The New Wave of Fishless Fish Is Here

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Food scientists and marketers are creating healthy, plant-based, imitation tuna, crab, and shrimp that look and taste like the real thing. Better yet, switching to faux seafood will help curb our reliance on an international fishing industry that has become an environmental and human-rights disaster.

The year 2020 has not been good to many things, but it has been very, very good to the tuna melt. As the world got weird and we sheltered at home, many of us hankered for the familiar, the stable, the uncool. And there was the tuna melt waiting for us, as uncool as ever.

References to the sandwich spiked on Reddit. New recipes (more or less indistinguishable from the old recipes) flowed onto the internet.
I, too, felt the allure. So, during the height of the pandemic, breaking away from the monotony of the keyboard, I made myself a lunch of soaring satisfaction: crispy bread and creamy tuna under a warm security blanket of cheese. What made it especially gratifying, however, was that it was the first tuna melt of my life that involved no fish at all. It was made with a new plant-based faux tuna called Good Catch (https://goodcatchfoods.com/), and while I can’t exactly say it changed my life, it definitely changed my lunch.

I swore off canned tuna last year, after reading The Outlaw Ocean (https://www.theoutlawocean.com/), Ian Urbina’s wrenching account (https://www.outsideonline.com/2401680/the-outlaw-ocean-book-review) of human-rights abuses in the global fishing industry. For years, my list of morally acceptable seafoods had been narrowing as I learned about the environmental impacts of industrial fishing. Bluefin tuna, of course, went out the window long ago. Then it was Chilean sea bass, swordfish, and farmed salmon. Cod, gone. Shrimp, toast. But I clung to canned tuna, in part because of the convenience. A highly functional shot of protein, shelf-stable and cheap, it seemed morally defensible as long as it sported the logos certifying that it was dolphin-safe and sustainably fished.

But that changed when I plunged into Urbina’s book, the result of more than three years reporting on high-seas crime across 12,000 nautical miles, all five oceans, and 20 smaller seas. He shipped out on roach-infested, barely seaworthy trawlers, chased pirates and poachers, got caught in border wars, and uncovered a grainy cell-phone video of casual assassinations at sea. After all that, Urbina asked, did we really think “that it is possible to fish sustainably, legally, and using workers with contracts, making a livable wage, and still deliver a five-ounce can of skipjack tuna for $2.50 that ends up on the grocery shelf only days after the fish was pulled from the water thousands of miles away”?

Spoiler alert: it’s not. The average can of tuna drags behind it a tangled net of wrecked ecosystems, definned sharks, debt bondage, child labor, human trafficking, physical abuse, and murder. By the time I finished The Outlaw Ocean, I couldn’t open a can of tuna without imagining a trickle of human blood oozing out. And it’s not just tuna. Swordfish, snapper, mahi mahi, mackerel, sardines, squid, and anchovies are all tainted by slavery. So are farmed salmon, farmed shrimp, and cat food, which relies on meal made out of small fish caught in fisheries rife with human suffering.

Many fishing boats are crewed by migrants from poor countries who are desperate for work. The boats can spend years at sea, periodically off-loading their catch to refrigerated mother ships and taking on fresh supplies. Oversight is almost nonexistent. Men are forced to work (https://www.hrw.org/report/2018/01/23/hidden-chains/rights-abuses-and-forced-labor-thailands-fishing-industry) brutal hours in filthy conditions. Beatings are common. So are deaths.

A typical experience is that of Lang Long, a poor Cambodian man Urbina met in Thailand. Long was smuggled to the Thai coast by a trafficker who promised to get him a construction job, but the job never materialized. Instead, Long was sold to a fishing captain for $530, to cover his trafficking debt. Once on the boat, he didn’t see land again for three years.

During that time, Long was beaten regularly, forced to work up to 23 hours a day, and given insufficient food and water. After trying to escape, he was shackled by the neck and chained to the deck whenever his boat approached another ship.

But Long was relatively lucky. He survived, and was returned to land after a Catholic charity paid the boat’s captain $750 for his freedom. Other sea slaves have described sick deckhands being thrown overboard and intransigent ones being locked in the hold, whipped, or beheaded.

All this happens on the untraceable high seas. By the time a tender comes into port, it can carry a vast mix of legally and illegally caught fish. And that’s how a can of tuna gets to your grocery shelf for $2.50.
So I kissed tuna goodbye. Lunch became a little more inconvenient, but then Good Catch showed up in the grocery aisle. Instead of a can, the product came in an upmarket pouch featuring a photo of a plate heaped with extremely tuna-like shards. Fish-Free Tuna, the label advertised. Chunk Albacore Texture. The ingredients list revealed that it was made using a blend of six legumes—soybeans, peas, chickpeas, fava beans, lentils, and navy beans—with some algal oil and seaweed powder mixed in for “Real Seafood Taste.” At $5 for a 3.3-ounce portion, it was pricier than canned tuna, but not exactly a budget buster.

I’d written about the battle for burger supremacy among fauxtein peddlers like Beyond Meat and Impossible Foods, and I knew the pattern those trailblazers had to follow: media campaigns to convince people their fake meats weren’t bizarre, slow rollouts of product in a handful of hipster restaurants, and then years of struggle to develop the production and distribution needed to reach the mainstream. I’d assumed alternative seafood would follow the same tortuous path. Yet here was Good Catch, already stocked by mainstream supermarkets like Whole Foods and Giant. Perhaps the trail had been blazed. And that made me wonder if the world of seafood was about to get pounded by a wave of fishless fish.
Second spoiler alert: it is. Many of the most popular seafoods now suddenly face direct competition from dozens of startups offering animal-free alternatives. The industry is still tiny, but sales of plant-based foods have surged 29 percent in the past two years, compared with just 4 percent overall for U.S. retail foods, and many expect the category to follow the arc of plant-based milks, which now account for 14 percent of all retail milk sales.

This is happening just as the seafood industry grapples with COVID-19, which has forced changes to its business model—sales of fresh seafood in restaurants cratered, while canned and frozen seafood surged. The seafood aisle of 2021 may look significantly different from the one that took a hit in the first quarter of 2020. And from what I’ve seen and tasted, a great deal of it may have nothing to do with the sea.

I bought a pouch of Good Catch and a can of solid white albacore for comparison. At home, I opened the pouch and dumped out a jumble of flaky chunks that had the same pallorred look as tuna. The chew was quite firm, which impressed me. Springiness is one of the main attractions of meat, and it’s hard to replicate using plants.

The albacore, stripped of support, was weirder than I remembered. Did you know tuna is canned in vegetable broth to give it flavor? Drained, it has nothing going on until you add mayonnaise, celery, and salt. Why had I been killing some of the sexiest fish in the sea for this loser lunch meat?

I preferred Good Catch in every way. It didn’t taste like much either—think seaweed-scented chicken breast—but the texture was addictive, and I found myself testing the little bouncy fibers between my teeth. I didn’t think of it as tuna so much as *chew-na*, and I used it liberally, sprinkled over caprese salad for extra tooth, tucked under melted cheese on a piece of toast. It made tasty fish burgers and cakes. It even held up beautifully in a *pasta al tonno*, simmered in garlicky tomato sauce. In other words, it passed the plug-and-play test. So long, Big Tuna.

When I called Chris Kerr, Good Catch’s cofounder and executive chair, he told me I wasn’t the only one to recently discover his product. COVID-19 had triggered a run on shelf-stable everything, and he was scrambling to keep stores stocked. His new 42,500-square-foot factory in Heath, Ohio, had come online just in time.

Kerr asked me how his product measured up. I told him it was never going to take over Instagram, but it was good enough. He agreed, and added that this was all it needed to be. “For the love of God,” he said, “it’s just a fucking tuna melt!”

Kerr, 53, is irreverent and savvy, and he’s got the vision thing. A longtime vegan, he worked at the Humane Society for seven years but eventually found the group’s traditional tactics frustrating. “We weren’t getting very far in terms of moving the needle on animal welfare,” he says. “Vegans are still 0.5 percent of the population.” He left in 2014 and was recruited to launch New Crop Capital, a venture firm that invests in vegan food startups. New Crop was an early backer of Beyond Meat and now has a stake in more than 40 companies.

Kerr was one of the first to see the need for a Beyond Meat of seafood. Like the founders of Beyond Meat and Impossible Foods, he came to the problem from the perspective of animal welfare. We’re so used to the traditions of fishing that we rarely notice that they involve the mass killing of wild animals, usually in painful ways that would never be acceptable with birds or mammals. (Try hooking a deer in the mouth and dragging it kicking and screaming for miles.)
But until the revelations of human-rights abuses in the fishing industry, the biggest knock against fishing was environmental. According to Daniel Pauly, a prominent British Columbia–based marine scientist, almost no fisheries are truly sustainable. “It’s so bad,” he says. “Sustainable is not a reliable term anymore. So many fisheries have been reduced to a small fraction of what they once were. You can ‘sustainably’ fish them at that diminished level, but they really need to be rebuilt to support the ecosystem.” According to a number of papers published by leading scientists, the agencies that certify fisheries are deeply flawed, and many fish that have the “sustainable” label applied to them are anything but.

Then there’s bycatch—other animals unintentionally caught and killed in nets. About 40 percent of the fishing industry’s combined haul is bycatch, a total of 63 billion pounds per year. That carnage includes an estimated 650,000 marine mammals, a million seabirds, 8.5 million sea turtles, and ten million sharks. In the Indian Ocean, more than 80 percent of the original dolphin population—four million animals—has been killed in tuna nets.

Aquaculture has not been the salvation many had hoped. Farming fish turns out to have the same problems as farming livestock in industrial settings: animal-welfare issues, disease and parasites, antibiotic overuse, and massive pollution.

For all those reasons, Kerr says, he felt a need to help jump-start the plant-based-seafood industry. “But I couldn’t find anything solid to invest in. So I just said, Fuck it, I’ll start my own.”

Now more mainstream investors—having watched Beyond Meat and Impossible Foods take the world by storm—are scrambling to catch up. In January of this year, General Mills joined a group of companies that invested $32 million in Good Catch. Soon the celebrities rushed in: Lance Bass, Paris Hilton, Woody Harrelson, and Shailene Woodley all invested in the company.

But the biggest development came in March, when Bumble Bee Foods, the international tuna giant, announced a new partnership to distribute Good Catch’s fishless tuna in many places where Bumble Bee sells its own. “They approached us!” Kerr told me. “We were prepared to be attacked by that same company.”

“That shocked the industry,” says Monica Talbert, CEO of Van Cleve Seafood, a Virginia company that has launched a subsidiary, Plant Based Seafood, that sells a line of fish-free products. “The seafood industry sees plant-based as treasonous. They're trying to squelch it. So for a giant, global company like Bumble Bee to take it on was huge.” Talbert thinks the writing is on the wall. “Consumers are demanding it. It would behoove the industry to jump on board.”
In Bumble Bee’s press release announcing the partnership, CEO Jan Tharp explained the thinking. “It is critically important that, as an industry, we continue to find innovative solutions to decouple growth with environmental impact,” she explained. “Providing great-tasting alternative ways for consumers to enjoy ocean-inspired foods is a key pillar of our long-term commitment to ocean health.”

Translation: Canned tuna is a sinking stone, and we can’t get on the plant-based bandwagon fast enough.

Jan Tharp (Photo: Courtesy Jan Tharp)  John Hocevar (Photo: Christian Åslund/Greenpeace)

I f Good Catch is basically the Beyond Meat of seafood, Van Cleve is something possibly more significant: a traditional business eagerly transforming itself into a meatless powerhouse. “I love plant-based seafood,” Talbert says, “because it gives us a platform to shine light on the unsavory things going on in the seafood industry, just like plant-based meat did for the livestock industry.”

Van Cleve Seafood started in 2001 as a Virginia crab shack, launched by Shelly Van Cleve and her teenage daughters, Monica and Monica’s sister Allie. The restaurant and shop soon became a celebrated destination, and they expanded. In 2013, the company began selling its signature products in supermarkets and found that its supply needs outstripped local options. When Talbert researched international sources, she was horrified. “The lawlessness,” she says. “The mislabeling. The fish illegally soaked in chemicals. The child labor, slavery, and human trafficking. Just horrendous practices. It was so disheartening.”

Talbert had been transitioning to a plant-based diet, so they decided to do the same with the company—starting, naturally, with crab cakes. “We’ve probably made a million crab cakes in the past 20 years,” Talbert says. “There’s a weave to the texture of a crab cake that’s very specific. We went through more than a hundred versions to get it right.”

Artichoke, hearts of palm, and cabbage play the role of crabmeat in the final product, with rice flour and potato starch used for binding and a hint of Old Bay seasoning for taste. The cake comes as a frozen lump and is easy to prepare: thaw, fry, top with tartar sauce. The crispy outside and cakey inside does everything a crab cake is supposed to do. Was I aware that I was basically eating an artichoke patty? Yes, I was. Was this a problem? Not at all.

Ian Urbina (Photo: Courtesy Outlaw Ocean Project)  Daniel Pauly (Photo: Geoffroy Van Der Hasselt/AFP/Getty)

I f you want to wield your fork for food justice, however, crab is small potatoes. The average American consumes half a pound of it per year, making it only the ninth most popular seafood. The big three are canned tuna (2.1 pounds per person), salmon (2.6 pounds), and the Goliath of seafood, shrimp (4.6 pounds).

If anything can make tuna fishing look scrupulous, it’s shrimp. Wild shrimp are caught using a massively destructive practice called bottom trawling, which John Hocevar (https://www.greenpeace.org/usa/bios/john-hocevar/), Greenpeace’s longtime oceans campaign director, describes like so: “Bottom trawlers fish with nets that weigh a couple of tons and are big enough to catch two 747s side by side, and they drag those along the bottom of the ocean. It’s insane.” For every haul of shrimp, a large amount of bycatch is brought in and tossed dead over the side.

Most shrimp is farmed, and that’s even worse. For feed, operations depend on small fish caught by boats using forced labor and relentless tools that rake the ocean clean. “Off Thailand,” Hocevar says, “the boats fish the water with very fine-meshed nets designed to strain out every last living thing. It’s endgame stuff.”
Shrimp is farmed along tropical coasts in shallow ponds made by ripping out mangroves, trees that protect shorelines and provide essential habitat for many marine species. The ponds become cesspools. After a few years, the ground is so contaminated that the site must be abandoned for a new one. “You just devastate one coastline after another,” says fisheries scientist Pauly.

Despite this mayhem, shrimp hasn’t suffered from consumer resistance the way other seafoods have. “Most people are somewhat aware that shrimp has big problems and they shouldn’t be eating it,” Hocevar says. “But they love it and there’s no real alternative, so they’re not willing to give it up.” For those reasons, he says, “a plant-based alternative would be amazing.”

Pauly was even more enthusiastic about the proposition. “The faster the better. If you can produce some gunk that can take the place of those disgusting shrimp operations, that would be wonderful.”

Well, I just happen to have some of that gunk right in front of me. It’s called konjac root, and it’s popular in Japanese and Korean cooking. Because it’s rich in soluble fiber, it can be boiled into a firmly textured gel. “It bounces back,” says Monica Talbert.

The product I’m sampling—Mind Blown Plant-Based Crunchy Coconut Shrimp (https://plantbasedseafoodco.com/products/25-ct-mind-blown-plant-based-shrimp)—comes in the form of plump pink crescents with a coconut coating. (Paprika provides the pink.) I fried them in oil until they turned golden and served them with cocktail sauce.

And let’s be honest, any breaded product—shrimp, chicken nuggets, whatever—asks very little of its core protein. All it really needs to do is bounce back, and the plant-based shrimp aced that test. The outside was crispy, coconuty, and slightly sweet. The inside was snowy white. (If you are attached to the black vein that bisects real shrimp, you’re out of luck.)

This was the one product I tested that elicited amazed table talk, and it made me realize that Hocevar isn’t entirely correct. People think they love shrimp because shrimp is easy. But all it will take is a slightly sweeter, cleaner alternative to make them wonder what they ever saw in those wriggly little bugs.

Most of the press on animal-free seafood focuses on what’s known as cellular aquaculture—fish in a dish, no head, gut, or tail attached. Rumors of its impending awesomeness have been circulating for a few years, goosed by venture capitalists who’ve sunk tens of millions into the California startups Wild Type (https://www.wildtypefoods.com/) (salmon), Finless Foods (https://www.finlessfoods.com/) (bluefin), and BlueNalu (http://bluenalu.com) (yellowtail and mahi mahi).

Before diving into the world of fishless fish, I’d expected these lab-based products to be the standouts. But as is true with lab-grown meat, the hype has gotten well ahead of the science.

The theory seems solid enough. In animals, muscle cells are supplied with a stream of nutrients delivered by the circulatory system. But those cells can be grown in a tank if they’re bathed in a broth of the same nutrients, along with hormone-like growth factors that tell them how to develop. This is the idea behind lab-grown meat, and it’s been achieved with various species of fish as well.

You can see the appeal. Cellular seafood doesn’t have parasites. It isn’t contaminated by mercury or microplastics. It isn’t tainted by slavery or ecological damage. And it doesn’t die a horrible death.
But the industry faces multiple challenges that so far lack solutions. To grow living cells in a vat is incredibly costly and energy intensive. (One life-cycle analysis of cultured meat found that it has an even larger environmental footprint than conventional beef.) And no one has mastered culturing meat at scale. In a 20,000-liter commercial tank, cells can be crushed by the weight of water or killed by the force of the paddles that keep everything circulating. The serum that bathes the cells costs hundreds of dollars per liter, and it takes 50 liters to produce one serving of meat. Microbial contamination is a constant threat. Texture and flavor are works in progress.

But Jennifer Jacquet, a professor of environmental studies at New York University who has studied the fishing industry extensively, thinks progress may come surprisingly fast. “I don’t think you can judge a product’s market price by its prototypes, especially with an industry in its infancy,” she says. “There are many examples, from clocks to computers, that show us how much prices can fall.” Sure, a single serving of cellular fish or meat currently costs hundreds of dollars, but not long ago it cost hundreds of thousands.

Jacquet points out that governments can strongly influence the affordability—and success—of beneficial new technologies. “It’s a little bit like renewable energy,” she says. “Right now, the cellular animal products, including seafood, have to compete on a very uneven footing with meat, dairy, and seafood companies that receive enormous government subsidies, which makes it even more difficult to become price competitive.” Jacquet believes that if the seafood industry stopped receiving these subsidies, cellular-based seafood would quickly succeed.

None of the California startups were about to let me sample their lab creations. BlueNalu anticipates having its mahi available by late 2021 in a few select restaurants in San Diego, but experts estimate that it will be five to ten years before cellular seafood is commercially viable. And by then it may be too late. Plant-based seafood is already here, and given another decade of R&D, it’s going to be very good and very cheap. Sure, there will still be holdouts who want real fish that came from the sea. But who exactly is going to demand fish from a lab?

Not all the plant-based seafoods I tried were as successful as the ones highlighted here. I very much wanted to like Ahimi (https://oceanhuggerfoods.com/ahimi), an ahi substitute whose production is simplicity itself: a skinned, seeded tomato lightly concentrated in soy sauce, water, sugar, and sesame oil. Unfortunately, that’s pretty much what it tastes like. If you squint hard, it looks a bit like a pink slab of ahi, but there’s no getting around that what you have on your plinth of rice is limp tomato. (Apparently others felt the same; the company ceased operations this summer.)

I also wanted to try Kuleana (https://kuleana.co/)—a bluefin replacement made from a blend of algae, pea protein, seawater, iron from fermented koji, and beetroot (for color)—but its founder told me it wasn’t ready for sashimi prime time. For now, true sushi analogs are out of reach, and we’ll have to stick to the low-hanging fruits de mer: canned tuna, crab cakes, and breaded shrimp.
But check back in a couple of years and I expect you’ll find the sushi counter transformed as well. By then I should be ready to complete the leap to plant-based. I’ll make exceptions for a couple of seafood standouts—American shellfish and Alaskan salmon (https://www.outsideonline.com/2411835/salmon-sisters-cookbook-fish-cooking-tips), for example, are paragons of sustainability and deliciousness—but I’ll leave the rest to the ocean. Unless, of course, the seafood industry can solve its outlaw problem once and for all.

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Lead Photo: Edward Addeo (fish); Iakov Kalinin/iStock (ocean)