Opinion | The Clue to Unlocking Parkinson's May Be All Around Us

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This essay is part of a series on environmental health.

It was back in 1958 that a chemical company first discovered that its new weed killer appeared toxic to humans, "mainly by affecting the central nervous system," as one company scientist documented at the time.

The company kept its concerns to itself — as well as its later research indicating that large doses caused tremors in mice and rats. That's because the herbicide, paraquat, was sublime at wiping out weeds. And profitable. Over the decades it became, an executive proudly declared, a "blockbuster." By 2018, some 17 million pounds of it were used across the United States, double the figure for six years earlier.

As industry has boomed and agricultural and industrial toxins like paraquat have proliferated in the postwar period, so has something else: Parkinson's disease. Once almost unknown, the ailment was first identified in 1817 when Dr. James Parkinson described a handful of elderly people with what he called "the shaking palsy." That was in polluted London, and it's now understood that air pollution is a risk factor for the disease.

Some 90,000 cases of Parkinson's are now diagnosed each year in the United States, about one every six minutes on average. It is the world's fastest-growing neurodegenerative disease, causing tremors, stiffness and balance problems. It is also the 13th-leading cause of death in the United States. One factor in its increase may be the way we have come to live, for there's growing evidence linking it to a range of pesticides and industrial chemicals, including paraquat and substances used in dry cleaning.

"Chemicals in our food, water and air have created this largely man-made disease," two Parkinson's experts, Dr. Ray Dorsey and Dr. Michael S. Okun, write in a new book, "The Parkinson's Plan." "These chemicals are all around us, and none are necessary."

Dorsey and Okun, who between them have published more than 1,000 papers and cared for more than 10,000 people with Parkinson's, describe the disease as a pandemic, but one caused not by a virus but by "a new class of 'vectors,' including pesticides in our food, industrial solvents in our water and pollution in our air."

Michael J. Fox, the actor who developed Parkinson's and then started a foundation to tackle the disease, believes that's how he most likely got the disease — an exposure to "some kind of chemical," he said.

Yet for Fox and most others with the disease, causation remains murky and the mechanisms not fully understood. Genetics appear to play a role in only a small percentage of cases, while environmental factors appear dominant. Researchers and regulators dispute the degree to which pesticides bear responsibility, and the Environmental Protection Agency continues to allow paraquat to be used in the United States — even as dozens of other countries have banned it.

In that respect, paraquat symbolizes the challenges of environmental health and chemical regulation. Evidence accumulates, but invariably there are gaps and contradictions. Companies, following the tobacco playbook, hire lobbyists and highlight the uncertainties. And often the regulatory process drags on as companies make money and people get sick.

Meanwhile, there is a growing mountain of imperfect but troubling evidence. Just this year, a study found that living within a mile of a golf course more than doubles a person's odds of developing Parkinson's. One theory is that it is because golf courses use pesticides.

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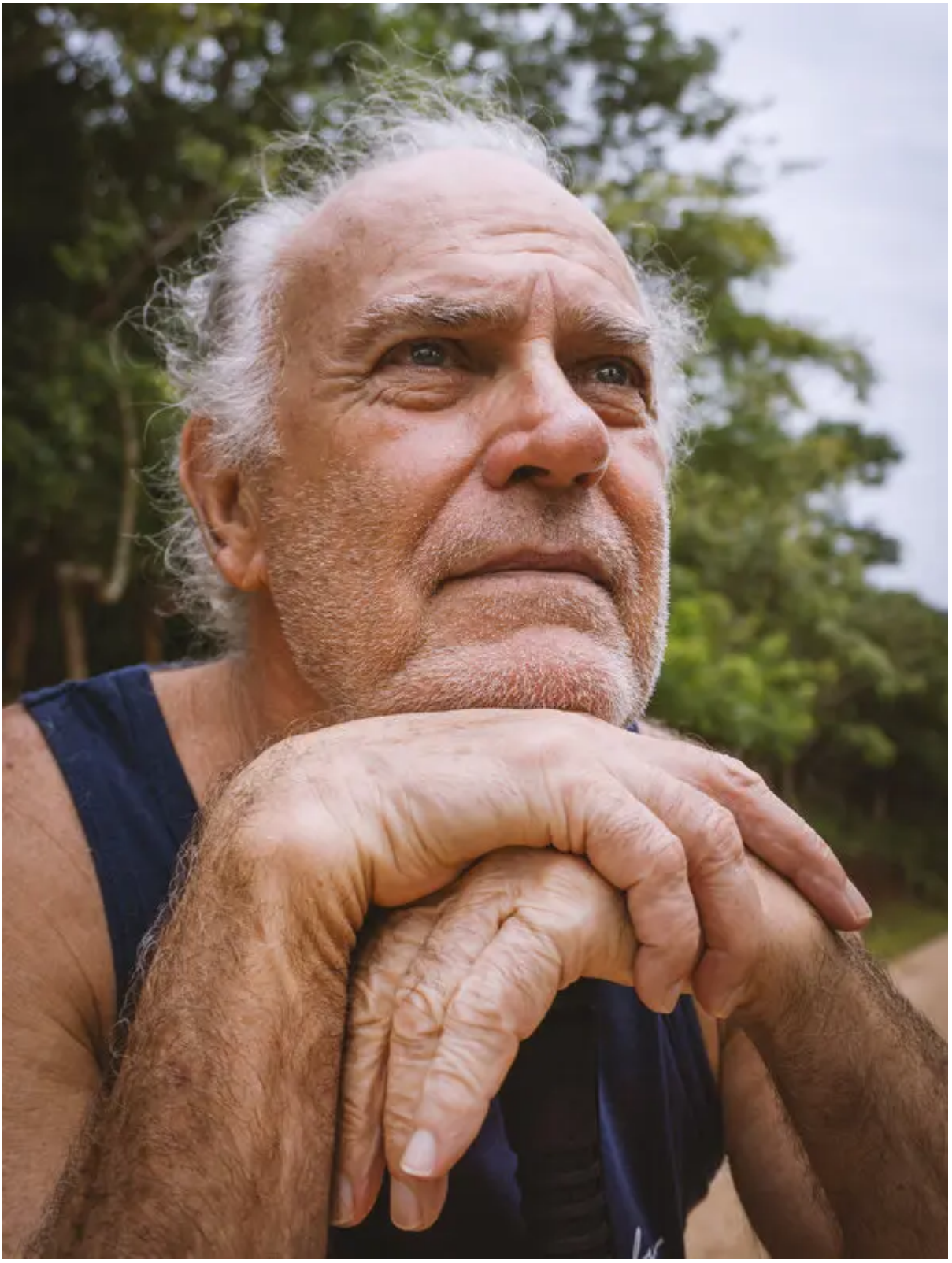

Mr. Phillips at his home in Costa Rica.Credit...Glorianna Ximendaz for The New York Times

So how do we protect ourselves and our children? How do we avoid following in the footsteps of Steve Phillips, a successful leadership consultant who at age 56 was hosting a banquet for corporate executives when he noticed that his left hand wasn't working properly? He thought it might be fatigue. But then he noticed that his left foot sometimes seemed stuck. Eventually, he was diagnosed with Parkinson's.

"It pretty much ended my career," Phillips, now 73, told me. "And I would say that it basically destroyed my marriage." He initially didn't know how he could have contracted the disease, and then he read the scientific research tying the disease to paraquat.

For two summers, when he was 16 and 17, Phillips had worked on a farm, spraying fields with paraquat. "I was a naïve teenager," he recalled. "I had my sunglasses on and a bandanna around my face, and I thought that was all the protection I needed."

So does Phillips know that it was the paraquat that caused his Parkinson's? "Am I absolutely certain? No, I can't be," he told me. "But that's the only thing I can really point to."

Phillips is one of more than 6,000 people with Parkinson's who have sued manufacturers of paraquat, particularly Syngenta, a Swiss business that is the heir of the company that invented paraquat and that conducted the studies beginning in the 1950s that in some cases pointed to health concerns with the substance.

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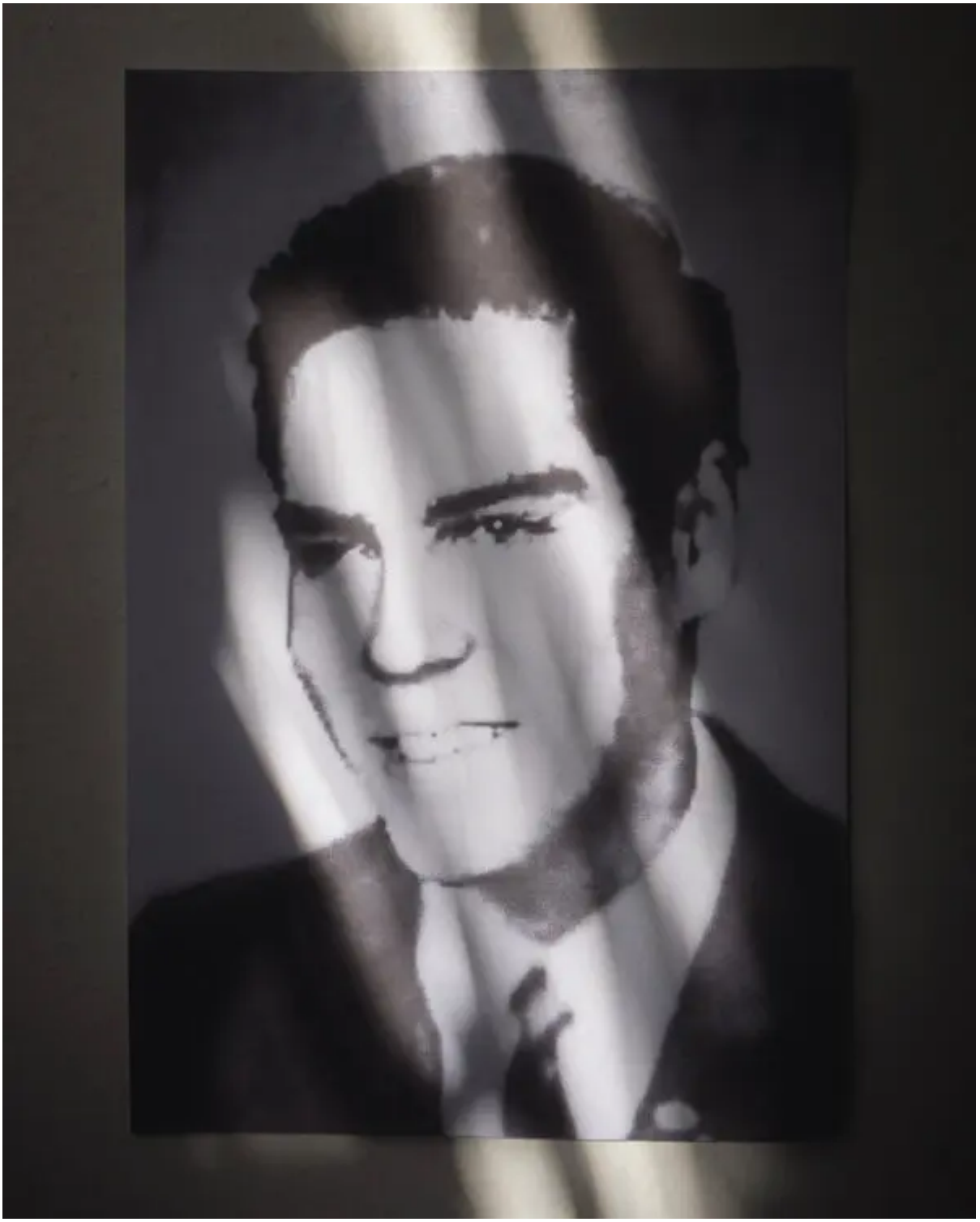

Mr. Phillips at 18.Credit...Glorianna Ximendaz for The New York Times

Image

He says Parkinson's feels like a suffocating vine.Credit...Glorianna Ximendaz for The New York Times

In 2022 The Guardian and The New Lede, an environmental publication, obtained a landmark trove of these internal Syngenta documents about paraquat. The documents, which had been furnished as discovery in a lawsuit against the company, are now available online as the Paraquat Papers.

The documents showed that even as the industry scoffed at health concerns publicly, it fretted about paraquat and risks of legal liability. As early as 1975, a company scientist described the legal risks as "a quite terrible problem."

But a 2003 strategy document hailed paraquat as a big seller that Syngenta must "vigorously defend." And it did so. The documents also showed that the company worked hard to disparage a pesticide expert, Deborah Cory-Slechta, who was being considered for a position on an E.P.A.

advisory panel. She did not get the post.

I called Saswato Das, a spokesman for Syngenta, and he argued that there has been a rush to judgment against paraquat. Das noted, correctly, that some large studies have not tied paraquat to Parkinson's and that some experts are skeptical of a direct causal connection.

A careful review last year by the California Department of Pesticide Regulation, for example, concluded that paraquat may have a role in Parkinson's in conjunction with other factors (such as certain genes, other pesticides or head injuries). But it concluded that "there is currently insufficient evidence to demonstrate a direct causal association with paraquat exposure and the increased risk of developing Parkinson's disease."

Hmm. It's true that direct causation is complex and difficult to prove beyond all doubt. We can't expose children to paraquat in a lab, lock them up for 50 years and then compare their Parkinson's rates to those of a control group exposed to something else.

What we can do is weigh the many observational studies linking pesticide exposure and Parkinson's, add in the experiments showing that very high doses of paraquat produce Parkinson's-like features in lab mice and also consider the evidence of a dose-response relationship in which higher exposures seem linked to more cases of Parkinson's. This accumulated evidence is sobering, if imperfect — and I think most of us would conclude that what's important is not absolute proof but keeping our children safe.

Other risks are also associated with Parkinson's. There's evidence linking the disease to other pesticides; to head trauma; to air pollution; and especially to two chemicals that have been used in traditional dry cleaning, trichloroethylene and perchloroethylene, also known as TCE and PCE.

If you're a basketball fan, you may remember Brian Grant, a power forward in the N.B.A. for 12 seasons, with Sacramento; Portland, Ore.; Miami; Los Angeles; and Phoenix. Grant, now 53 and retired, had a dad who was a Marine, so at ages 2 and 3, he lived on Camp Lejeune, a military base in North Carolina.

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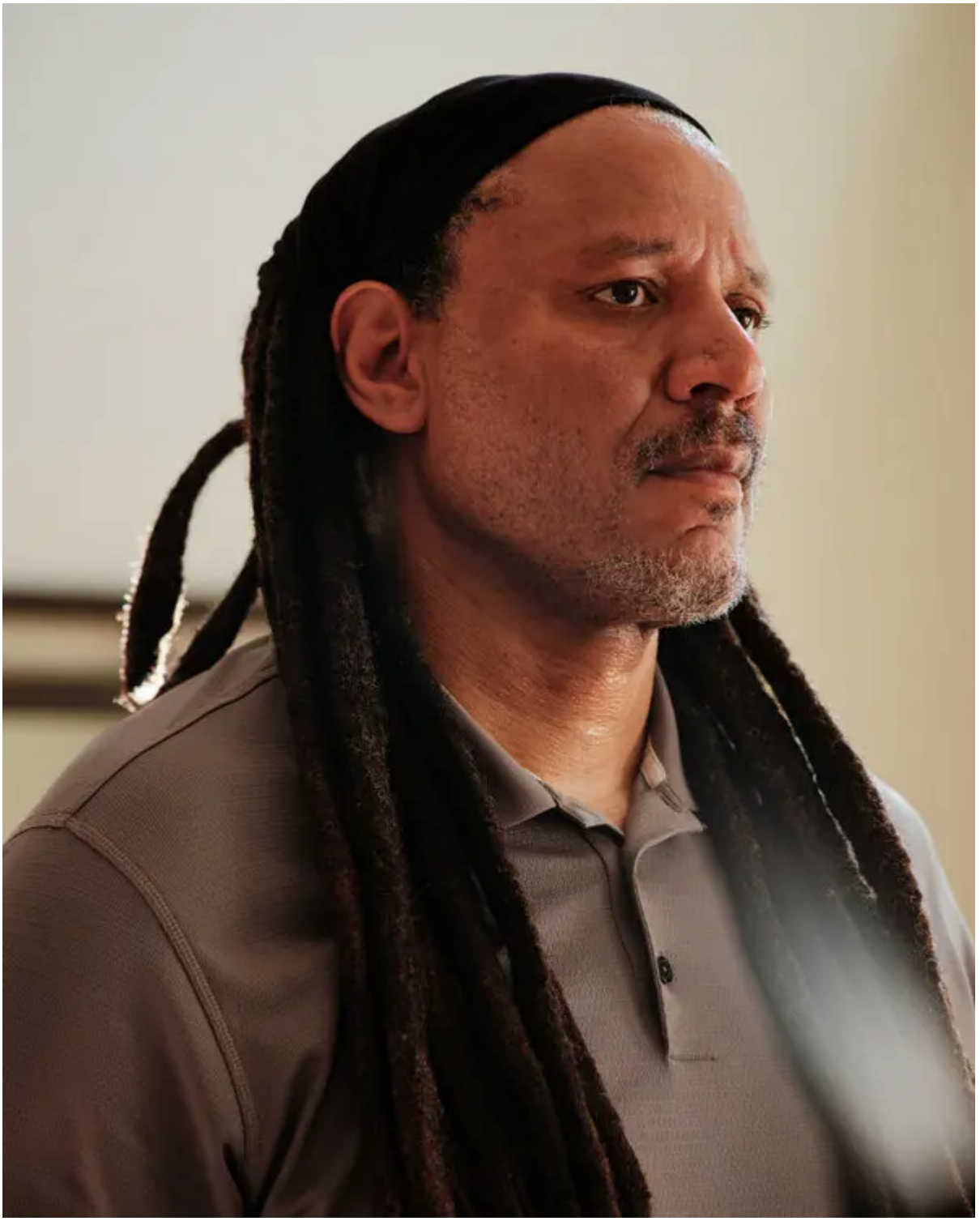

Brian Grant.Credit...Christopher Valentine for The New York Times

Decades later, at the end of his career as a professional basketball player, Grant found his body wasn't always responsive. "I was feeling uncoordinated," he told me. Then he began having trouble jumping off his left leg, and he developed a twitch. He retired from basketball in 2006. "There was no way I could play," he told me, and he then tumbled into despair. "I got into some deep, dark depression," he recalled. "I was very angry and upset and wasn't the type of person you wanted to be around."

Eventually Grant saw a neurologist who diagnosed him with Parkinson's. He had no idea how he could have contracted the disease, but then a Parkinson's expert read his memoir, "Rebound."

"Oh, my God," she said, "you were at Camp Lejeune!"

For much of the 1950s, '60s and '70s, including when Grant was a little boy, the water supply at

Camp Lejeune was severely contaminated with PCE and TCE, in large part from chemical spills at a dry cleaner near the base.

Decades later, a follow-up study found that Camp Lejeune veterans had a 70 percent greater chance of developing Parkinson's than those who served at another Marine base, Camp Pendleton. So Grant can't be sure, but he suspects that living on Camp Lejeune may be responsible for his Parkinson's.

Now living in Portland, Ore., Grant started the Brian Grant Foundation in 2010 to support people with the disease. And he worries that unnecessary exposures like the one he suffered as a toddler are still happening. "We know what the chemicals can do to us," he said. "Yet we still allow them to be used."

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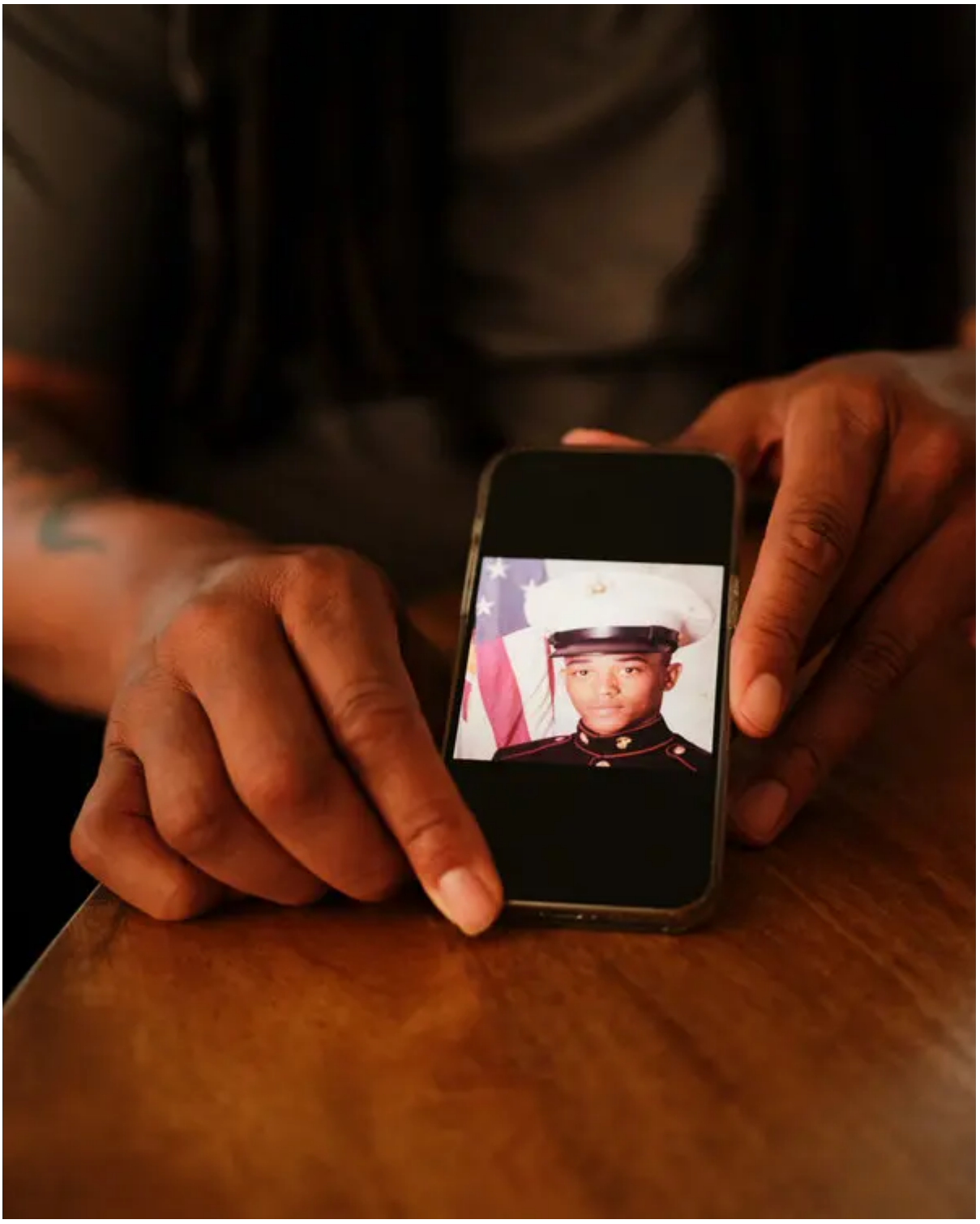

Brian Grant's father when he was stationed at Camp Lejeune.Credit...Christopher Valentine for The New York Times

That's more true of America than of other countries. Scrutinizing the same evidence, regulators in other countries have often acted more vigorously to protect public health. So while the E.P.A. continues to allow paraquat to be used on fields in America (although not on golf courses anymore), regulators have banned it in the European Union, China, Brazil and dozens of other countries (although this is often to prevent suicide by drinking it, rather than to reduce the risk of Parkinson's).

When Robert F. Kennedy Jr. joined the Trump administration, some activists thought he might be tougher on chemical companies. But that has not happened; Kennedy seems more inclined to persecute lifesaving vaccines.

Paradoxically, most of the paraquat used in the United States is manufactured in Britain and China — where it cannot legally be used. But it's fine to produce it there and sell it to America, where regulation is more lax.

It wasn't always this way. The United States was once a model of health regulation in the context of uncertainty. In 1960 a brave scientist at the Food and Drug Administration, Dr. Frances Oldham Kelsey, stood fast in the face of industry pressure and refused to approve thalidomide in the United States, even as Canada and Europe allowed it as a sleeping pill for pregnant women. Kelsey acted not on absolute proof that thalidomide was harmful, but on the weight of imperfect evidence.

As a result, America was spared a wave of horrific birth defects seen in other countries from thalidomide. So in 1962 President John F. Kennedy gave Kelsey an award for her "exceptional judgment."

Yet in recent decades, American regulators have grown timid and have often deferred to industries making unhealthy products, more so than abroad. Europe mostly curbed the use of lead paint well before America (France began to act in 1909!), and Europeans moved more aggressively than the United States in limiting endocrine-disrupting chemicals such as flame retardants, phthalates and PFAS — forever chemicals. Europe also restricts many food additives and cosmetic ingredients that are still used in the United States.

Essentially, Europe bans substances it harbors doubts about, while the United States tends to allow substances unless there is solid evidence of harm. That may have something to do with the millions that companies spend lobbying ($77 million last year by the chemical industry alone) and donating to political candidates.

The cigarette, lead paint, asbestos, prescription painkiller and chemical industries repeatedly staved off regulators by insisting that it would be premature to act. Instead of debating laws and regulations, companies hired armies of mercenary Ph.D.s to haggle over the science, leaving policymakers too bewildered to regulate.

In 1969, the American Tobacco Company published an ad, "Why We're Dropping The New York Times," in which it denounced "anticigarette crusaders" at The Times. The ad declared: "Sure, there are statistics associating lung cancer and cigarettes. There are statistics associating lung cancer with divorce, and even with lack of sleep. But no scientist has produced clinical or biological proof that cigarettes cause the diseases they are accused of causing."

"We believe the anticigarette theory is a bum rap," the company declared. That sounds like the Syngenta defense of paraquat today. Syngenta rejects the negative findings, pointing instead to those that are favorable. It dismisses the animal experiments that critics point to, noting that they involved injecting large quantities of paraquat into animals — not something likely to happen to a human. And above all, it insists that there is no proof of causation.

“Syngenta rejects the claims of a causal link between paraquat and Parkinson’s disease because it is not supported by scientific evidence,” the company says. “Despite decades of investigation and more than 1,200 epidemiological and laboratory studies of paraquat, no scientist or doctor has ever concluded in a peer-reviewed scientific analysis that paraquat causes Parkinson’s disease.”

In a narrow sense this may be true. But, as Dr. Caroline Tanner, a professor of neurology at the University of California, San Francisco, who has conducted important research on paraquat and Parkinson’s, put it, “They’re playing word games.”

Scientists are careful and incremental. No single observational study is going to prove causation. But put together the mountain of human and animal studies that have accumulated, and it’s hard to avoid the conclusion that you would not want your child to be regularly exposed to pesticides. Granting a measure of uncertainty, it’s not obvious to me why public policy should give chemicals the benefit of the doubt over children’s health.

In fairness, though, we should acknowledge that regulating environmental health carries trade-offs. Banning paraquat might reduce agricultural yields or make fruits and vegetables more expensive (just as organic foods are more expensive). And Syngenta says that paraquat binds with clay particles, so that there is less runoff into waterways than with other herbicides.

It’s also true that while environmental health activists have an excellent record, there have been missteps. I think we were right to ban DDT in the United States but too quick to oppose low-level usages in impoverished countries abroad where it was a tool to reduce malaria deaths. Malaria then rebounded, with the estimated death toll surging to a peak of some 917,000 in 2004 from 638,000 in 1980. I fear hundreds of thousands of people in poor countries may have died because of our well-intentioned activism.

Still, that just goes to show that policy is challenging. It’s certainly not an argument for demanding absolute proof of causation before acting to protect ourselves.

I asked Syngenta if the company uses paraquat on its own grounds — but then I realized that it can’t, because its headquarters are in Switzerland, which bans the chemical; its paraquat manufacturing base is in Britain, which also bans its use; and its ultimate owner is a company in China, where paraquat is likewise banned.

After reading “The Parkinson’s Plan,” I took some precautions myself. I purchased fruit and vegetable wash, which helps remove pesticide residues. (I already buy organic.) And I’ll take the counsel of Dr. Okun, one of the authors, to try to use green dry cleaners and to remove plastic wrappings from clothes and air them out before wearing them.

Is this necessary? I don’t know. But Parkinson’s is becoming much more common, and I don’t want it to afflict me or my loved ones.

Environmental health is hard. It requires juggling trade-offs and making complex choices with insufficient knowledge. Yet because of profit incentives, we work much harder at spewing toxins into our ecosystem than at shielding ourselves from them. Unfortunately, the United States government — more so than other governments — is more inclined to keep chemical companies safe than to protect our families.

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