Monday, July 29, 2024 / Is your refrigerator running?

[HALF SECOND OF SILENCE]

[BILLBOARD]

NOEL KING (host): Ninety nine point five percent of Americans have a refrigerator.

NOEL: But we can’t agree on what goes in it.

SCORING IN – Disco Infernal BMC

*<*[*CLIP*](https://www.tiktok.com/@averagejoegam3/video/7272104703264083242)*> TikTok: It took me having roommates to figure out what goes in the fridge apparently I’ve been doing it wrong my whole life. Muffins, bagels, regular loaf of bread goes in the fridge.*

*<*[*CLIP*](https://www.instagram.com/eatinghealthyfeed/reel/CbxDnisDein/)*> Instagram: Never put potatoes in the fridge. It’ll turn their starch into sugars. Put them somewhere cool and dry and in a very dark spot.*

*<CLIP> tiktok: butter. It's one of the few dairy products that doesn't need to be refrigerated canned pasta.*

*<*[*CLIP*](https://www.tiktok.com/@neat.caroline/video/7254284929754778923?q=what%20not%20to%20put%20in%20the%20fridge&t=1722268032353)*> Coffee. It’s likely to pick up other flavors in the fridge so keep it in a sealed container in the pantry.*

NOEL: She’s wrong about the coffee but that’s my opinion and that’s the point! Who is the expert here?

NOEL: Coming up on Today, Explained: an actual fridge expert gives us a chill history of the one appliance we can’t live without and why we all may be using it INCORRECTLY.

[THEME]

Nicola Twilley (author and podcast host): My name is Nicola Twilley. I am co-host of Gastropod, the podcast that looks at food through the lens of science and history. And I am the author of Frostbite, how refrigeration changed our food, our planet and ourselves.

Noel King: Okay, so this is going to sound – this is not going to sound like a basic question. It is a very basic question. What is the point of the refrigerator?

Nicola: \*laughs\* Just to provide a low level hum for your the background of your life?

SFX REFRIGERATOR HUM

SCORING IN – Mosquito Boogie

No. The point of the refrigerator is to preserve food. One of humanity's longest and most sustained struggles is to keep our food good and stop the bacteria and the fungi that want to eat it before we can.

Nicola: for fruit and vegetables, when you harvest fruit and vegetables, they're still alive. It’s Still breathing. It’s still metabolizing.

SFX BREATHING

It only has a certain number of breaths left before it dies, like us. And so the trick is, if you can get it to breathe more slowly,

SFX BREATHING SLOWS

then you can extend its life. And so that is literally what is happening in your refrigerator. And so that's what it's doing. It's slowing time.

SFX BREATHING SLOWS EVEN MORE FADES INTO REVERSE CHIMES SFX

It's literally a time machine.

SFX IN THE CLEAR FOR HALF A SEC AND FADES

For, meat and dairy and things like that, what it's doing is slowing down how fast the bacteria and fungi are metabolizing. And so they reproduce more slowly. And so again, your milk stays good longer.

SCORING HARD OUT REVERB

Noel King: Okay. So based on this, Nikki, it sounds like everything we eat should be refrigerated. I recently became fixated on this Instagram account where this man tells you what should be in the fridge and what shouldn't, and it is shocking. It is shocking to me.

<[CLIP](https://www.instagram.com/eatinghealthyfeed/reel/CbxDnisDein/)> *Armen Adamjan: Lettuce – wrap them in foil, stick them in teh fridge and they’ll be fresh for 30 days.*

There are things I have always put in the fridge and he's like, no, put them in a paper bag. What from your point of view belongs in the fridge and what doesn't?

Nicola Twilley: Oh, this is America's most controversial question, you might think. We're split on politics. No, nothing. We get along, actually, compared to the views on what should be in the refrigerator. I've had a Google alert on fridge and refrigerator for more than a decade now, and I can report that the internet, apart from being cat videos, is basically people piling on to each other about what they do put in the fridge and what they don't put in the fridge. And is my boyfriend a psychopath because he does put ketchup in the fridge onwards like that.

SFX SWIPE

<CLIP> tiktok: Never put these fruits in the refrigerator otherwise you wouldn’t even know how you died

SFX SWIPE

<CLIP> tiktok: hot sauce there’s plenty of vinegar and salt that you don’t need to refrigerate it

I set foot in this area, with a certain sense of trepidation But here's the deal. For some things, your fridge is not best.

So the classic is stone fruit or tomatoes or things like that. If you put them under 50 degrees for a length of time, you literally disable the genetic machinery inside the fruit, inside the tomato that can produce flavor. So that is a terrible idea. Scientists call the fridge the stone fruit killing zone.

Noel King: \*gasps\* Scientists, Nicky? [laughs]

Nicola Twilley: Don't put your stone fruit in the fridge. Don't put your tomatoes in the fridge. They will be tasting worst in the fridge. The other thing about the fridge is the cold in there is dry and so bread for example. Yes, you're slowing down how quickly the molds and the bacteria are metabolizing, but you're also drying that bread out. It will go stale.

The things people get worried about like, oh, should I put my ketchup in my fridge or should I not? Listen, ketchup was originally invented as a way to make first, small fish and then tomatoes last for longer, so it doesn't need to be refrigerated. But if you're the kind of person who eats ketchup once a year, put it in the fridge and just don't tell people because they'll get upset.

Noel King: You. In the course of your reporting, you spoke to people who are looking for ways to not use a refrigerator, but to get the same results that a refrigerator gives you. Who are these people and what are their ideas?

Nicola Twilley: You know, human history has been this actually, you could look at it as a history of sort of advances in food preservation technology. And yet then when we got the fridge, we sort of just downed tools and we're like, great, problem solved. And actually some people didn't. Some people said, well, this doesn't have to be the only way we preserve food. There are other ways to keep food good.

And one, person that I came across is a guy called James Rogers. He's based in California in Santa Barbara, and he has gone the coatings route.

SCORING IN – SKEETERS

*<CLIP> ROGERS: every plant on the planet has a protective barrier on the outside of it. So we take that material and we recycle it back into a barrier that we apply back to the surface of the produc e and that allows the fruit that it ages by a factor of 2 3 or 4 times.*

So basically, one of the ways you can slow down how fast your produce is breathing is not just cold, but you can actually tweak the atmosphere. So if you give them very, very low levels of oxygen, the oxygen in the atmosphere normally is about 21%. If you take that down to 0.5%, 1%, then again, you slow down the breathing. It has the exact same effect.

SLOW BREATHING SFX AND CHIMES

If you do that at the level of each individual fruit item, by putting on a coating that keeps that perfect little atmosphere inside the bell pepper or inside the lime or lemon or cucumber, then you are basically keeping the perfect atmosphere for the fruit or vegetable to just breathe really slowly, to metabolize really slowly, and to burn through less of its internal nutrients and and resources. The great thing is it's made from food waste. It's made from food. He uses the skins from tomato canneries in the, you know, the leftover stuff from when you're making guacamole and things like that. So it's not some weird chemical coating. It just happens to using physics assemble in the right way to make this kind of barrier membrane that lets only a certain amount of oxygen in.

SCORING OUT

Noel King: I, I love when people come up with new things, especially when they're cool and they're useful. But I wonder about the practicality of this. I have a fridge. I don't have to spray anything on my fruits and vegetables in order to at least keep them relatively healthy. Do you envision this being something that is that is in widespread use at any point?

Nicola Twilley: I do, and in fact it is.

The way they design it is this gets sprayed on at the packing house.

The cucumbers come off the vine. They go get washed and cooled and and you spray this on . it's not something you have to have in your home. And it is already being used at scale You can go to Walmart right now and buy produce that has been sprayed with this.

Noel King: Why why is this something that people are looking into? What what I mean I mean, we do we do have fridges. You're saying there are better ways though. No. Well, and I get that, but in order for this to make any sense, it's got to be profitable. And it has to like fill some gaps in the market or solve some big problem. What are the big problems?

Nicola Twilley: Yeah. So refrigeration has been good enough for a long time, right? I'm saying it's not perfect, right. It's actually bad for peaches. It removes the flavor. This is why your grocery store tomato tastes have nothing. But listen, we can live with that. We have lived with that. We do live with that.

But now we're facing a much bigger problem. We have woken up to the fact that actually refrigeration is a huge contributor to climate change, and it does that in two ways.

SCORING IN – Neutral Irene

One, there's the energy required for cooling

You cannot move all this heat around out of something without putting it somewhere else and using a lot of energy to do that.

And here's the thing, Noel. Like we have a cold chain. We have refrigerated warehouses and trucks and grocery stores. Much of the world is building that right now.

*<CLIP> NEWS ANCHOR: Residents of Lamu at the Kenyan coast have for decades depended mainly on two industries for their livelihood tourism and fishing*

*<CLIP> LAMU GOVT OFFICIAL: As a county government we’ve taken this opportunity to try and tap into the areas which were before non existent like cold chain storage which is very very critical for fisheries*

Places like sub-Saharan Africa, much of Southeast Asia, India, they don't have this and they are looking to build it right now. And if they build it right now, that will be such a huge increase in power required to run it. But one expert said to me, listen, if we build a, a US style cold chain for the entire world, there won't be a harvest to put in it because climate change will have made sure of that.

Noel King: ooh

Nicole Twiley: ~~So~~ and that's just the power. The other big piece with, refrigeration and climate change is the chemicals we use to create cold. They're called refrigerants. They have really long, complicated chemical names. Many of them, and especially many of the ones that are used in the developed world because they're not flammable and they're easier to work with, are what are called super greenhouse gases. So, they have many thousands of times the global warming potential of carbon dioxide.

So that is terrible.

And that is why Project Drawdown, which was this group funded to sort of look at all the things we could do to mitigate climate change and which gave us the biggest bang for the buck. They ended up with refrigerant management as number one on their list,

*<CLIP> Paul Hawken, Executive Director of Project Drawdown: And we were so disappointed. We wanted something really sexy and it was refrigerant management. We were going ah no. It’s like Refrigerant management? But it’s true it’s you know 7-8-9 thousand times more powerful than CO2 is the gases in our air conditioners and refrigerators*

SCORING OUT

Noel King: Let me ask you briefly. A lot of electrical appliances have gotten more energy efficient as the years have gone on. We've seen real advances. Any advances in refrigeration that make that prediction? Maybe not as dire as we might assume.

Nicola Twilley: Yeah, all the time people are working on more sustainable technologies, better refrigerants. Unfortunately, the new generation of these refrigeration chemicals is, again, harder to work with. More, flammable, explosive, toxic, dangerous, just less global warming potential. So the replacement is not easy. Nor is it necessarily popular. People are working on making the actual process of refrigeration more efficient. There are people working on different ways of producing cooling. So you can use, certain materials produce a cooling effect if you use magnets.

<CLIP> ICP: MAGNETS HOW DO THEY WORK (SLIGHT REVERB)

Einstein came up with a design for a new fridge at one poi nt. No one can make it work. Apparently howls like a jackal every time you switch it on.

SFX FRIDGE

SFX JACKAL HOWL (SLIGHT REVERB)

Noel King: Ha!

Nicola Twilley: He was brilliant, but not at everything. And there, you know, there's the Department of Defense briefly worked on a cooling device that was powered by acoustics, by sound waves.

SFX THX (SLIGHT REVERB)

None of these are at commercial scale right now. That's not to say they couldn't get there if we put the money in. You know, if you do, like a moonshot on this. But people are working on more sustainable cooling methods, for sure.

SCORING IN – users lose drugs

NOEL: Nicola Twilley. She said sustainable. Coming up… will a fight over fridges be the next dumb culture war!? If we all work together … we can make it so.

[BREAK]

[BUMPER]

NOEL: We’re back with Nicola Twilley. She’s co-host of Gastropod and author of Frostbite! How refrigeration changed our food, our planet and ourselves. So, you’ve said 100 years ago most Americans didn’t have refrigerators. Today all of us do. If we want to tell the story of how the fridge took over, where do we start?

NICOLA: We start with a high school dropout in Boston. His name was Frederick Tudor.

His family was was relatively wealthy. They had an ice house on their estate.

Noel: hmmm

Nicola: You would have your, you know, servants harvest blocks of ice

<[SFX](https://freesound.org/people/davilca/sounds/677230/)> chopping ice

from a local freshwater pond or lake, and you would stow it in an ice house where it would survive until summer.

And then you could have ice cream and you could have wine slushies, and you could have chilled drinks.

SFX sip ahhh

And it was this very elite, decadent, luxurious thing.

<[CLIP](https://www.youtube.com/watch?v=OXFv8IOVL0U)> posh woman: mmmhmm yes

And so, Frederick drops out of school. He's tasked by his father with taking his brother, who had tuberculosis, to Cuba for a little bit of sun, R & R, hopefully it would make him better. And these two New Englanders go to Cuba, and they are so hot and so uncomfortable.

SFX OUT

They're like, Imagine if only we had some of our chilled ice house cool drinks right now.

SCORING IN – Lordy I hope there are drums

And then Frederick thinks, you know what? Cubans would love this. They would kill for this. And so he comes up with his latest, you know, get rich quick scheme. And he comes home and he says I am soon going to have more money than I know what to do with.

It is a whole saga because super relatable guy. He hasn't thought anything through. He hasn't thought about the fact that when he gets to Cuba, everyone's just going to look at this stuff that is melting and be like, you want money for this? He hasn't he hasn't counted on the fact that there isn't a natural appetite for cold. Most people take their first drink of an icy drink in some manner. Like what? What is this? His, notebooks, which still exist He has one page that just has the word anxiety in block caps repeatedly.

NOEL: LAUGH

NICOLA: He's he it's a struggle, but he eventually figures it out. He figures out the practical side of things, how you, store ice, how you harvest it most efficiently.. And then he also figures out the business side of the things. And it eventually works. And the ice business takes off to the extent that he becomes the Ice King and millions of imitators, you know, get in on this. North America's, you know, fresh water and cold winters is suddenly seen as like the equivalent of Saudi oil.

NOEL: Oh!

NICOLA: It's like this great natural resource. American ice is shipped around the world. And people start to realize, You could use it to, I don't know, keep your fish cool. You could use it if you're a farmer. If you're bringing butter or cheese milk to market.

And with this huge amount of ice, people suddenly start to realize, oh, if we could keep our food cold, this is actually a very useful way to preserve food. We should get on it. And that is what inspired eventually engineers to figure out how to make cold.

SCORING OUT

Noel King: All right. So how do we get from Frederic Tudor to a fridge in every home?

Nicola Twilley: various engineers take what had already been sort of figured out as a party trick, which is how to use these chemicals that evaporate, verifies to create mechanical cold. So and this is amazing to me, it's really recent. It's 1850s where we get the first machine that's capable commercially of producing ice artificially. There was this sense that what is this new technology? Previously, if you had seen a chicken that looked, you know, fresh. Well, then you knew it had to have been slaughtered less than 48 hours ago and really within an 80 mile radius, because that was the only way it could have got to you. Now you have this technology where a chicken can be slaughtered six months ago, a year ago, and then stored in the cold. And that's freaky. People are genuinely afraid of it. How do they know it's fresh? How do they know it's good? All the old certainties have been disrupted and they had no way of telling what was truly fresh anymore.

Noel King: And so what ultimately changes people's expectations about what makes something fresh?

Nicola Twilley: The federal government hired a woman called, Polly Pennington. Mary Engle Pennington was her her for her full name. And she made refrigeration scientific.

SCORING IN – Bubbles Bamboo\_APM

She did the research both in the lab and traveling around the country on the refrigerated rail cars. Sampling the chickens and figuring out where things were going wrong. She did the research to say, here's how you store chickens safely.

And she by making refrigeration scientific and doing the research to to say this is how you keep food safe. By the end of her life. she gave a speech just before the Second World War at MIT and she was like. when I started, Americans didn't think food was fresh. If it had been refrigerated, things have changed so much that now they think food isn't fresh if it hasn't been refrigerated. That's the 180 flip that she managed to do

Noel King: let me move us more into the present day.Recently in the U.S., there's been a push against gas stoves, and depending on what your politics were, you may have gone a little bit wild during during that fight. Is there the same kind of culture war themed conversation happening around refrigerators?

Nicola Twilley: Unfortunately there is

SCORING IN – #DoYourJobDoSomeResearch (minimal kick, polyrhythm, moving forward, figuring things out)

and this was shocking to me, but sadly true in the world we live in. Just the other week, the House Republicans passed a bill called the Refrigerator Freedom Act.

NOEL: No. They did not \*laughs\*

*<*[*CLIP*](https://www.youtube.com/watch?v=pFGdGgZQb1o)*> Rep Buddy Carter: THE REFRIGERATOR FREEDOM ACT WILL PROTECT AMERICAN CONSUMERS FROM UNAFFORDABLE AND UNREALISTIC STANDARDS FROM THE DEPARTMENT OF ENERGY. \*KEEP RUNNING\**

it's called the Refrigerator Freedom Act because what you are free to do is pollute. Remember I mentioned these refrigerants, the chemicals that we use to create cold, that are the things that make sort of the machinery work and how polluting they are. Well, the Biden administration had introduced legislation to just phase out the most polluting. You were still allowed uh refrigerants that were had 700 times the global warming potential of carbon dioxide. You just weren't allowed the ones that were like over a thousand times more polluting than carbon dioxide. And so that was the bill was introduced.

<[CLIP](https://www.youtube.com/watch?v=zd1ym6OGjtQ)> *Rep. Miller-Meeks: my bill the refrigerator Freedom Act prohibits the department of energy from enforcing ing unrealistic energy standards for refrigerators that are not energy inefficient*

The House Republicans responded with this Refrigerator Freedom Act, which passed. It's not going to pass the Senate, but it is a sign of just like ~~how politically~~ how politicized this has become.

SCORING OUT

Noel King: So what do you think the future of refrigeration is?

Nicola Twilley: Well, depends on whether you catch me in an optimistic mood or not. What I would like and why I wrote this book is, I think. Listen, refrigeration. We we invented it. It has many benefits. It has brought us a lot of great things. A cold beer is a beautiful thing. But. But that doesn't mean it isn't without costs. And having implemented it and just accepted it into our lives in this way, we have never really accurately assessed the costs. And now there's this big wake up around climate. and, you know, the developing world, building their own refrigeration systems. My argument is, let's have a step back here.

SCORING IN – Sunken Cruiseship Lobby Song (pensive, warm, claps, 808 beat, thoughtful, piano melody, glitch) .wav

Let's say, what has refrigerating our food system done to our food system? Do we like it? Does our food tastes better, have more nutrients? Are there environmental costs that are unacceptable? If so, can we do something about them?

This is the history of humanity, is figuring out ways to store our food better.

Let's turn our brains to this again, and do it with an idea of some of the downsides of refrigeration that we'd really like to fix.

NOEL: Nicola Twilley: author of Frostbite! Host of Gastropod!

NOEL: Peter Balonon-Rosen produced today’s episode and Matthew Collette edited. Laura Bullard and Miles Bryan fact-checked. Patrick Boyd and Andrea Kristinsdottir are our engineers.

I’m Noel King. It’s today, explained.

[10 SECONDS OF SILENCE]