



July 2024

Nicola Twilley reveals the secrets of refrigeration

Interview by Linda M. Castellitto

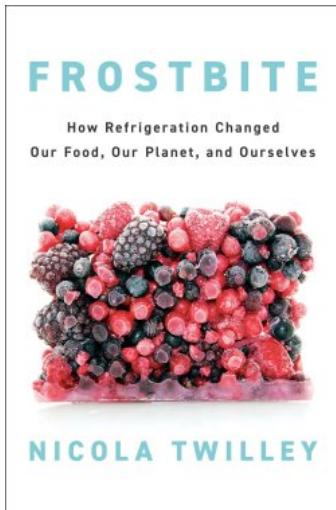
The *Gastropod* host's adventurous **Frostbite** takes readers into cheese caves, ice cream warehouses and the world of "refrigerator dating."

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For so many of us, the refrigerator is an appliance we've interacted with daily for as long as we can remember. It's also one we take for granted, rather than viewing it as emblematic of the world-changing innovation Nicola Twilley explores in **Frostbite: How Refrigeration Changed Our Food, Our Planet, and Ourselves**. As readers will learn from Twilley's extensively researched, impressively wide-ranging ride along the "cold-chain," artificial cold is much more than a convenience, thanks to its effects on what we eat, how we feel and the future of our planet.

You note in *Frostbite* that your interest in the cold-chain began 15 years ago when farm-to-table eating was becoming increasingly popular, and you "got stuck on the conjunction. What about the to?" Why do you think that space between, so to speak, captured your curiosity and sparked a yearslong drive to learn more?

Back in 2009, when I first started writing about food, I loved the way Michael Pollan took me to a Kansas feedlot in *The Omnivore's Dilemma*. He made the places a steer travels through on its way from farm to slaughterhouse real and tangible, so I could picture them, as well as understand why they matter. I decided that I wanted to do the same for the spaces we've built for our food to live in. I suspected (correctly, it turned out!) they might be equally fascinating and equally important in terms of transforming our diet, health, economy and environment.



Your first book was 2021's *Until Proven Safe: The History and Future of Quarantine*, which you co-wrote with your husband and fellow writer Geoff Manaugh. And you co-host the podcast *Gastropod* with Cynthia Graber. What was it like to move away from your (clearly, wonderfully strong and productive) partnerships and take the helm of *Frostbite* solo?

Nerve-racking! Having an extra brain and an extra perspective to draw on is often essential and always a bonus. Fortunately, I still did: Although it's just my name on the cover, Geoff still read every word in the book many times. His edits—and his encouragement, enthusiasm and patience as I tacked on visits to refrigeration landmarks on vacations and family trips—were essential. (He also came up with the title!) That said, it is undoubtedly lonelier to work solo, which makes me all the more excited to talk about the ideas and stories in the book with readers.

Of course, as per your extensive acknowledgements section and the wealth of experts and sources you introduce throughout, a global village of cold enthusiasts provided

information and insight on refrigeration's past, present and future. Will you share a bit about how you decided what to explore, who to interview, where to go and what to include in your book?

When I began the research that inspired **Frostbite**, there hadn't been a book about refrigeration (that wasn't a textbook for HVAC technicians) published since the 1950s, so I really had to just follow my curiosity, cold call banana-ripening facilities and scour industry publications for clues. Because I quickly became obsessed with the subject and talked about it at every opportunity, friends started sending everything refrigerated my way: My friend Kevin Slavin introduced me to Kipp Bradford, for example, who helped me build a fridge in order to understand how cold is made; my friend Alexis Madrigal tipped me off about the refrigerated warehouse's appearance in Tom Wolfe's *A Man in Full*. Then, after I wrote about China's race to refrigerate for the *New York Times Magazine*, people inside the cold-chain industry reached out to share their stories, and those connections led me to working in

a refrigerated warehouse myself as well as traveling to Rwanda to see what the future of refrigeration might look like.

One of the things I love the most about the kind of writing I do is the opportunity to peek inside weird, fascinating places that are otherwise off-limits.

Speaking of “where,” you traveled around the world and did loads of experiential research, including exploring underground cheese storage caves in Missouri, wearing a safety harness on a crane high in the air at the 12-story NewCold warehouse in England, and venturing to the Arctic to visit the Svalbard Global Seed Vault. What was the most exciting, wow-inducing place you visited?

One of the things I love the most about the kind of writing I do is the opportunity to peek inside weird, fascinating places that are otherwise off-limits. It's hard to pick a favorite, but I loved the gigantic, subterranean cheese cave in Missouri—a former mine where Kraft stores our national reserve of Cheez Whiz and Kraft Singles—and the juice tanks at the Port of Wilmington, Delaware, where most OJ drunk in the Northeast spends months or even years, stripped of flavor molecules and stirred slowly under a blanket of nitrogen, before it making its way onto shelves as “fresh” orange juice.

You drew from novels like *The Mosquito Coast*, *East of Eden* and *The Great Gatsby* as you wrote *Frostbite*. What was refrigeration's role in these works of fiction?

Given refrigeration's importance, and my love of fiction, it was surprising and disappointing to realize how few appearances the cold-chain makes in novels, or theater or film for that matter. (I truly believe that a cold-storage warehouse would make a great setting for a movie or TV show—call me, Hollywood!) One thing that's interesting is that, in both *The Mosquito Coast* and *East of Eden*, ice-making is a project of flawed idealists—characters whose visionary zeal exceeds their grasp on reality. Artificial cold itself is seen as both progress and corruption, as beneficent yet dangerous, which is how I ended up seeing it too.

***Frostbite* was created over a 10-year period in your life. How has your work, your life as a writer (including your regular contributions to *The New Yorker*), evolved over that decade?**

It's possible that Ann Godoff, my wonderful editor at Penguin Press, might feel differently about the wait for me to deliver my manuscript(!), but I think *Frostbite* is definitely richer for everything I've learned over the past decade. Being edited by Leo Carey at *The New Yorker*, in particular, has been a masterclass in how to tell stories both beautifully and economically, and I am a much better writer for that training. Meanwhile, my reporting for *Gastropod*, on everything from Native American cuisine to cocktails, has expanded my perspective on so many aspects of food. Refrigeration is one of those topics that touches everything—flavor, popular culture, technology, public health, climate change—and so, the more context I was able to bring to it, the better the book became.

Cheers to you for having a “date-ready fridge,” according to “the world's first and only refrigerator dating expert”! Will you share what you learned about “fridge compatibility” and why you assert “It is the humble fridge that offers a window onto the twenty-first century soul”? And also: Please tell us more about your fabulous fridge and its French doors.

Although I was pleased (and surprised) that my fridge was rated so favorably, and I will happily admit to judging people based on their fridge contents, I actually believe that fridge-peeping offers more value as a collective self-portrait, rather than as a guide to an individual's character.* The size of American fridges as opposed to European ones reflects the form of our cities; the amount of junk stuck onto a fridge door correlates directly with female stress levels; the wilting salad leaves are a testament to our aspirational goals and dietary reality!

*At least, I hope so: My own fridge is full of far too many curious condiments, a somewhat concerning quantity of beer and wine, and enough neatly stacked grain-, bean- and roasted veg-filled Tupperware to warm the most anal-retentive heart. The overall effect is a confusing mix of adventurous, fun-loving and uptight. Hmm, maybe there is something to this fridge-dating business after all . . .

Regarding use-by, sell-by and other such dates, you note that in today's world “freshness is a belief system.” How does that relate to food waste, and how might we more effectively counteract it?

Before the refrigeration time machine was invented, no one would have expected a fresh peach or milk to last more than a few days, unless they turned it into jam or cheese—fresh food was by definition ephemeral. Today, the cold-chain, including our home fridges, does such a marvelous job of slowing time that food can stay good for ages. That's fantastic, but it does have a couple of downsides. First of all, it seems to encourage us to buy more perishables than we can eat, or assume they'll be fine for another day if we don't feel like cooking that evening—and, because the fridge can't actually confer immortality, they do eventually go bad and we throw them away. Secondly, refrigeration has almost erased more traditional ways of sensing whether food is good or not. The risks and lack of transparency built into a refrigeration-extended supply chain lead many of us to trust a sell-by-date over our own judgment. And, because we no longer have any idea how old produce is, metabolically speaking, when it gets to us, it doesn't matter if we know roughly how long to expect, say, a cucumber to last after it's been harvested; we don't have enough insight into the supply chain to use that expertise, even if we still have it.

Refrigeration improved people's lives in so many ways, but it's also had numerous unintended consequences on our health and environment. What are, say, the top three things we should be thinking about when we consider purchasing and consuming refrigerated and/or frozen food?

I'm definitely not in the business of telling people what to eat, but I can say from personal experience that minimizing your refrigerated footprint can lead to a more delicious, more nutrient-rich diet. It's easier to do this in California than most places on Earth, I'll admit, but, given what I discovered while writing this book, I rarely eat fruit and vegetables that are out of season or shipped from another continent anymore. I love apples, but, in June, I'd rather not eat an apple that's been stored for nine months when I can buy locally grown berries or cherries that have more flavor and more nutrients. (Of course, unless I'm planning on eating them that day, I put them in my fridge after I've bought them—but at least they haven't traveled halfway around the world through the cold-chain, losing flavor and vitamins en route.) And, after realizing how much of our pre-refrigerated diet would have consisted of fermented food, as well as talking to researchers about the emerging science of the gut microbiome, I eat more miso, sauerkraut and yogurt than before. Finally, I've tried to become better about not stockpiling perishables, so that I rarely have to throw food out.

Realizing that radical change is quite possible makes me feel much more optimistic about our shared future

As you explain, the advent of refrigeration has caused us to become disconnected from the seasons, from nature's rhythms and from the Earth itself. You note that “reducing our dependence on refrigeration might also allow us to rebuild our relationship with food.” What might individuals want to do first to set themselves on that path?

As Natalia Falagán, one of the refrigeration experts I spent time with in the book, has discovered, there's nothing like growing fruit and vegetables to understand what freshness really is and how to value it. You don't need a backyard—you can volunteer at a community garden, which has the side benefit of being a lot of fun. With meat, fish and milk, if you eat animal products (which I do), the scale encouraged by refrigeration has allowed inhumane, ecologically disastrous practices to become the norm, while the distance enabled by refrigeration has made it easier to turn a blind eye to them; being conscious of those implications can't help but lead to making choices that are healthier for both yourself and the planet. But also, as with climate change, individuals aren't and can't be responsible for transforming our entire food system. Right now, a lot of money and effort is being thrown at building cold-chains in the developing world by both institutions like the United Nations and megarich philanthropists like Bill Gates. I would love for policymakers and funders to read my book and consider how they can learn from the unintended side effects and less desirable impacts of refrigeration that I tease out in *Frostbite*, so that the rest of the world doesn't make the same mistakes we have—at even larger scale and with disastrous consequences for all of us.

What were you most hoping to convey or accomplish with *Frostbite*? And what's up next for you?

Mostly, I want readers to share my sense of fascination while exploring this utterly essential but mostly invisible world. But I would love readers to share the sense that I developed that, given how recent and transformative and somewhat arbitrary our embrace of refrigeration was, our food system is clearly a lot more amenable to change than it seems. That's important, because today's food system is damaging our health and our planet, as well as contributing to inequality. Realizing that radical change is quite possible makes me feel much more optimistic about our shared future—I hope readers come away feeling that way, too. I would also love to inspire a new generation of inventors to think creatively about how to keep food fresh and stop it from going bad. Ice cream needs to be cold, but meat doesn't necessarily, and refrigeration needn't be humanity's final answer to the problem of preservation. As far as what's next: I would like to take a very long nap, but, in fact, I have a couple of new *New Yorker* stories in the works, and *Gastropod* never stops! I'm also starting to tinker at the edges of what I think will be my next book-length projects—I have an idea for another nonfiction book but also the start of what might become a novel. I've never written any publishable fiction, so who knows whether I can pull it off, but I'm excited to give it a go.