose of Bordeaux Mixture, a combination of copper and lime, one of the foundations of modern fruit tree spraying, invented by a French farmer in 1885, was not to repel fungus or insects. Rather the farmer's disruptive innovation was intended to repel hungry children who had been eating his grapes.[363]

What is perhaps new is the twenty-first century agricultural technology reimagines the concept of the farm misanthropically, without farmers and other pricey human laborers, and distorts the other creatures and plants—that it does not kill outright—into new shapes to accommodate the rising need of Capital to self-replicate.

While the goal to feed a growing world population is laudable, one of the side-effects of this style of agriculture is the creation of environmentally destructive needs which might otherwise not exist,[364] and this is a justification for any increase in agricultural efficiency that can be imagined.

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[363] Schooley, Theresa, et al. "The History of Lead Arsenate Use in Apple Production: Comparison of its Impact in Virginia with Other States." Journal of Pesticide Safety Education, 2008, p. 24. https://aapse.wildapricot.org/resources/Documents/AAPSE%20Publications/JPSE/ARTICLES/1/public/1-195-1-PB.pdf

[364] Veraart, Frank. "Agriculture and Foods: Overproduction and Overconsumption." Springer, 2018. https://link.springer.com/chapter/10.1007/978-3-319-76696-6_18.

This corporate gaze is similar to how Silicon Valley views the human users of its products: inducing behavioral addictions is a feature, not a bug. We are livestock. Adam Alter observes in his book *Irresistible: The Rise of Addictive Technology*:

> Behavioral addiction consists of six ingredients: compelling goals that are just beyond reach; irresistible and unpredictable positive feedback; a sense of incremental progress and improvement; tasks that become slowly more difficult over time; unresolved tensions that demand resolution; and strong social connections.[365]

Bruce Sterling positions the human being in the corporate matrix of the Internet of Things:

> ... the standard Internet of Things scenario [is] framed in the traditional language of consumer electronics. People often mock it, because they don't like so much unnecessary technical complication in their daily lives. It seems baroque, maybe even fraudulent.
>
> That's not what's going to happen.
>
> The real problem with this scenario is that the reader thinks he's the hero of the story. To the vacuum company, he was the "customer" or "consumer." In the legacy internet days, he was the "user." In the Internet of Things, he lacks those privileged positions, "user" and "customer." An Internet of Things is not a consumer society. It's a materialized network society. It's like a Google or Facebook writ large on the landscape.

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[365] Alter, Adam. *Irresistible: The Rise of Addictive Technology and the Business of Keeping Us Hooked*. New York: Penguin Publishing Group, 2017, p. 9.

Google and Facebook don't have "users" or "customers." Instead, they have participants under machine surveillance, whose activities are algorithmically combined within Big Data silos. They don't need the reader to be the hero. He's not some rational, autonomous, economic actor who decides to encourage the Internet of Things with his purchasing dollars. They're much better off when those decisions are not his to make.[366]

An image and metaphor that runs through Zuboff's *Surveillance Capitalism* is the Berlin Wall: There were around 70 tunnels under it before the Wall came down:

> … hiding risks becomes an adaptation when it should be a rallying point for outrage. *These conditions are unacceptable. Tunnels under this wall are not enough. This wall must come down*.[367]

THE FRUITS OF JUXTAPOSITION

The apple tree, already symbolic in the Bible, remains resonant with rich meanings. And yet the apple tree as we have known it may be mostly gone in 20 years, replaced by distorted shrubs that just happen to yield apples, trees distorted so that AIs can understand the ontology of the Tree as such. This bodes ill for the Subject of just about every target problem to which humans may use Artificial Intelligence as a solution.

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[366] Sterling, Bruce. *The Epic Struggle of the Internet of Things*. Moscow: Strelka Press, 2014.

[367] Zuboff, Shoshana. *The Age of Surveillance Capitalism: The Fight for a Human Future at the New Frontier of Power*. New York: Public Affairs, 2019, p. 490.

This exploration could have been organized into Foresight's more conventional methodology of signals and trends, framing it within the context of the agricultural technology industry.

Instead, I have chosen a more synthetic, more collage-like approach, creating a vision of the future by pasting red-eyed mechanical wolves alongside heavily surveilled pigs and pastured poultry who never go outside, in world where the mythic apple tree becomes a short-lived shrub, the better for Artificial Intelligence to see it and where farms may soon have no human farmers.

When I wrote and edited hypertext fiction in the mid-1990s, it was sometimes hard to convince people that readers could make sense of things broken into chunks and presented in an eccentric or surprising order. This non-sequential reading order has been normalized by Twitter, Facebook, and Instagram. As it turns out, the mass audience is surprisingly adept at this kind of sensemaking.

What the collage style of writing present here gains us additionally is a lot of themes, metaphors, and contexts, with Geertizian thick description to help it adhere to memory. In his famous essay, ""Deep Play: Notes on the Balinese Cockfight,"[368] Clifford Geertz also wrote about chickens.

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[368] Geertz, Clifford. *The Interpretation of Cultures*. New York: Basic Books, 1973.

THE FUTURE OF COLONIZATION
VIEWED THROUGH THE PRISM OF FARMING

There is an even wilder, darker scenario lurking within this one. In these days when statues of confederates and colonizers are being pulled down, when we speak of "decolonizing," and when the United States and the United Kingdom, formerly colonial powers, seem to be circling in self-inflicted death spirals, it might seem colonization is waning.

But colonization is about land. As nation-states—that have defined the pace of colonization—fall into insignificance through waves of privatization and acts of political vandalism, it may be that a form of technological colonization, unfettered by governments, is underway. It may be that the mechanism of colonization is these agricultural technologies and that conventional agriculture is driven out, in favor of a system that meets the needs of capital rather than the system of meeting human needs that it replaces.

People of European origin are used to experiencing and expecting the benefits of colonization. This may, however, be the beginning of a new kind of colonization that neither wants nor needs humans at all, but instead runs on a computational logic all its own, writing its own story.

Some of this lurid agricultural technology, such as the robowolf, is likely meme-ware, flashy prototypes with little basis in agricultural practice. (Wouldn't it be easier,

cheaper, and more effective to costume a big dog to get this effect?) But the vision here

is a scenario-space worth exploring.

Another aspect of this scenario-space is the choices we make as individuals about

where to be and what to do with our lives. Another good insight from Mark Kimball's

Instagram photo captions:

> I don't think the Homestead model works if only one percent of us farms. But nor is it easy to
> pull off a cooperative effort in which everyone is empowered to be their own person in the
> context of the whole. Bottom line: if cities and banking and technology keep siphoning people
> away from the countryside, processed food is the future. Don't think too hard about how to
> change that trend. Learn to farm.[369]

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[369] Kimball, Mark. Photo caption on Instagram posted as FarmerKimball, July 13, 2020. The caption accompanies a
photo of a calf behind an electric fence near a blue water tub.

8   PATENT RESEARCH

> The truth of art lies in its power to break the monopoly of established reality (i.e. of those who established it) to *define* what is *real*. In this rupture, which is the achievement of the aesthetic form, the fictitious world of art appears the true reality.
>
> —Herbert Marcuse[370]

Like the previous section, this the method of this section is similar to the signals and trends methodology. It is a focused patent search, a form of horizon scan. A weakness of this approach is that, for the most part, we only find out what the inventors were willing to tell the patent office and there is little way to find out what happened before or after the documents we can access were filed or approved. Much is left to the imagination.

Anthony Dunne and Fiona Raby begin their chapter "Physical Fictions: Invitations to Make-Believe" by talking about patents as design fiction:

> As science fiction author Bruce Sterling pointed out in a public conversation with us about design fiction, there are many forms of fictional objects outside art and design, including patents and failed inventions.[371]

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[370] Marcuse, Herbert. *The Aesthetic Dimension: Toward A Critique of Marxist Aesthetics*. [1977] Boston: Beacon Press, 2003, p. 9.

[371] Anthony Dunne; Fiona Raby. *Speculative Everything: Design, Fiction, and Social Dreaming*. Cambridge, MA: MIT Press, 2014.

Here my intention was more pragmatic. I was not looking for fiction. I was looking for what other people thought the linkage of the words *computational* and *narrative* meant. In 1988, I published the essay, "Science Fiction and the Adventures of the Spherical Cow,"[372] in which I imagined what the relationships between science fiction and mathematics might be. I already knew from earlier perusal of the patent literature that there were patents associated with term computational narrative, though I had not explored this systematically. The questions I sought to answer were:

- What did people mean by this term? Did they mean what I meant—or something else?

- What problems were they trying to solve?

- What methods did they arrive at to solve them?

Initially, I was envisioning that computational narrative technologies might have the potential to help update foresight scenarios in fluid, fast-moving situations. That doesn't look plausible now.

Aside from plausibility, though: At first this seemed like a good idea. Then I contemplated how, say, intelligence services might use this, and how it could go wrong. (Narrative Sciences, Inc., a notable player in this space, is partly funded by the United

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[372] Cramer, Kathryn. "Science Fiction & the Adventures of the Spherical Cow." New York Review of Science Fiction, Vol. 1., No. 1, 1988. (Reprinted in *Visions of Wonder*, Hartwell & Wolf, eds. NY: Tor Books, 1996.)

States Central Intelligence Agency.[373]) Then it seemed like Bad Idea because, like cryptocurrency, its very existence could invite abuse.

Good or bad, based on my patent survey, I don't think these technologies can really do that. What they mostly seem to be able to do is act as fancy "macros" for generating corporate reporting, and various other kinds of data reporting.[374] And their operation seems to involve a lot of human oversight. They seem not to be good at simulating or replacing the synthetic cognitive strengths of human beings.

SEAN STEWART'S INTERACTIVE STORY-TELLING

This is the closest to what I was imagining I might find when I set out to look for computational narrative patents: Science fiction writer Sean Stewart holds a 2016 patent entitled, "Interactive story telling method to unveil a story like solving a crossword

[373] Farr, Christine. "Narrative Science goes beyond 'robot journalism' with CIA investment." VentureBeat, December 12, 2018. Retrieved July 26, 2020, from https://venturebeat.com/2013/06/05/narrative-science-goes-beyond-robot-journalism-with-cia-investment/

[374] Novet, Jordan. "The CIA takes an interest in Narrative Science's quick summaries of big data." Gigaom, June 5, 2013. https://gigaom.com/2013/06/05/the-cia-takes-an-interest-in-narrative-sciences-quick-summaries-of-big-data/

puzzle."[375] He developed this concept into a Sherlock Holmes game that is now

available as a free download.[376]

Computational Narrative Patents
Held By Major Corporations

Here is an assortment of patents controlled by major corporations; I have ordered

them by date. Xerox controls a 1998 patent titled, "Method and apparatus for embodied

conversational characters with multimodal input/output in an interface device."[377] IBM

controls a 2008 patent entitled, "Method and system for automatic computation

creativity and specifically for story generation."[378] Sony controls a 2008 patent entitled,

"Application of category theory and cognitive science to design of semantic

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[375] Stewart, Michael Sean. U.S. Patent No. US10235896B2. Washington, DC: U.S. Patent and Trademark Office, 2019. "Interactive story telling method to unveil a story like solving a crossword puzzle." https://patents.google.com/patent/US10235896B2/

[376] Stewart, Sean. *Sherlock Holmes: The Last Breath (Ink Spotters)*. A computer game. Three Story House, LLC, January, 2020. https://apps.apple.com/app/id1179178017s

[377] Prevost, S. A. Bickmore, T. W., Sullivan, J. W., Churchill, E., & Girgensohn, A. (2003). "U.S. Patent No. US 6570555 B1. Method and apparatus for embodied conversational characters with multimodal input/output in an interface device." Washington, DC: U.S. Patent and Trademark Office. Fuji Xerox Co., Ltd., Tokyo (JP); Xerox Corporation, Stamford, CT, 2003. https://patents.google.com/patent/US6570555B1/

[378] Bringsjord, S. C., & Ferrucci, D. A. "U.S. Patent No. US 7333967 B1. Method and system for automatic computation creativity and specifically for story generation." Washington, DC: U.S. Patent and Trademark Office. IBM, 2008. https://patents.google.com/patent/US7333967B1/

descriptions for content data."[379] This is especially interesting because it attempts a metacognitive approach to the problem of arriving at descriptions. It is aimed at a flexible system for semantic descriptions to be implemented by computer. The patent's abstract explains:

> Instead of focusing on specific, static semantic description schemes, emphasis and focus is placed on determining what is necessary and needed to create any type or kind of semantic description for content data in various applications such as MPEG-7. In particular, numerous semantic description tools are selected after examining the principles of cognitive science and category theory. These semantic description tools provide sufficient flexibility and power to create any type or kind of semantic description.

This appears to provide for—as Karl Schroeder put it in his essay on the meaning of his term "thalience"— the potential for machines to invent their own semantics. Schroeder develops the concept in his novels *Ventus*[380] and *Lady of Mazes*.[381]

> Here's the question that leads to the notion of thalience: if they were allowed to freely invent their own semantics, would their physical model of the universe end up resembling ours? --I don't

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[379] Rising, H., III, & Tabatabai, A. "U.S. Patent No. US 7319951 B2. Application of Category Theory and Cognitive Science to Design of Semantic Descriptions for Content Data." Washington, DC: U.S. Patent and Trademark Office. Sony, 2008. https://patents.google.com/patent/US7319951B2/

[380] Schroeder, Karl, *Ventus*. New York: Tor Books, 2000.

[381] Schroeder, Karl. *Lady of Mazes*. New York: Tor Books, 2005.

mean would it produce the same results given the same inputs, because it would. But would it be a humanly-accessible theory?[382]

Schroeder defines the term like this:

> So here is the grandest definition of *thalience*: it is the discipline that chooses among multiple successful scientific models based on which ones best satisfy our human, aesthetic/moral/personal needs. In other words, given two or more equally valid models of the universe, thalience is the art of choosing the one with the most human face. It is the recovery of the natural in our understanding of the Natural.

While it is not entirely clear if something like this is what Sony intends, it seems close.

Intel controls a 2012 patent entitled, "Method and apparatus for automatically creating an experiential narrative":[383] The abstract goes on to say, "Embodiments of a method and apparatus for automatically generating an experiential narrative are described."

CBS Interactive controls a 2013 patent entitled, "Techniques for providing a natural language narrative."[384] Vox Media controls a 2013 patent entitled, "Story-based data

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[382] Schroeder, Karl. "The Successor to Science." KarlSchroeder.com. Retrieved from https://www.kschroeder.com/my-books/ventus/thalience on July 28, 2020.

[383] Harrison, E. R., & Sandage, D. A. "U.S. Patent No. US 20120158850 A1. Method and apparatus for automatically creating an experiential narrative." Washington, DC: U.S. Patent and Trademark Office. Intel Corp, 2012. https://patents.google.com/patent/US20120158850A1/

[384] Locke, M. "U.S. Patent No. US 20130174026 A1. "Techniques for providing a natural language narrative." Washington, DC: U.S. Patent and Trademark Office. CBS, 2013. https://patents.google.com/patent/US20130174026A1/

structures"[385] which appears to be aimed at relating news stories to organize them on a web page.

It may be that most of these patents are more symbolic than a practical statement of fact, in the manner of the Apollo 11 Astronauts, Neil Armstrong and Buzz Aldrin, planting a flag on the Moon.

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[385] Brundrett, G. N., III. "U.S. Patent No. US 20130110885 A1. Story-based data structures." Washington, DC: U.S. Patent and Trademark Office. Vox Media Inc., 2013. https://patents.google.com/patent/US20130110885A1/

Narrative Sciences, the CIA, & the Department of Homeland Security

Narrative Sciences, Inc. holds about five patents, the thrust of which seems to be the creation of data stories. They seem to be in the business of making tools for what is called "robojournalism." These patents are:

1. "System and method for using data to automatically generate a narrative story." (2014)[386]

2. "Method and apparatus for Triggering the Automatic Generation of Narratives." (2016)[387] This one mentions the use of artificial intelligence: "artificial intelligence methods and systems for triggering the generation of narratives are disclosed."

3. "Use of tools and abstraction in a configurable and portable system for generating narratives." (2017)[388] This one seems to be about an advanced technique for robojournalism.

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[386] Birnbaum, L. A., Hammond, K. J., Allen, N. D., & Templeton, J. R. "U.S. Patent No. US 8688434 B1. System and method for using data to automatically generate a narrative story." Washington, DC: U.S. Patent and Trademark Office. Narrative Science Inc., 2014. https://patents.google.com/patent/US8688434B1/

[387] Nichols, N., Smathers, M. J., Birnbaum, L., Hammond, K., & Adams, L. E. "U.S. Patent No. US 20160086084 A1. Method and apparatus for Triggering the automatic Generation of Narratives." Washington, DC: U.S. Patent and Trademark Office. Narrative Sciences Inc., 2016. https://patents.google.com/patent/US20160086084A1/

[388] Nichols, N. D., Birnbaum, L. A., & Hammond, K. J. "U.S. Patent No. US 9697178 B1. Use of tools and abstraction in a configurable and portable system for generating narratives." Washington, DC: U.S. Patent and Trademark Office. Narrative Sciences Inc., 2017. https://patents.google.com/patent/US9697178B1/

4.   "Automatic generation of narratives from data using communication goals and narrative analytics." (2017)[389] This one seems specific to data stories and aspires to the kind of fluidity in the face of fastmoving events I envisioned prior to this patent research.

5. "Method and system for configuring automatic generation of narratives from data." (2019)[390] It is intended to "generate narrative stories based on the configuration of the narrative story generator and the input data."

For most of the computational narrative patents, we can't tell how much success the patent holders have had with their ideas. Narrative Sciences is more transparent because they license their tools to third-parties.

They have two commercially available products, Quill for robojournalism and Lexio for translating business data into plain English. They have a government intelligence version of Quill for government customers including the US Department of

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[389] Birnbaum, L. A., Hammond, K. J., Nicholas, N. D., Paley, A. R., Murata, S., & Opulencia, P. "U.S. Patent No. US 9697197 B1. Automatic generation of narratives from data using communication goals and narrative analytics." Washington, DC: U.S. Patent and Trademark Office Narrative Science Inc. 2017. https://patents.google.com/patent/US9697197B1/

[390] Paley, A. R., Nichols, N. D., & Hammond, K. J. "U.S. Patent No. US10185477B1. Method and system for configuring automatic generation of narratives from data." Washington, DC: U.S. Patent and Trademark Office. "Narrative Sciences Inc., 2019. https://patents.google.com/patent/US10185477B1/

Homeland Security.[391] These have some similarity to foresight tools I have wished

existed, though implemented for different disciplines.

Admittedly, I am most curious about what Homeland Security is currently doing

with a computational narrative tool as it transforms itself into an illegal occupying army

that also runs concentration camps. In his 2008 novel *Little Brother*, Cory Doctorow

correctly perceived that DHS was built to go off the rails.

What stories is DHS telling itself so its employees can sleep at night? Go through

prose narratives emanating from DHS to look for signs of robojournalism in their

composition: FOIAs of the future could yield interesting documents. Would the textual

utterances of Trump's DHS pass the Turing Test?[392]

Where we do have information is from their corporate clients as reported upon in

Nicholas Diakopoulos's 2019 book *Automating the News: How Algorithms Are*

Rewriting the Media. To an extent, State of the Art of computational narrative is about

giving the illusion of narrative, rather than the synthetic narrative itself.

> Narration builds on description but offers more structure in presenting an event, perhaps even
> making it come across as more of a story by establishing connections between facts, events, and

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[391] Farr, Christine. "Narrative Science goes beyond 'robot journalism' with CIA investment." VentureBeat, December 12, 2018. Retrieved July 26, 2020, from https://venturebeat.com/2013/06/05/narrative-science-goes-beyond-robot-journalism-with-cia-investment/

[392] Ramsay, Stephen. *Reading Machines: Towards an Algorithmic Criticism*. Urbana: University of Illinois Press, 2011. See especially Chapter 4, entitled, "The Turing Text."

characters. This is what companies such as Narrative Science strive for: to be smart about document planning *so that description starts to look more like narrative*. The current state of the art in content automation gives us description and narrative.[393] *(italics mine)*

In essence, what is being said here is non-fiction computational narrative is a form of generative art that situates the reader in the position to synthesize meaning from the pieces laid on the table.

In the popular imagination, algorithms are clean, tidy, and objective. The reality is different. In *What Algorithms Want*, Ed Finn argues:

> The pragmatic definition lays bare the essential politics of the algorithm, its transparent complicity in the ideology of instrumental reason that digital culture scholar David Golumbia calls out in his critique of computation. Of course, this is what algorithms do: they are methods, inheriting the inductive tradition of the scientific method and engineering from Archimedes to Vannevar Bush. They solve problems that have been identified as such by the engineers and entrepreneurs who develop and optimize the code. But such implementations are never just code: a method for solving a problem inevitably involves all sorts of technical and intellectual inferences, interventions, and filters.[394]

Additionally, despite our fantasies about the capacities of artificial intelligence, these tools are not conscious. It still takes a human to make it mean.

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[393] Diakopoulos, Nicholas. *Automating the News: How Algorithms Are Rewriting the Media*. Cambridge, MA: Harvard University Press, 2019, pp. 137-138.

[394] Finn, Ed. *What Algorithms Want: Imagination in the Age of Computing*. Cambridge, MA: The MIT Press, 2017.

While a bleak vision of AIs writing the disastrous policy storylines pursued by the Department of Homeland Security seems to peek out at us, a full pulling back of the curtain would likely reveal more mundane truths of stupidity and malevolent incompetence. The tools are not advanced enough to play the role of evil genius. It does not take genius to gaslight and confuse people.

But as the Department of Homeland Security spins out of control, there is the eerie possibility that DHS is using this software to think with, and the resulting prose reads rather like you would expect from a novel written by an AI.

This analysis of a recent DHS memo appeared in the New York Times on July 28, 2020:

> Another internal government memo, from Department of Homeland Security intelligence officers, indicated that even as federal agents in camouflage deployed to quell the unrest in Portland, the administration had little understanding of what it was facing.
>
> The memo tried to put the recent conflict into historical context, describing how "anarchist extremists" have committed crimes in the Pacific Northwest for years and asserting that "sustained violence against government personnel and facilities" had longstanding roots.
>
> But even as it laid out a timeline of violence extending back to 2015, the intelligence briefing, dated July 16, admitted, "We have low confidence in our assessment" when it comes to the present day.

"We lack insight into the motives for the most recent attacks," it read.[395]

I am not sure if it is optimistic or pessimistic to entertain the thought that the DHS memo in question may have been written by a Narrative Sciences product. The memo's prose sounds plausibly like it was generated by their system.

This is not *thalience* in operation here, but perhaps its misanthropic evil twin? Karl Schroeder's 2018 story "Noon at the Antilibrary" speculates about the future of automated disinformation, positioning the concept of an *antilibrary* as being the dark mirror image of thalience.[396]

Someone at DHS has since been blamed and reassigned.[397] But let's explore this scenario space a little further. An interview:

> "Artful engineering, I like that term," says Nate Nichols, distinguished principal of product strategy and architecture at Narrative, in an interview by phone with ZDNet.
>
> The results of analysis get put into a "compositional natural language generation engine" that can build sentences and paragraphs, with rules about punctuation and other aspects of composition.

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[395] Kanno-Youngs, Zolan, Olmos, Sergio, Baker, Mike, & Goldman, Adam. "From the Start, Federal Agents Demanded a Role in Suppressing Anti-Racism Protests." New York Times, July 28, 2020. Retrieved July 28, 2020, from https://www.nytimes.com/2020/07/28/us/federal-agents-portland-seattle-protests.html

[396] Schroeder, Karl. "Noon in the Antilibrary." Cambridge, MA: MIT Technology Review, August 18, 2018. https://www.technologyreview.com/2018/08/18/104097/noon-in-the-antilibrary/

[397] Harris, Shane. "DHS official whose office compiled 'intelligence reports' on journalists and protesters has been removed from his job." The Washington Post, August 1st, 2020.

"A lot of it is thinking pretty deeply about how stories are structured," says Nichols, when asked where the technical challenges are. Some of that involves doing "part of speech tagging," to see the nouns in phrases, to look for grammatical relationships between entities, to infer the actual semantic relationships, he explains.[398] [399]

And here we arrive at an interesting moment. Science fiction writing is mostly practiced by people who sit at home and write their novels, not by people with access to intelligence agencies or teams of investigative journalists or private detective agencies. While many science fiction writers are obsessive researchers, we are not in a position to be able to verify, say, whether Trump's Department of Homeland Security has been decapitated to the extent that key reports on humanitarian decisions are being automatically generated.

The underlying techniques behind these patents probably look something like this description of narrative construction from Massimo Mariani's book *What Images Really Tell Us*.

A trick a great many storytellers have used and still use it to imagine the framing of a fact they are recounting with a mental camera that reveals where their story takes place, just like a movie. It is

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[398] Ray, Tiernan. "'We won't have the sexiest AI, but everything it says is true,' says Narrative Science: Narrative Science is less enamored of deep learning than some firms, more interested in artful engineering of software to produce language tools that help people in an everyday kind of way." ZDNet, December 17, 2019.

[399] The other thing I find fascinating about this description of how their software works is that it is very similar to my techniques for creating collage poetry. The entities generated by Narrative Sciences' software are essentially collage.

possible to set the plot as if the narrative look were an imaginary lens, pointing from a wide

panoramic view, right up to the very daily setting.[400]

The semantically tagged units of fact would be handled and arranged like images in a

collage to suggest a big picture narrative. The implied rebus generates the perceived

narrative. Such narrative, in the hands of a decapitated and understaffed government

agency might become policy that is enacted by the frontline workers who would then

grumble they were just following orders when held to account.[401]

From a science fiction writing standpoint, I find this situation—where the key

memo obtained by the New York Times certainly looks like it *could* be generated by a

Narrative Sciences product—exciting, a very playable space. Elaborations on this

plotline keep occurring to me. This is the sort of scenario science fiction writers explain

excitedly over lunch to their editor when pitching their next book—"No, let's do a

three-book contract!" says the writer in my head in this scene.

The lines between professions and the standards of evidence for speculation are not

always clear. Some science fiction writers *do* have access to intelligence reports. In the

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[400] Mariani, Massimo, *What Images Really Tell Us: Visual Rhetoric in Art, Graphic Design and Advertisement*. Barcelona: Hoaki, 2019, p. 159.

[401] Da Silva, Chantal. "ICE Agents Complain About Nazi Comparisons, Say They're Only Enforcing the Laws." Newsweek, July 29, 2020. Retrieved from https://www.newsweek.com/ice-agents-complain-about-nazi-comparisons-say-theyre-only-enforcing-laws-1521382?utm_term=Autofeed&utm_medium=Social&utm_source=Twitter#Echobox=1596037024 on July 30, 2020. The article discusses the Netflix docuseries *Immigration Nation* which was created by filmmakers who spent 3 years essentially embedded with ICE.

early 1990s, I was briefly a State Department wife. I was married to a science fiction novelist who was also a Foreign Service Officer with the US State Department, the Desk Officer for East Germany.

We lived in Silver Spring, Maryland. He worked at "Foggy Bottom" near the Watergate Hotel, often bicycling to the office down Rock Creek Parkway, and he wrote reports. He wrote a report suggesting East Germany might shortly have to open the Berlin Wall, and for which he received some kind of reprimand for being too speculative. If I recall his account correctly, the reprimand made some reference to science fiction.

Less than a month later, the Wall fell.[402]

Science fiction is somewhat insulated from the constraints of what one can and cannot speculate because it is *fiction* and because it is classed as a form of *entertainment*. This protects us—to some extent—from the burden of telling Power what it wants to hear and allows science fiction writers to speculate more freely in their scenarios than people who have professional and institutional obligations requiring

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[402] Interestingly, Dunne and Raby see the fall of the Wall like this: "…with the fall of the Berlin Wall in 1989 and the end of the Cold War the possibility of other ways of being and alternative models for society collapsed as well." They see it as a victory for Capitalism. This statement is an example of what Ernst Bloch called utopian longing. Anthony Dunne; Fiona Raby. *Speculative Everything: Design, Fiction, and Social Dreaming.* Cambridge, MA: MIT Press, 2014.

them to stay within some expected terrain of facts. It also means we are less likely to be

listened to when we do speculate, even by foresight researchers.[403]

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[403] Note to foresight researchers: Go to science fiction for the speculative scenarios, not just to look for imaginary gadgetry.

OF CATEGORY THEORY &
BUREAUCRACY AS GENERATIVE ART

Imagining, for a moment, the Trump administration's possible use of robojournalism for policy position papers, the lack of facts is not accidental or because something isn't finished. For the Trump administrations, facts are the enemy. What would this look like if automated? People can systematically lie because they understand the concept. A Trumpian implementation of this using what Kellyanne Conway called "alternative facts"[404] would seem to require a different verb. What verb would describe the automated production of a blizzard of lies? Would such a word be in the Desecration Phrasebook?

The most intriguing of the approaches is the Sony patent involving category theory. While I like the Sony patent, I have my doubts about whether they accomplished what they hoped

As I said earlier, human motifs and metaphors are too messy, in my experience, to literally use with Category Theory. It's about seeing the forest for the trees. Better to take inspiration.

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[404] Blake, Aaron. "Kellyanne Conway says Donald Trump's team has 'alternative facts.' Which pretty much says it all." Washington Post, January 22, 2017. Retrieved from https://www.washingtonpost.com/news/the-fix/wp/2017/01/22/kellyanne-conway-says-donald-trumps-team-has-alternate-facts-which-pretty-much-says-it-all/ on July 29, 2020.

In addition to the intriguing Sony patent, there are more patents related to Category Theory, including patents controlled by Salesforce.com[405] and Cisco[406] (they have several).

CATEGORY THEORY & RIEL MILLER'S *TRANSFORMING THE FUTURE*

To avoid confusion for foresight professionals, it is necessary here to discuss for a moment Riel Miller's use of Category Theory: In *Transforming the Future*[407]*,* Miller invokes Category Theory, which he uses in association with the biological theories of Robert Rosen that require that biology have an alternative physics, or at least some kind of exemptions from physical laws. (More on this in a moment.) Ironically, Miller invokes physics in the very first line of his book: "Imagine, for a moment, that you are a physicist doing research in the early years of the 20th century." (P. 1)

Miller describes how he combines Rosen's ideas with Category Theory:

> Although Rosen discussed adaptation and evolution in biological systems … his work on anticipatory systems mainly focused on the organization of living beings in an invariant state.

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[405] Fuchs, Matthew. "US9,990,223B2: Systems and methods of improving parallel functional processing." 2018. Salesforce.com. https://patentimages.storage.googleapis.com/b4/5a/5c/94bd3623933687/US9990223.pdf

[406] Turner, Bryan, and Moon, Billy Gayle. "US 8,762.964B2: Optimizing symbol manipulation language-based executable applications for distributed execution." Cisco. 2014. https://patentimages.storage.googleapis.com/72/71/b1/8308c840116ae4/US8762964.pdf

[407] Miller, Riel, ed. *Transforming the Future.* New York: Routledge, 2018.

Category theory, however, also provides a rigorous formal way to describe change and emergence when time is incorporated in it. Furthermore, as category theory can help to compare formal models, including the relational, non-mechanistic ones that interested Rosen …, it also provides a solid foundation for understanding systems where action is based on anticipatory models of the future. (p. 73)

The Sony patent does not use Category Theory in this sense. Neither do I. Miller uses these concepts, Category Theory and Rosen's alternate physics for living systems, to formulate his concept of *Anticipatory Assumptions* that he defines as:

> … the most basic component of anticipatory activities: these assumptions are necessary for all 'uses-of-the-future' because 'imagination' can only be elaborated on the basis of the underlying assumptions.

Applied mathematician Ivo Siekmann discusses Rosen's theories in a way that should give us pause about how Miller structures his concept of Anticipatory Assumptions around Rosen:

> On the one hand, Rosen propagates relational models that neglect underlying structural details of the components and focus on relationships between the elements of a biological system, according to the motto *"throw away the physics, keep the organization"*. Rosen's strong rejection of mechanistic models that he implicitly associates with a strong form of reductionism might have deterred mathematical modelers from adopting his ideas for their own work. On the other hand, Rosen's presentation of his modelling framework, (M, R) systems, is highly abstract which makes

it hard to appreciate how this approach could be applied to concrete biological problems. [408]

(italics mine)

Earlier, I have argued for an exploration of types of linguistic animacy and animacy in world view. Rosen's imposes what appears to be something like animism onto the science of biology by hypothesizing, it seems, that the conventionally understood laws of physics do not apply; this view is not mainstream.

Is Miller perhaps seeking in Category Theory linked to Rosennean Complexity permission for animacy as a worldview for his audience? Even a paper supporting Rosen's view notes that, "the great majority of biologists are unaware of his work." [409] Category Theory on its own makes no claims about biology or biological systems. In Rosen's defense, Juan-Carlos Letelier et al. note that since Rosen's methodology is "non-reductionist," Rosen does not specify what his alternate physics for biology might entail. But, as a general rule of thumb, theories of foresight should not require exemptions from physical law.

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[408] Siekmann, Ivo. "An applied mathematician's perspective on Rosennean Complexity. Ecological Complexity, Volume 35, September 2018, pp 28-38.

[409] Letelier, Juan-Carlos, et al. "Organizational invariance and metabolic closure: Analysis in terms of (M, R) systems." Journal of Theoretical Biology 238, 949–961, 2006. http://bip.cnrs-mrs.fr/bip10/rosen.pdf

There *are* biological systems that do show surprising anticipation. In this context, the behavior of slime molds is especially interesting.[410] But *Be the slime mold!* is perhaps a less appealing call to action than appeals invoking Category Theory.

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[410] Zhu, Liping et. al. "Remarkable problem-solving ability of unicellular amoeboid organisms and its mechanism."
Royal Society Open Science. Volume 5, Issue 12. Published:19 December 2018
https://doi.org/10.1098/rsos.180396

9   PRAXIS

The threat is no longer the deadly sweet seduction of nostalgia. The problem is not, any more, the longing to get to the past, but the inability to get out of it.

—Mark Fisher[411]

The method for creating and curating scenarios I describe here is a social and collective creativity.[412] I attempt to simulate genre processes, that in general take place over much longer spans of time and are accelerated in the SF genre by workshops and by conversations and events science fiction conventions. There are three aspects of practice I will recommend here: writing, tagging (which is to say, coding), and curation.

METHODS FOR FUTURES WRITING & CURATION

WRITE SCENARIOS & SKETCHES

If you intend to write foresight scenarios, you should be doing it all the time if you can. Look at the world. Write the future you think you see.

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[411] Fisher, Mark. "Sleevenotes for The Caretaker's *Theoretically Pure Anterograde Amnesia."* [2006] In Fisher, Mark. *Ghosts of My Life: Writings on Depression, Hauntology, and Lost Futures.* Winchester, UK: Zero Books, 2013, p. 111.

[412] Sanders, Elizabeth B.-N.; and Stappers, Pieter Jan. *Convivial Toolbox: Generative Research for the Front End of Design.* Amsterdam: BIS Publishers, 2012, pp. 58-60.

Methodologies for seeing what you maybe should write about are helpful. But whether or not you have filled out the forms, you are a filter-feeder of information, and you should be writing down that future that the present is telling you about.

Brian David Johnson's book *Science Fiction Prototyping* may be helpful here, with the caveat that the easy compositional steps it advocates, derived from such things as the Scott Meredith plot outline, are likely to introduce cognitive bias. Workshopping the scenarios can help mitigate this.

There are many books on how to write science fiction. For the purposes of writing down casual foresight sketches, most of what you need to know is in Robin Scott Wilson's 1973 anthology *Those Who Can: A Science Fiction Reader*.[413] It is organized by the various aspects of fiction: plot, character, setting, theme, point of view, and style. Each section has stories by writers, along with an essay on how they addressed this aspect of the story.

GO DARK FIRST: EARN YOUR OPTIMISM

While foresight tends to steer you towards writing about "preferred" futures, I suggest before trying to get to that preferred future, you first write out a few of the darkest scenarios you can imagine: go all the way into the dark to see what your

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[413] Wilson, Robin Scott. *Those Who Can: A Science Fiction Reader*. [1973] New York: St. Martin's Press, 1996.

preferred might look like. As we know from Trump's dystopia, false optimism can kill you.

Writing near-future science fiction is hard because there are so many factors to take into account. Know that and do it anyway. Do it a lot to get comfortable with being bad at it and leaving out things you should have seen.

THE PROBLEM OF LENGTH

Length is an interesting problem. If you are writing daily or weekly, you might try writing your scenario ideas at 100-200 words in length. Understand that as a professional practice, writing the short-short story is hard. It is quite challenging for an amateur writer to write something that looks like a complete short story in under about 2,500 words. Writing very short is like writing down your dreams. If you try to write complete stories or scenarios at 1,000 words, you are setting yourself a hard problem. Either go very short or give yourself enough room to write out the whole idea.

USE FOOTNOTES

Although science fiction writers don't usually publish bibliographies with their stories, if you are writing as an exercise to understand the future, use footnotes. Use them to track where your inspirations come from. Because if you are thinking synthetically (and maybe even if you are not), you won't remember later.

Although professional writers are not supposed to submit illustrations with their stories (because the publisher controls the commissioning of art), if you are doing foresight, draw your ideas. Also, cut up images and collage your ideas. If you are engaging with data as an inspiration, draw where you think this data is going. Also, footnote your drawings.

If stories or movies give your ideas about the future, write them. Draw them. Keep track of where you got the ideas.

Transrealism as a Literary Model

A specific literary model I recommend for exploring the future is Rudy Rucker's concept of Transrealism, though not necessarily following every bullet-point in his aesthetic program. (You might want to be cautious about his recommendations as to who to use for characters.)

Transrealism occupies an uncomfortable liminal zone between journalism and science fiction, which makes it sometimes challenging to publish as conventional fiction. This speculative engagement with the real is the zone where foresight needs to operate.

In 1983, Rudy Rucker, a mathematician and science fiction writer, published "The Transrealist Manifesto."[414] His manifesto declared transrealism is "not so much a type of SF as it is a type of avant-garde literature."

- ✓ "The Transrealist writes about immediate perceptions in a fantastic way."
- ✓ "The characters should be based on actual people."
- ✓ "In a Transrealist novel, the author usually appears as an actual character, or his or her personality is divided among several characters."
- ✓ "The Transrealist artist cannot predict the finished form of his or her work. The Transrealist novel grows organically, like life itself."
- ✓ "Transrealism is a revolutionary art-form. A major tool in mass thought-control is the myth of consensus reality. Hand in hand with this myth goes the notion of a 'normal person'."
- ✓ "The idea of breaking down consensus reality is even more important. This is where the tools of SF are particularly useful. Each mind is a reality unto itself."

Crucial to Rucker's aesthetic was the practice of "sketching" in which Rucker would write in *plein air*, but bend what he saw with the tools of science fiction to produce eccentric visions of what the future might be like.

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[414] Rucker, Rudy. "A Transrealist Manifesto." First published in The Bulletin of the Science Fiction Writers of America, #82, Winter, 1983. Reprinted in Rucker's anthologies *Transreal!* (WCS Books, 1991) and *Seek!* (Four Walls Eight Windows, 1999). http://www.rudyrucker.com/pdf/transrealistmanifesto.pdf

Damien Walter, a columnist for The Guardian, claims a much larger body of authors and works should be classified as transrealist.

> The potential list of transrealist authors is both contentious and fascinating. Margaret Atwood for The Handmaid's Tale and her novels from Oryx and Crake onwards. Stephen King, when at his best describing the lives of blue-collar America shattered by supernatural horrors. Thomas Pynchon, Don DeLillo and David Foster Wallace, among other big names of American letters. Iain Banks in novels like Whit and The Bridge. J.G. Ballard, as one of many writers originating from the science fiction genre to pioneer transrealist techniques. Martin Amis in Time's Arrow, among others. [415]

RUCKER'S *SAUCER WISDOM*: A FORESIGHTSMÄRCHEN

Earlier, I coined the Denglish[416] term *Foresightsmärchen* to help us imagine what folk-process-aware foresight scenarios might look like. Rudy Rucker's book *Saucer Wisdom* is an example of this hypothetical genre. It uses a very broad-brushstroke framework involving an alien abduction *schtick* as a strategy to pack the book with exposition about futurological speculation.

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[415] Walter, Damien. "Transrealism: the first major literary movement of the 21st century: It's not science fiction, it's not realism, but hovers in the unsettling zone in between. From Philip K Dick to Stephen King, Damien Walter takes a tour through transrealism, the emerging genre aiming to kill off 'consensus reality'." The Guardian, October 24, 2014.

[416] English and German smooshed together.

In the late 1990s, the Mark Frauenfelder, newly hired as an editor of Wired Magazine, had a bold plan for a Wired-branded publishing line to go with their popular magazine about emerging technologies. He acquired a few novels for the launch of the line, one by science fiction writer and Wired contributor Rudy Rucker. Just about the time Rucker finished his book, Wired got financial cold feet and canceled their publishing line, leaving Rucker and his novel stranded. The full story is wilder and more anarchic than this and is detailed on Rucker's website.[417] My husband, Tor Books editor David Hartwell, had been the editor of Rucker's previous books and ended up acquiring *Saucer Wisdom* for Tor. The catch was because the book was timely it needed to be published quickly, and not make its way slowly through the usual Tor pipeline. I was hired by Tor to do the actual editorial work on *Saucer Wisdom*.

Taking this book from the Dionysian publishing plans Wired had and fitting it into an Apollonian science fiction publishing line was a bit awkward. Rucker recalls:

> For whatever misguided reasons, in 1999 Tor and I chose to market *Saucer Wisdom* as a nonfiction book of speculations about the future. And it didn't sell very well. But, really it was a novel all along. A transreal novel about living in the San Francisco Bay Area just before the Millennium hit the fan.

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[417] Rucker, Rudy. http://www.rudyrucker.com/saucerwisdom/.

What I suggest is a composition process for foresight sketches similar to what Rucker describes, using what would be codified as "signals" in more conventional foresight methodologies. This allows one to make use of the compositional tools of science fiction, that has a much higher informational through-put than most foresight methodologies. Use footnotes to track the sources of the information that informs the speculation.

Like Speculative Design, Rucker's narrative style is hyperbolic, which allows for nearfuture speculation without getting himself mired in unrealistic and unwarranted realism. (*Saucer Wisdom* has UFOs in it.)

ASSUME THE PREDATOR IS ALREADY INSIDE THE COOP

This principle—based on trying to keep my chickens from being eaten by predators—is related to the concept of the Three Horizons but with a dystopian framework.

This is admittedly an imperfect metaphor for a strategy of human liberation because it presumes the existence of coops. Recall the common idiom "the fox guarding the henhouse." Increasingly in, here the 21st century, foxes are in charge of henhouses.

A source of possible design examples of this principle is 21st-century protest design. Leaf-blowers repurposed to dissipate tear gas, the layouts of encampments in

Toronto parks, and the social innovations for protests whereby protestors provide information needed to get them out of jail before they set out for the protest.

The vast network of tunnels under Helsinki that could shelter 750,000 people; the Russian border is five hours away.[418] Construction began in the 1980s and continues to the present. The parking garages of Helsinki are gorgeous human-made caves.

It is not just a reworking of the Boy Scouts' "Be Prepared" motto. Rather, it is an understanding that the subject of your design is the object of a powerful and predatory gaze. And as we anticipate the rise of increasingly powerful computer systems, from the point of view of misanthropic, automated, self-replicating Capital, we all taste like chicken.

Those in power will often portray themselves as victims. In Ayn Rand's philosophy, this is framed as "the sanction of the victim," (the title of Chapter 4 of Part 2 of *Atlas Shrugged*.) The rhetoric of this is similar to that of Mitt Romney's US Presidential campaign.[419] This stance reframes the capitalism as the real producer of "value" and everyone else as a predator after the capitlist's money.

In its highest reaches, the realm of Capital is already sparsely inhabited. As Bill McKibben points out, "The world's eight richest men possess more wealth than the

[418] "Underground Helsinki." MyHelsinki.fi. https://www.myhelsinki.fi/en/see-and-do/underground-helsinki

[419] Meyerson, Harold. "Mitt "Ayn Rand" Romney." American Prospect. September 17, 2012. https://prospect.org/power/mitt-ayn-rand-romney/

bottom half of humanity."[420] The failure of imagination is the idea that algorithms need us. In the long haul, they don't. Feral billionaire technologists in pursuit of personal wealth are accelerating us toward this technological moment.

Although philosopher Søren Kierkegaard—in his essay "Mercifulness, a Work of Love"—implores us to "Be merciful, be merciful to the rich!"[421], as a species, we have decisions to make. Shoshana Zuboff notes,

> The sudden development of these conditions of existence means that if we are to claim the future for humanity, then new forms of collective action, resistance, and struggle are required.[422]

WORKSHOP YOUR SCENARIOS

There are two main pressures that lead science fiction writers to improve: *rejection* by professional markets—you submitted your work to a professional market and they rejected it; and, *workshopping*, either formal or informal. A formal workshop has a fixed membership and meets regularly to workshop members' submissions. Informal workshopping would be having experienced and knowledgeable friends willing to look at your work for comment.

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[420] McKibben, Bill. *Falter: Has the Human Game Begun to Play Itself Out?* New York: Henry Holt, 2019, p. 86.

[421] Kierkegaard, Søren. *Works of Love*. [1847] Princeton, NJ: Princeton University Press, p. 322.

[422] Zuboff, Shoshana. "'We Make Them Dance': Surveillance Capitalism, the Rise of Instrumentarian Power, and the Threat to Human Rights." in Human Rights in the Age of Platforms, Rikke Frank Jørgensen, ed. Cambridge, MA: MIT Press, 2019, p. 7.

In Strategic Foresight and Innovation, we took a course entitled *Foresight Studio* where we went through one iteration of this: we wrote scenarios for a grade and maybe got commentary from team members along the way. To get better, you need to do this over and over.

Whether you are workshopping formally or informally, I recommend you use the Turkey City Lexicon[423] as a reference so you have the vocabulary to describe common mistakes.

READ FUTURES

If you want to write about the future, you should read a lot about it. Earlier, I have driven home the point "Know the History of Your Tools." This is important for the reasons I have already explained. But also, reading a lot of the kind of thing you are trying to write will help you get good at it fast.

DOCUMENT WHAT YOU READ WITH TAGS

Because you are reading about the future for the purpose of being able to write foresight, you should document your reading. This is where tagging comes in. Synthetic thinking is lovely. However, if you are trying to write originally about the future, there will be times when you need to be able to pinpoint specific things. You may have an

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[423] "Turkey City Lexicon: A Primer for SF Workshops." Edited by Lewis Shiner. 2nd edition, ed. Bruce Sterling.

excellent memory and think you will remember later. But if you are reading enough in the area you want to write in, you will swamp that memory capacity.

DEVELOP YOUR OWN CODING SYSTEM

Develop your own coding systems for futures based on your own interests. Use key words, and such obvious tagging as date, time, place, source, language. In the history of my own practice, systems I have used for this general purpose have been, in chronological order, file cards, HyperCard, FileMaker Pro (through many upgrades), and most recently Tinderbox[424] from Eastgate Systems. As I have been planning future work this, I have been envisioning that the data structures will be structured to be compliant with the data libraries of Mathematica and Wolfram Language.[425] I am aware that there are software packages specifically designed for use with coding in the social sciences and digital humanities. Were this project implemented as a group project going forward, I would likely use one of those for group work. But I have not yet explored options.

Below, I will discuss motif indexes and Peter Stoyko's SystemViz iconography. I recommend both of these. A key element in training yourself to do this is to develop

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[424] Tinderbox 8.7: http://www.eastgate.com/Tinderbox/

[425] Wolfram Language: https://www.wolfram.com/language/

your own tagging of futures based on what you think you see when you develop your

own scenarios. Use tagging to develop your personal ontologies.

PUT YOUR ONTOLOGIES THROUGH A WORKSHOP PROCESS

Recall earlier I recommended workshopping your sketches, stories, and scenarios.

You should also workshop your ontologies. I envision a workshop of between six and

fifteen people all prolifically writing foresight drafts and workshopping those as well as

their scenario ontologies by meeting frequently. A workshop process, as described in the

section on science fiction workshop culture is essential to make rapid progress in both

of these things.

COLLECTIVE SCENARIO ONTOLOGIES

TAGGING SYSTEMS

Most people who have kept a blog have been faced with the question of tagging.

Blog tools encourage tagging because it helps in search engine optimization. The social

media equivalent of these blog tags are hashtags. Beyond that, when we are structuring

scenarios to be computational narratives, or to have those capacities, we have to do

more than issue key words. We need to decide what type of entities these are, and what

their properties are. This involves figuring out what underlying metaphor we are using

for the entity we seek to describe.

In his essay, "The Practical Business of Ontology," Stephen Wolfram recounts a conversation in which the question comes up:

"We've got to decide: is a chemical like a city or like a number?"[426]

The data is structured as Entities, with Properties, and these Properties may be assigned values. What is implied by this question is that there is a choice of which templates of data structures will be adapted to structure the data of the new entity.

As we consider Stephen Wolfram constructing ontologies, it bears mentioning when he was a child that his mother, philosopher Sybil Wolfram, was Claude Lévi-Strauss's translator for *The Savage Mind*, she later disavowed the translation when it was edited in ways she saw as incorrect. Structuring of ontologies is deeply laid in his mode of thinking.[427]

Using Motifs

In *The Coding Manual for Qualitative Researchers*[428], the authors describe the use of motifs to code themes and ideas from interviews in qualitative research in which the

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[426] Wolfram, Stephen. "The Practical Business of Ontology: A Tale from the Front Lines, July 19, 2017." In *Adventures of a Computational Explorer* by Stephen Wolfram. Champaign: IL: Wolfram Media, 2019, p. 301.

[427] Wolfram, Sybil. "A Disclaimer." *American Anthropologist*. 69: 86, 1967.

[428] Saldaña, Johnny. *The Coding Manual for Qualitative Researchers, Third Edition.* London: Sage Publications, 2016, p. 149.

interviewee tells a story. What I propose is a different application of motifs. Here one codes foresight narratives, whether ones' own or written by someone else. A recognition that foresight ought to make use of motif indices for coding scenarios is a recognition that scenarios, science fiction, design fiction, and related enterprises are a form of folk-literature and they are part of a cultural fabric.

In the summer of 1985, I worked as a bibliographic assistant for science fiction book dealer and bibliographer, Lloyd Currey. This is where I discovered the existence of motif indices. My first was Everett Bleiler's *Guide to Supernatural Literature*.[429] His motif index volumes on science fiction did not come out until later. The motif index comes out of the study of folklore and catalogs elements of that folklore.

STITH THOMPSON

The big one is *The Motif-Index of Folk-Literature* in six volumes, initially created by Stith Thompson in 1932-1936 and revised from 1955 -1958.[430] (I have only ever had

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[429] Bleiler, Everett F. *The Guide to Supernatural Literature*. Kent, OH: Kent State University Press, 1983.

[430] Thompson, Stith. *Motif-Index of Folk-Literature: A Classification of Narrative Elements in Folk-Tales, Ballads, Myths, Fables, Mediaeval Romances, Exempla, Fabliaux, Jest-Books, and Local Legends, revised and enlarged edition, 6 volumes.* Copenhagen: Rosenkilde and Bagger, 1955-58.

access to this one through Columbia University libraries.) Stith Thompson's catalog structure is built upon Finnish folklorist Antti Aarne's system from 1910[431].

Already in Stith Thompson's classifications, one can see the roots of foresight scenarios, with such classification of folk motifs as "World calamities, "Transformations," "Otherworldly journeys," and "Ordaining the Future."

VLADIMIR PROPP

Russian folklorist Vladimir Propp extended upon Antti Aarne's system by adding a system for classifying folktales by function. This has particular relevance for the classification of foresight scenarios. Propp argued that these 31 functions happened in a specific sequence, a contention with which Claude Lévi-Strauss took issue.[432]

In 2001, Scott Malec, a bioinformatics professor, created an XML system for coding stories for 20 of Propp's functional motifs.[433]

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[431] Aarne, Antti. *Verzeichnis der Märchentypen.* Helsinki: FF Communications, 1910. In English: Aarne, Antti. *The Types of the Folktale: A Classification and Bibliography*. Helsinki: The Finnish Academy of Science and Letters, 1961.

[432] McGrath, Alastair E. *A Scientific Theology, Volume 3*. London: T. & T. Clark, 2003, p. 30.

[433] Malec, Scott. "Proppian Structural Analysis and XML Modeling." In Proc. of Computers, Literature and Philology, 2001. Retrieved August 5, 2020, from https://www.researchgate.net/publication/247286265_Proppian_Structural_Analysis_and_XML_Modeling.

There are many other kinds of motif index. Everett Bleiler, in two volumes,[434] indexed early science fiction, that includes invention fiction, into motif index format. These systems should be used, and elaborated upon, for the classification of foresight and design works. *The Science Fiction Encyclopedia*[435] and Brian Stableford's *Science Fiction and Science Fact: An Encyclopedia*[436] provide updated elaboration of the groundwork laid by Bleiler.

Coding scenarios and stories with motifs provides an essential who-what-when-where to position a scenario within the context of others: baseline items recorded should include, for example, the location where the scenario is situated, who its characters are (if any), and what themes or disciplines were the focus.

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[434] These are: Bleiler, Everett F. Science fiction: *The Early Years: A Full Description of More than 3,000 Science-Fiction Stories from Earliest Times to the Appearance of the Genre Magazines in 1930; with Author, Title, and Motif Indexes*. Kent, Ohio: Kent State University Press, 1990. And: Bleiler, Everett F., & Bleiler, Richard. *Science-Fiction: The Gernsback Years: A Complete Coverage of the Genre Magazines Amazing, Astounding, Wonder; and Others from 1926 through 1936*. Kent, Ohio: Kent State University Press, 1998.

[435] Clute, John et al. *The Science Fiction Encyclopedia*, 3rd Edition. http://www.sf-encyclopedia.com

[436] Stableford, Brian. *Science Fact and Science Fiction: An Encyclopedia.* New York, New York: Routledge, 2006.

In Vladimir Propp's system of functional motifs, we can see foreshadowing of Peter Stoyko's System Viz iconography. (I have no idea whether Stoyko is familiar with Propp.)

Peter Stoyko, an Information Designer, was a virtual guest in Peter Jones's Understanding Systems course in the Winter 2020 term. In this class visit, we were introduced to Stoyko's System Viz tools.

The System Viz website explains the project:

> SystemViz is a research project by Peter Stoyko exploring how visuals can enhance systems thinking, especially as it relates to inter-disciplinary, collaborative design. Findings are expressed as visual codexes and other applied tools. Phase One of the project is an exploration of the visual notation techniques used to express systems across disciplines. Phase Two is an exploration of the theoretical literature of various disciplines—in the natural science, social sciences, design disciplines, and managerial disciplines—to distil the basic elements and dynamics. These elements and dynamics are then abstracted into generic types and displayed with an illustrative icon. This is called a Visual Vocabulary, which is being released under a Creative Commons Free Culture license for all to use and modify. Watch this space for further information about the project, including a third phase about using "motion signatures" to analyze and communicate systems.[437]

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[437] Stoyko, Peter. SystemViz by Elanica, 2019. Retrieved from http://www.elanica.com/systemviz/systemviz-presentation-overview1.pdf.

There are about 175 icons in Stoyko's currently published set. Collectively, they provide a detailed notation for describing systems in a way that is much more narrative and specific than the causal loop diagrams of circles and arrows more usually used for describing systems.

There are six types of icons in Stoyko's visual vocabulary:

Driver	State	Relation
Signal	Boundary	Domain
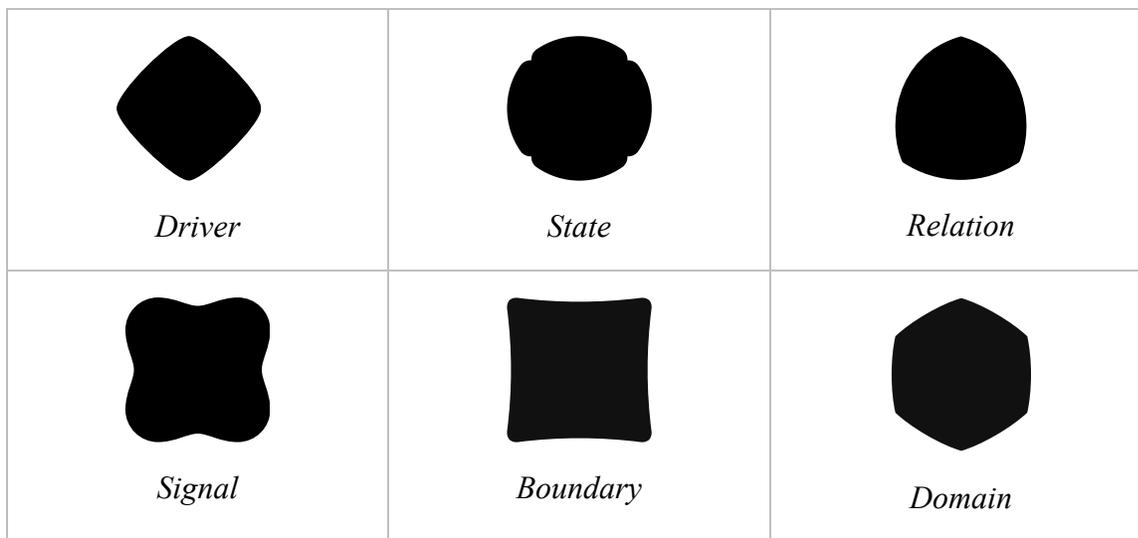
Figure 31: Typology of Icons from Peter Stoyko's System Viz.

The shortcoming of the system is it takes a while to become fluent in. The upside, from the perspective of descriptive bibliography of foresight scenarios is it provides a set of system motifs that can be used to describe specific scenarios as whole, or also used in the manner of Scott Malec's XML coding for Propp's motifs, which is to say they can be used to track a system over the course of the narration of a scenario.

Stoyko's SystemViz is not just descriptive. It is also aspirational, striving to reveal positive outcomes. For inspiration, next to my home whiteboard, I have posted nine of his system elements. The descriptive texts are from Stoyko's chips for the individual concepts:

Feed-Forward (signal)
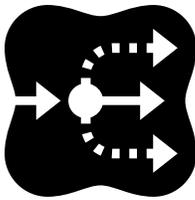
"Information about an impending action is sent out ahead of time to cause a response." Science fiction is, in general, a feed-forward phenomenon, even at its most whimsical.

Emergent Property (state)

"A characteristic or function that comes into being without direction; multiple objects have qualities that parts alone do not have."

COMPLEMENTARITY (RELATION)
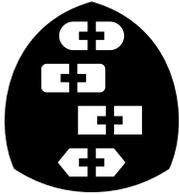
"Different actors or objects are able to do more together that they would otherwise; synergistic or positive-sum bond."

SUPPORT STRUCTURE (DOMAIN)
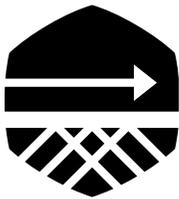
"Constructed supports (including underlying or hidden infrastructure) that enables activity."

SYMMATHESY (RELATION)

"Simultaneous contextual learning or influence between entities through mutual exposure."

Nora Bateson coined this term in 2015, defining it this way:

> I want to put the Greek prefix Syn/ Sym (together) + Mathesi, (to learn):
>
> **Symmathesy = Learning together.**
>
> **(Pronounced: sym- math-a-see)**
>
> A working definition of symmathesy might look like this:

Symmathesy (Noun): An entity composed by contextual mutual learning through interaction. This process of interaction and mutual learning takes place in living entities at larger or smaller scales of symmathesy.

Symmathesy (Verb): to interact within multiple variables to produce a mutual learning context.[438]

CRITICALITY (STATE)

"The threshold beyond which a dynamic becomes self-sustaining; critical mass necessary for an activity to take place."

CROSS-POLLINATION (RELATION)
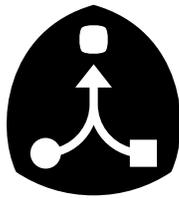
"Aspects of two or more objects are combined to create a hybrid; the purposeful breeding of a new type of entity."

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[438] Bateson, Norah. "Symmathesy: A Word in Progress." November 3, 2015.
https://norabateson.wordpress.com/2015/11/03/symmathesy-a-word-in-progress/
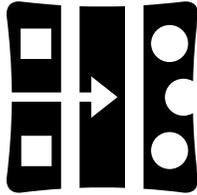
"Moving into the space between domain boundaries; the reorientation that comes from travelling across domains." And:

ANTICIPATION (DRIVER)
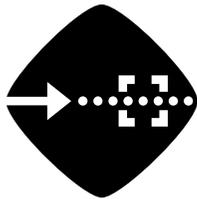
"An expectation or prediction of a future happening; an imagined future or scenario; may itself trigger actions, including self-fulfilling ones."

This is a toolset designed both for accuracy of description and for catalyzing narratives of change.

RECENT ROADMAPS

Two recent projects that follow an impulse similar to this one are Project Drawdown, that attempts to survey possible strategies to reverse global warming and Pluriverse.

PROJECT DRAWDOWN

Project Drawdown involves a website, a series of workshop events to engage people in conversation about we might reduce carbon emissions and draw carbon back into the land. And there is also a book: *Drawdown: The Most Comprehensive Plan Ever Proposed to Reverse Global Warming*, edited by Paul Hawken.[439] Topic categories include: Energy, Food, Women and Girls, Buildings and Cities, Land Use, Transport, Materials, and Coming Attractions. All of these include subtopics. These would work well as tags within the framework I suggest here.

PLURIVERSE

The Pluriverse initiative is essentially a decolonizing of ecological thought. The book, *Pluriverse: A Post-Development Dictionary*[440], contains a hundred essays on various ecological topics. Sections in the book include:

- Development and Its Crises: Global Experiences,

- Universalizing the Earth: Reformist Solutions, and

- A People's Pluriverse: Transformative Initiatives, by far the longest section.

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[439] Hawken, Paul, ed. Drawdown: *The Most Comprehensive Plan Ever Proposed to Reverse Global Warming*. New York: Penguin, 2017. See also Project Drawdown at https://www.drawdown.org.

[440] Kothari, Ashish; Salleh, Arial; Escobar, Arturo; Demaria, Frederico, & Acosta, Alberto, eds. *Pluriverse: A Post-Development Dictionary*. New Dehli: Tulika Books, 2019.

Like Project Drawdown, the topic areas enumerated in *Pluriverse* provide a rich set of possible topic tags.

CURATE VISIONS OF THE FUTURE

Once you have developed a practice of writing foresight, workshopping it, reading it, tagging it, and workshopping your tagging systems with your workshop group, you should then take up the task of curating these visions of the future.

What I describe here are concepts for the curation. The curation will involve software than can be used collaboratively by a group of people. Designing the right software configuration is a matter for future work. With the sudden rush to move education, work, and research online due to the pandemic, the underlying technology is rapidly evolving.

This set of collective practices, if enacted by various groups of people could lead us to much clearer visioning of what is to be done if we and the planetary ecology is to survive our past reckless ideas of modernity. An aesthetic that provides for branching realities is a handy tool for developing alternate scenarios, so allow for some free play with this. Alternate history aesthetics tend to define types of inflection points leading to different outcomes. What is perhaps most important about an ontology of the Future is we have not invented it yet. Here, I have led you through a long walk, or maybe a wild

goose chase, through how I view what foresight scenarios should be like, who should write them, and how they should go about it.

Were we to do all this, would we become better at prediction? Yes, because we would develop a richer set of archetypes of the future. Rudy Rucker classifies the predictability of future events into three classes: predictable, unpredictable, and strongly unpredictable:

- *Predictable*: A computation is predictable if there's a way to speed it up exponentially.
- *Unpredictable*. A computation is unpredictable if there is no way to speed it up exponentially.
- *Strongly unpredictable*. A computation is unpredictable if there is no way to speed it up at all, not even by a linear factor.[441]

Right now, as a species, we seem to be stuck with allowing the *Predictable* (climate destabilization) to be represented to us by political forces as *Unpredictable*: This is the effect of the various types of denialism.

A richer set of archetypes of the future seem likely to speed up our comprehension of scenarios to make some of the stories of future scenarios easier to tell: although Rucker speaks here of computation, the distinction between predictable and unpredictable is defined in the human context by whether we understand the storyline.

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[441] Rucker, Rudy. *The Lifebox, the Seashell, and the Soul: What Gnarly Computation Taught Me about Ultimate Reality, the Meaning of Life, and How to be Happy*. Thunder's Mouth Press, 2005, p. 428-430.

CONCLUSION

It is not that I have no past. Rather, it continually fragments on the terrible and vivid ephemera of now.

— Samuel R. Delany, *Dhalgren*

I have titled this work "A Thousand Futures" because—as discussed earlier—the problem of climate volatility means we need to imagine a wide variety of futures. Imagining the future will involve imagining scenario spaces, the space of these futures, not just scenarios.

This project was motivated by a desire to combine the techniques of science fiction and the methods we learn in OCAD's graduate program in Strategic Foresight and Innovation. Through this process, I have arrived at some design principles.

⇒ **Exit Flatland**, which is to say, free yourself of the conceptual constraints of visualizations optimized for whiteboards, Post-It Notes, and presentation software.

⇒ **Know the history of your tools.** This principle might be a variation on Marshall McLuhan's motto, "The medium is the message." Tools have their own discourses, which means they bring with them an unconscious of both meaning and practice.

⇒ **Adopt a computational narrative outlook.** Big Data looks at you that way. Be able to return the gaze.

⇒ **Scenarios are a form of the folktale.** Storytelling has a history. Scenarios, even when produced in environments seemingly remote from folktales, are still within that tradition.

⇒ **Folk processes are collective.** Although science fiction stories are usually written by individuals, the processes of the discourse of the future that results, is a collective process. The folk processes of scenario generation have a similar dynamic within culture.

⇒ **Retrofuturism**: Ideas we need for the future may be found in the past.

⇒ **Transrealism**: Of the literary modes within science fiction, this may be the best fit for getting scenario ideas down in writing for further exploration. This is not to say that this is necessarily the best format for *publishing* those ideas. But it is a powerful composition tool.

⇒ **Reclaim the imaginary**. We need the tools of imagination to chart our way to planetary survival.

⇒ **Reclaim the expressive semantics of our languages and folk traditions**. To be able to articulate what we have and what we have lost, we need the expressive ranges of human languages.

⇒ **Dystoutopia**: Understand that utopia and dystopia are not opposites and that both come with a point of view.

⇒ **Assume the predator is already in the coop**.

The process I have designed comes from multiple streams of my experience. It is like a writing workshop. It draws upon my experience as an editor of anthologies, especially the editing of *The Architecture of Fear* (1987)[442] and *Hieroglyph* (2014). And it draws upon my work as a database administrator of the antiquarian bookseller L. W. Currey, Inc. and my work on the data libraries of Mathematica, leading to the release of *Mathematica 6*.

While writing stories for a writers workshop may seem like fun and games, we should not forget what is at stake. I have designed a workshop for creating ontologies of the future, intending that there be a way to synthetize concepts and information into a conceptual playing space where we can imagine otherwise unimaginable futures, that we be able to pick our way through this treacherous time to what Joanna Russ called *optopia*: the optimal future, under the circumstances.[443]

If we regard scenario space as a geography to be explored, our specificity will allow us to see archipelagos of possibility rather than overlap zones in Venn diagrams. I leave you with my graphic of the Venn Archipelago, a remix of the ubiquitous IDEO

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[442] Cramer, Kathryn, and Pautz, Peter. *The Architecture of Fear*. New York: Arbor House: 1987.

[443] Robinson, Kim Stanley. "There Is No Planet B: It's up to us to craft the shape of the future." Sierra Club, December 18, 2018. Retrieved August 14, from https://www.sierraclub.org/sierra/2019-1-january-february/feature/there-no-planet-b-kim-stanley-robinson.

Venn diagram of Desirability, Feasibility, and Viability in the spirit of Bruce Sterling's

Venn Diagram, "Anticonventional Objects"[444].
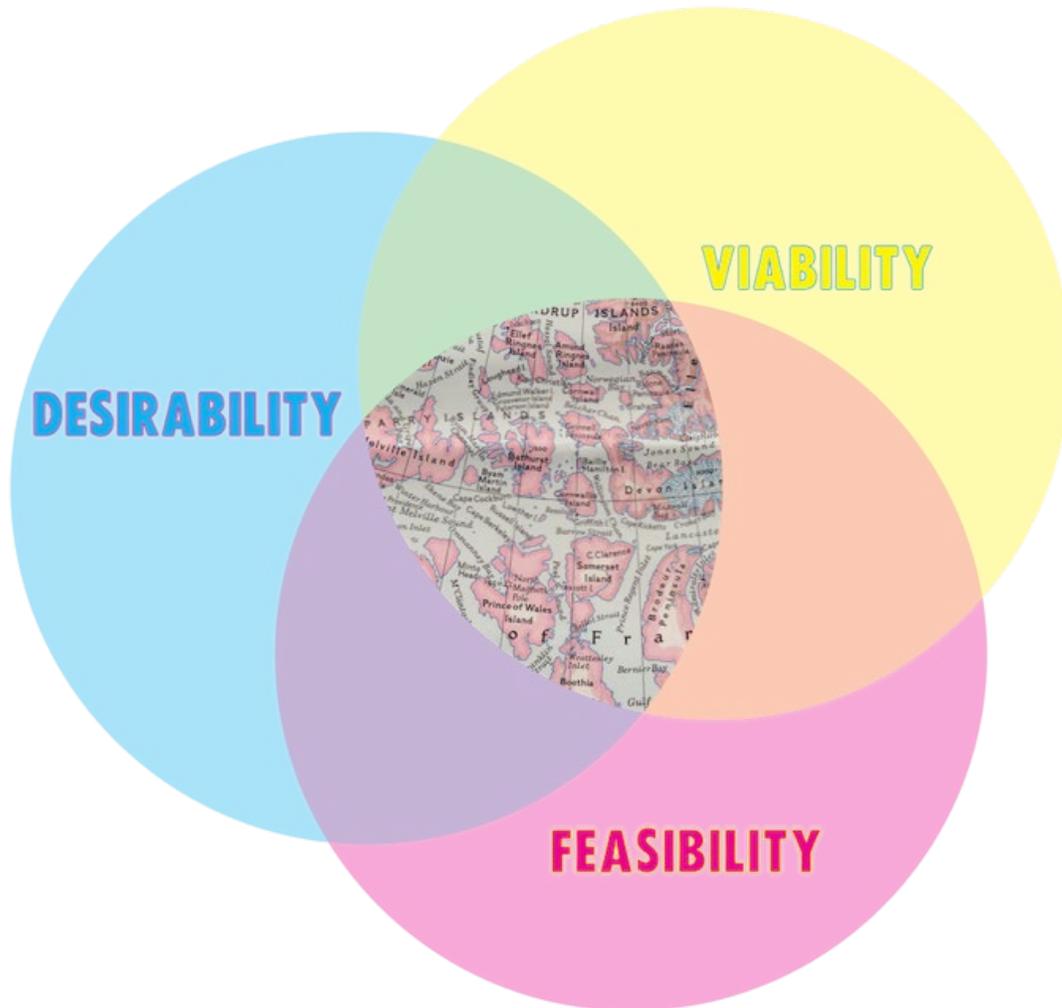
Figure 32: Venn archipelago, diagram by Kathryn Cramer based on the
IDEO Venn Diagram of Desirability, Viability, and Feasibility

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[444] Sterling, Bruce. "Design Fiction: Anticonventional Objects." Wired, October 10, 2013.

https://www.wired.com/2013/10/design-fiction-anticonventional-objects/

The contents of the bowed-edged triangle in the center are not necessarily close to one another nor similar. For anything other than a simple problem, the IDEO triangle in the middle is not really a triangle, but rather an archipelago of possibly unrelated and dissimilar things.

As ice sheets crash into the ocean and formerly sturdy governments fall, we see the possibility that the Powers that Be are not coming to save us. And if there is a way out of this predicament, we may have to find it for ourselves. I hope I have given you some tools to use for that.

Set sail and explore.

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Figure 33: American Guinea Hog piglet at the orchard, August 22, 2015. Photo by Kathryn Cramer.
This photo brings to mind the line from Edward Lear's "The Owl & the Pussy Cat":
And there in a wood a *Piggy-wig stood*.