

# The Lethal Legacy of the Vietnam War

**Fifty years after the first US troops came ashore at Da Nang, the Vietnamese are still coping with unexploded bombs and Agent Orange.**

By George Black

[The Nation](#)

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On a mild, sunny morning last November, Chuck Searcy and I drove out along a spur of the old Ho Chi Minh Trail to the former Marine base at Khe Sanh, which sits in a bowl of green mountains and coffee plantations in Vietnam's Quang Tri province, hard on the border with Laos. The seventy-seven-day siege of Khe Sanh in early 1968, coinciding with the Tet Offensive, was the longest battle of what Vietnamese call the American War and a pivotal event in the conflict. By the off-kilter logic of Saigon and Washington, unleashing enough technology and firepower to produce a ten-to-one kill ratio was a metric of success, but the televised carnage of 1968, in which 16,592 Americans died, was too much for audiences back home. After Tet and Khe Sanh, the war was no longer America's to win, only to avoid losing.

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I learned later that this ravishing forested landscape was something of an illusion. In defense of Khe Sanh, the US Air Force dropped 100,000 tons of bombs on the surrounding mountains, stripped the forests bare with Agent Orange and incinerated them with napalm. Since the war, the Vietnamese government has replanted this barren and eroded land, part of a national effort to rehabilitate the portions of Vietnam that were devastated by herbicides—an area the size of Massachusetts.

A trickle of American veterans come back to Khe Sanh these days, said Nguyen Viet Minh, a chatty, hospitable man in his late 30s who runs a small museum and memorial site that includes various chunks of abandoned American hardware—a C-130 aircraft, a Huey helicopter, an armored personnel carrier, a tank—and a reconstructed airstrip and bunkers. These visitors often share their memories with him. “They witnessed by their own eye some bad thing happen,” he said in English. “Everything very bloody, everything shock them, life, death, and they cannot forget it.”

Searcy himself first came to Khe Sanh in 1992, twenty-four years after Tet and twenty-four years after he shipped out of Vietnam at the end of a tour of duty with the 519th Military Intelligence Battalion in Saigon. He is a tall, lean man with a head of thick, gray-white hair and a courtly charm that seems entirely without effort or artifice. His speech still has the soft cadences of his hometown of Athens, Georgia. Probably no American, and certainly no veteran of the US military, has ever immersed himself so completely in the realities of Vietnam. The war defined Searcy's young adulthood, and its aftermath has defined the past third of his life. That initial visit to Khe Sanh was part of his first trip back since the war. In January 1995, after returning for the third time, he moved to Hanoi, fell for the city's magical blend of elegance and chaos, and has never left. He turned 70 last September—or perhaps it was 71, he said; it all depended on how you count time. When friends invited him to a surprise birthday party, they reminded him that Vietnamese add a year for the time spent in the womb.



# Bombs, Agent Orange and the Legacy of War in Quang Tri

Straddling the demilitarized zone (DMZ) and only 1,800 square miles in size, Quang Tri was a prime target for the defoliation campaign known as Operation Ranch Hand and was hit with a greater tonnage of bombs than was dropped on Germany during all of World War II.

## FOUR KEY OPERATION RANCH HAND TARGETS

### TARGETS:

#### A "Free-fire zone"

In 1967, the area between the Cam Lo river and the DMZ was turned into a free-fire zone and became "priority one" for Ranch Hand. This polygon, the scene of intense ground fighting, was known to U.S. Marines as "Leatherneck Square."

#### B Ho Chi Minh Trail

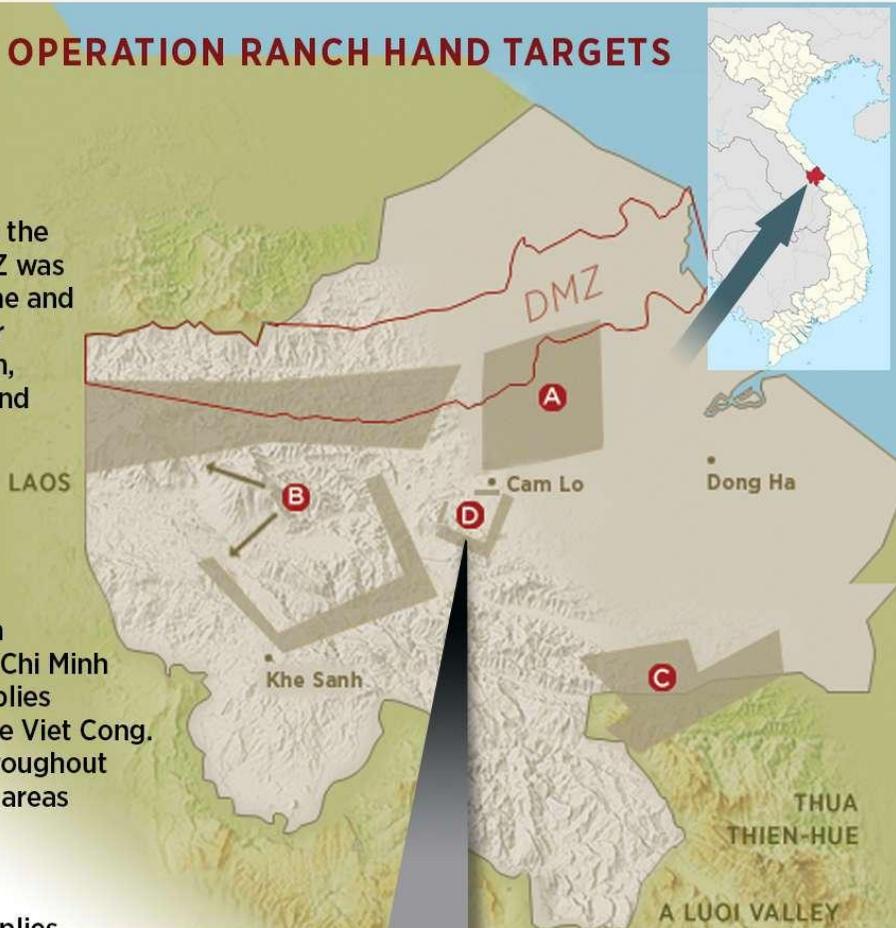
The mountainous area in western Quang Tri was an important spur of the Ho Chi Minh Trail, which funneled supplies from North Vietnam to the Viet Cong. It was heavily sprayed throughout the war, as were forested areas in neighboring Laos.

#### C Starving the enemy

In 1966, to deny food supplies to the Viet Cong, the U.S. Air Force focused heavily on crop-spraying operations in the valley of the winding Thach Han river and the neighboring province of Thua Thien-Hue.

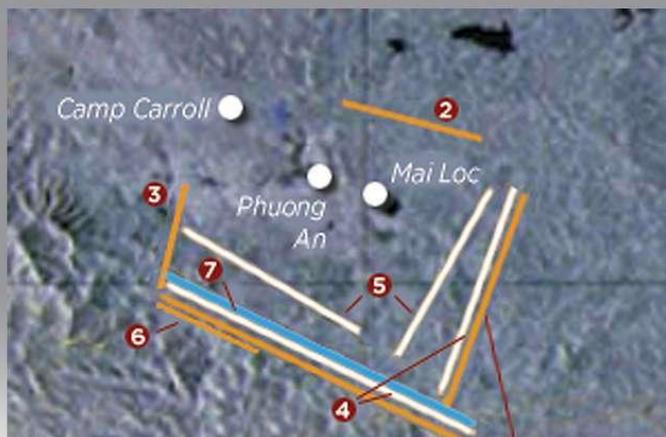
#### D "The Agent Orange Village"

In September 1966, Ranch Hand reached Cam Lo district, home to two U.S. military bases, Camp Carroll and Mai Loc. A cluster of hamlets here, where many families have two or more children with birth defects, is collectively known as "the Agent Orange Village."



### "The Agent Orange Village"

7 Missions in 11 Months



## Bombs, Agent Orange and the Lethal Legacy of Bombs in Quang Tri Credits: The Food & Environment Reporting Network and SwitchYard Media

As we walked out across the red-dirt airstrip, trailed by an old man who wanted to sell us a trayload of spent bullets and faux American dog tags, Searcy pointed out a line of trees along the perimeter. On that first visit, he said, he encountered two boys herding cows. “I asked them if there were still any bombs here. They walked us over to those trees and pointed to the ground. There was a small artillery shell lying on the ground, intact, unexploded. And they said it’s all around, it’s everywhere. I asked if anyone came around to clean it up. They said no. So we’re standing there and staring at this weapon, and the younger boy, who’s about 8 or 9 years old, tentatively sticks his toe out, just to nudge it a bit out of curiosity. And I say, ‘Stop! stop!’ That was my first awareness of the problem.”

If anywhere embodied Air Force Gen. Curtis LeMay’s famous threat to bomb Vietnam back into the Stone Age, it was Quang Tri province, which was split in two by the demilitarized zone (DMZ) between North and South Vietnam. This is the skinny waist of Vietnam, a long snake of a country that stretches 1,000 miles from north to south. Hemmed in by the Annamite Mountains to the west and the South China Sea to the east, Quang Tri is only thirty miles wide in places. It’s smaller than Delaware, covering a little more than 1,800 square miles. Yet that tiny piece of earth is the most heavily bombed place in history; a greater tonnage was dropped here than on Germany in the whole of World War II.

***“It didn’t take long to see that what I’d been told about America’s role in the war was distortions, exaggerations and lies.” —Chuck Searcy***

When the war ended, Searcy said, “Quang Tri was a moonscape.” Farmers returning to work their rice paddies and their fields of corn, cassava and peanuts were walking into a death trap. Ten percent of the munitions that rained down on the province failed to detonate, so there was the constant risk of stepping on a piece of unexploded ordnance, and many thousands did. They also had no idea of how dioxin, the lethal contaminant in Agent Orange, might blight their lives down through three generations. After putting down new roots in Hanoi, Searcy decided this would be his purpose in life: to address this legacy of destruction, or, as he puts it, “to build on the ashes and bones of war.”



Cleaning up: An unexploded US MK-82 bomb found in Lang Vei was safely destroyed by Project RENEW, August 2012. Photo: Project RENEW

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The Tet offensive broke at the midpoint of Searcy's year in Saigon. In the early hours of January 31, everyone was asleep in the barracks. Things had been quiet. The only recent excitement had been a USO show with Bob Hope and Raquel Welch. Suddenly, the alarm siren went off. "Everybody groans and moans and drags out of bed because it's going to be another practice alert," he said, "and you hate it, you have to put all your gear on, get your weapon, go out to the perimeter and wait until the all-clear is sounded."

Except that this time it didn't. Instead, "This captain in a jeep comes around with a bullhorn and says the US consulate has been overrun. Saigon is getting the shit kicked out of it."



Waist deep in the big muddy: President Lyndon Johnson (center left) had a scale model of the Khe Sanh Marine base built in the White House. Photo: Creative Commons

The captain's radio was tuned to the frequency of a helicopter pilot who was circling overhead, bringing in troops to retake the embassy. Searcy listened to the conversation in disbelief. "It turns out he's only been in Vietnam for about two weeks, he's never even been to Saigon," Searcy said. "He doesn't know where to go. So they're marking instructions for him on this squawk-box radio, asking if he can see the church. 'OK, then turn east from there, turn right two blocks, three blocks, and you'll see the embassy.'"

What stayed with Searcy after Tet was not only these sometimes farcical elements of military conduct, but the scale of destruction that followed. His compound was in a converted blanket factory on the outskirts of town, "a neighborhood of little houses and cafes and old men smoking pipes, water buffalo, rice paddies, kids and chickens." Now there were streams of refugees and "a rain of fire from the sky, night after night. By June '68, there was almost nothing left, just blackened rubble."

This was not what Searcy had imagined two years earlier, when, with the draft board breathing down his neck, he decided to enlist. He came from conservative Southern stock. He was born in Alabama and moved at age 3 to Thomson, Georgia, where his father, a proud veteran and POW captured in the Battle of the Bulge in 1944, ran the local Coca-Cola plant. Every male in the family served in the military.

*The best estimates are that about 40,000 have been killed by unexploded ordnance since the war's end, with another 65,000 maimed.*

“As a Georgia boy, it was just something you did,” he said. “You joined the military and you served your country.” He was a regular at the Presbyterian church. He liked Barry Goldwater’s politics and volunteered in his 1964 election campaign. He saw no reason to doubt the government’s assurances that America had honorable motives in Vietnam or that victory would be swift.

At Fort Benning, Georgia, he went through the customary rigors of basic training, with screaming drill sergeants trying to turn him against his quiet nature to become a killer and a hater of gooks. His first doubts crept in when he went on to Fort Holabird, Maryland, for training as an intelligence analyst. When his superiors asked what language he’d like to learn, Searcy chose Vietnamese. They rejected his request. When he asked why, they said it was because he was going to be posted to Vietnam. When he eventually got to Saigon, he found that no one in his battalion, whose job was, after all, intelligence, spoke the language. The logic of this remained obscure.



Ignominious retreat: After a months- long siege by the North Vietnamese, US forces finally evacuated Khe Sanh on July 1, 1968. Creative Commons

When Searcy arrived at the Tan Son Nhut air base, he was driven into the city in a “deuce and a half,” a two-and-a-half-ton truck, with a driver who enjoyed swerving from side to side, aiming for mud puddles. “He passed an old woman carrying baskets on a shoulder pole and just covered her with a

sheet of water from head to foot,” Searcy said. “I looked in her eyes, and she looked in my eyes, and the look on her face was not anger or malice, it was just like, why did you have to do that? That was my introduction to Saigon.”

At the Combined Intelligence Center of Vietnam (CICV), known as Sick-Vee, much of the raw intelligence that crossed Searcy’s desk came from bushy-tailed young officers from the US Agency for International Development (USAID) or analysts from the RAND Corporation. He synthesized their rose-colored reports on rice production targets and on political loyalties in the “strategic hamlets,” where peasants forcibly displaced from their homes could be reclassified as “friendlies.” But their unrelenting optimism made him queasy, especially when he saw CICV’s final reports constantly revised and rewritten to reflect the war that Washington liked to imagine rather than the one that was actually being fought.

In the months after Tet, Searcy’s doubts hardened into disgust. “It didn’t take long to see that what I’d been told about America’s role in the war was distortions, exaggerations and lies,” he said. “Although ‘lies’ implies malice. Like so many things Americans do, we had good intentions, but I saw very quickly that they had gone awry.”

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Searcy was rotated out of Saigon after a year and served out his enlistment in Germany. There were beautiful women, great beer, the Keystone Cops follies of Cold War intelligence-gathering, like the American colonel who had the bright idea of photographing a factory in East Germany from a car concealed in a haystack, only to be seized by farmers wielding pitchforks after they saw the haystack barreling across their field.

Staying on as a civilian in Germany was enticing, but in the fall of 1970, Searcy decided it was time to come home. He found the antiwar movement at its zenith, and his changed opinions brought a bitter two-year schism with his parents. Yet he was more sad than angry, and to this day he eschews labels like “liberal” and “conservative.” He was never a flag-burner, preferring to give talks to local Kiwanis and Rotary Club chapters and hand out petitions at Georgia football games. When about 1,000 vets threw their medals down on the steps of the Capitol, he chose to lay his discreetly on the desk of his senator. Besides, he said wryly, it wasn’t as if his were Bronze Stars or Purple Hearts; they were just the basic set you got for serving, surviving and not screwing up.

For the next twenty years, Searcy followed a conventional career path, cleaving to the mainstream of Georgia Democratic Party politics. He started a small newspaper in Athens, spent a year with the Small Business Administration in Washington, ran the Georgia Trial Lawyers Association, grew close to future Senator Max Cleland, a Vietnam veteran who lost two legs and part of one arm to a grenade near Khe Sanh in 1968. Then one day he got a call from an old friend from his military intelligence days, who was in Atlanta for a convention. They had dinner together. By the time dessert came, they’d decided to go back to Vietnam.

“As we landed, both of us had a panic attack,” he said. “For God’s sake, what are we thinking? We’re ex-GIs; the country is devastated. But I couldn’t believe the welcome we got, the curiosity. ‘Were you

in the war? My father was in the war. Where were you?’ But without any animosity or anger. It was astonishing.” Everywhere they went for the next month, it was the same story: not a harsh word.

By late 1994, when Searcy made his third trip, Bill Clinton had finally lifted the US embargo, paving the way for full diplomatic relations. As part of the goodwill offensive, USAID asked the Vietnam Veterans of America Foundation to administer a humanitarian project to provide orthopedic braces for children, and Searcy agreed to run it. “The Vietnamese were doing prosthetic limbs for amputees,” he said. “But for children with polio or cerebral palsy or club foot, they only had crude implements of bamboo, wood, metal and leather.”

He began to wonder about the cause of all these disabilities. “And of course, there was always the hanging question,” he said. “Could any of this be related to Agent Orange?” The Vietnamese doctors demurred: it’s possible, we can’t be certain, there isn’t enough research, perhaps yes, perhaps no. The government, too, was reluctant to raise the issue, given the delicate rapprochement with the United States. And the new ambassador, Pete Peterson, a former Air Force pilot who had been shot down over Hanoi, declared bluntly that any talk of Agent Orange was propaganda designed to extort war reparations.

“It didn’t seem fair,” Searcy said. “The Vietnamese were getting hammered, going beyond any expectations to help us find the remains of MIAs, flying all over the country, even digging up Vietnamese cemeteries. A lot of us veterans felt that they should have been asking for US cooperation in return in dealing with these war legacies.”

While Agent Orange remained a political third rail, unexploded ordnance (UXO) proved an easier sell. The US government offered Vietnam \$3 million to help with a cleanup program, and, with Searcy acting as a back-channel go-between, the Vietnamese defense ministry was finally persuaded that there would be no strings attached. Other governments and private groups also kicked in funding. There was no better place to start than Quang Tri and the former DMZ. And so, to make a long story short, Project RENEW was born, in 2001. The acronym stands for Restoring the Environment and Neutralizing the Effects of War. Today, most of its funding comes from Norwegian People’s Aid.

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Project Renew has its headquarters in the bustling provincial capital, Dong Ha, where it also runs a small Mine Action Visitor Center, with its own Facebook page and a TripAdvisor sticker on the wall. “Mine” is actually a bit of a misnomer, Searcy said, for the minefields in Quang Tri were mainly around old military bases and on the beaches, and these were quickly cleared. But the word resonates with people, perhaps because they associate it with Princess Diana, who made eradication of mines her personal crusade. In reality, Searcy said, UXO includes everything from hand grenades to naval shells “the size of Volkswagens” that were fired from battleships twenty-five miles offshore.

Local schoolchildren visit the center in good numbers under a program that until recently was funded by the State Department’s Office of Weapons Removal and Abatement. On one occasion, I found a group of elementary school kids from nearby Cam Lo district intent on an energetic role-playing game: what to do when you find UXO. Their teacher had called to report the discovery, in a patch of

vegetation at the edge of the school's soccer field, of three shoulder-fired M-79 grenades and a 37-millimeter projectile.

No one really knows how many people have been injured or killed by unexploded ordnance in Vietnam since the war ended, said Searcy's colleague Ngo Xuan Hien, but the best estimates are at least 105,000, including about 40,000 deaths. An estimated 84 percent of Quang Tri's 1,800 square miles are contaminated with UXO. Provincial records show that since 1975, 3,419 people have died in the province and another 5,095 have been maimed—commonly meaning the loss of one or more limbs and/or being blinded.

There were clear patterns among the victims. Poor farmers accounted for more than half of them, perhaps not surprisingly, since most of the fighting and bombing took place in rural areas. Rice paddies are the most common site of explosions. These are people who often earn barely a third of Quang Tri's annual per capita income of less than \$1,000. "People were desperate to have land for farming," Hien said, "so they defied all the risks to reclaim it."

In recent years, the casualty numbers have steadily declined—not because the bombs aren't still there, but because Project RENEW has gotten better at finding them. And the pattern of victims has changed, from those who stumble on munitions accidentally to the scrap-metal scavengers who go out looking for them in full knowledge of the danger. "What they're looking for is larger items like bombs or artillery shells, because those have the greatest value," Searcy said, and the methods they use to get the metal can be hair-raising—sawing or hammering away at the seam that separates the body of the bomb from the warhead.

One day, we paid a call on one of Quang Tri's dozens of scrap dealers. A young man pulled up on a motorbike and unloaded a rattling bag of metal. The dealer took a look inside, placed the bag on an old-fashioned scale and, after some perfunctory negotiation, handed over the equivalent of a dollar or two.

His yard was littered with rusted weaponry of every description. Off in a shed, he had set aside a shelf and a sheet of pegboard that had the air of a small museum. The items on display were for sale, everything from aluminum mess tins and water canteens to rocket-propelled grenades and cluster bombs. I could have a rocket with all its fins intact for about \$40, the dealer said. I asked about a helmet with a jagged gash in it that might have been a bullet hole, but I preferred to think was rust. One hundred thousand Vietnamese dong for that one, he said. Five bucks.

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Cluster bombs are the most malignant of all the UXO, Hien told me. It takes a kind of perverse ingenuity to design such things (although Leonardo da Vinci, of all people, is credited with the original idea). An airplane drops a mother pod, an elongated canister that springs open in midair. As many as 600 individual bomblets, each the size of a baseball and with its own explosive charge, fly out in all directions, blanketing an area the size of two or three football fields and shredding anything in their path. As the unexploded ones rust away in the ground, some become inert, while others become unstable. You never know.

“There’s a footprint to a cluster-bomb strike pattern that’s different from any other kind of blast,” Searcy explained. “If you find one or two bombs, you can assume there are others in the immediate area.” It helps, he said, that the US Air Force has turned over many of its maps, tracking the planned bombing runs—although pilots had discretion to drop bombs wherever they saw fit. Sometimes the path of a cluster-bomb strike will match that of an Agent Orange spraying run, fighter jets having cleared the way to eliminate the risk of ground fire.

We went out one morning with a cluster-bomb survey team in a village in Cam Lo district, which was the scene of intense fighting. We were joined there by retired Col. Bui Trong Hong, Project RENEW’s national technical officer. The colonel learned his skills when he was assigned to a de-mining team in Quang Tri after the war, helping villagers reclaim their land for farming and resettlement. A tiny man who barely came up to my shoulder, he seemed to regard life as an inexhaustible source of humor. He laughed when he told me of his childhood in Nghe An province, the birthplace of Ho Chi Minh, how he and his classmates would be dispersed into improvised classrooms in the jungle to reduce the number of deaths if fighter jets hit their school. He laughed when he described villagers shooting at airplanes with World War I-era rifles. He laughed when I was asked to sign a liability waiver, writing down my blood group in exchange for a promise that if anything went wrong, they’d have me in the hospital in Dong Ha in the blink of an eye.

The team leader showed me a map of the survey area, divided up into a color-coded grid with hundreds of smaller boxes. Red for cluster bombs, blue for other munitions, dark green for all clear. We were in box 103. Covering about one square kilometer, it had been under cultivation with sweet potato and cassava. His team had already found one mortar round and two cluster bombs, and five men with mine detectors, accompanied by a paramedic, were sweeping the field for more. I was told to turn off my cellphone, because it would interfere with their signal. And to follow exactly—exactly—in their footsteps.

***Thanks largely to Senator Patrick Leahy, the State Department will continue to provide annual funding to help with ordnance removal.***

As we crisscrossed the field, the detectors made a rhythmic, high-pitched chatter, like a flock of angry geese. Suddenly, one of them gave a loud squawk. Maybe it was a bomb, maybe just a piece of shrapnel, the colonel said. The spot was flagged for later inspection.

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When local people find something nasty in their fields, they can call Project RENEW for help, and out goes another kind of crew, the first responders, usually in a matter of minutes. I went out on another day with one of these teams, to a soccer field just off the highway, sodden with recent rains. The previous week, workers widening an irrigation ditch had unearthed a grenade and a five-inch white phosphorus bomb. A cassava farmer who lives nearby told me that he had seen the phosphorus ignite when it was exposed to the air and had called the hot line. Kids had been playing soccer on the field; people were tending water buffalo. Now there was another find, this time three 40-millimeter grenades, small but lethal items.

The shallow holes that had been dug to expose the grenades were ringed with sandbags, yellow and candy-cane pink. When the team leader was satisfied that everything was in place, we retreated to a

safe distance. On the count of three, a member of the crew pressed the button. There was a dull boom, and an inverted cone of mud and debris shot thirty feet into the air.

When it was over, I asked Colonel Hong—who was still compelled to do this, often responding to five calls a day, forty years after the war ended—what he thought of Americans. He had felt hatred as a child, he said, seeing all the killing, the bombing of schools. But what the Americans had done here had to be placed in context, he added. Vietnam had been attacked and invaded by China for more than a thousand years. France had occupied the country for a century. Up to 2 million people had died from famine in the brutal Japanese occupation during World War II. And perhaps the experience of the North had been different than in South Vietnam. “We saw the enemy only coming from the sky, the enemy without a face,” he said. I was reminded of a line in Frances FitzGerald’s Pulitzer Prize-winning book on the war, *Fire in the Lake*, about “bombs released by an invisible pilot with incomprehensible intentions.”

Getting rid of the UXO “is a continuing, dynamic process,” Chuck Searcy said later. For a long time, people had spoken of removing every last piece of ordnance from the fields of Vietnam. But that’s impossible. What’s realistic, he said, is to make the country safe—in the way that Europe is now safe, even if construction workers in London or Berlin still dig up the odd unexploded bomb left over from World War II.

By one estimate, more than 370,000 pieces of ordnance have been destroyed in Quang Tri since 1998. No one knows how many remain. But there are few fatalities these days, and Searcy now sees a new window of opportunity to finish the job. Thanks largely to the efforts of Senator Patrick Leahy, the State Department will continue to provide annual funding to help with UXO removal in Vietnam. Just as significant, there will also be a little new money to address the darkest and most intractable of all the legacies of the war: Agent Orange.

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As we drove one day through Cam Lo district, Ngo Xuan Hien, who is 38, recalled his childhood here, the constant struggle to find food, classmates who had seizures and fell to the ground and drooled, a girl who was cruelly teased because of her harelip.

The low, rolling hills were carpeted with long, even rows of spindly trees. It had all been replanted since the war, Hien said, first with pepper and then with stands of rubber and, above all, acacia, a fast-growing wood used in the making of paper and furniture. “In the old-growth forests, there used to be bears and monkeys and wildcats,” Searcy said. “Now it’s all just acacia, acacia, acacia.” Though the new plantation monoculture is drab by comparison with the lush ecosystem that once existed, it’s part of an intensive government effort to restore badly eroded lands that were sprayed with herbicides and then invaded by coarse grasses, while providing some cash income for local farmers.

No one could dispute that Agent Orange was responsible for denuding the forests. But was it also the reason for the disabilities that afflicted Hien’s classmates? That question has occupied the tortured intersection of science and politics for forty years now, though for many Vietnamese, the connection is an article of faith.

Although the Romans used to destroy their enemies' fields, and armies have always bombed and burned adversaries out of their hiding places, there is no real precedent for the systematic use of science and technology to destroy large portions of a country's natural environment, as the United States did with its herbicide-spraying program in Vietnam. The overall operation was called Trail Dust, but it's generally referred to as Ranch Hand. Another name that was sometimes used was Hades, and that may be the most apposite of the three.

The most authoritative estimate of the scale of the program comes from a 2003 study by Jeanne Stellman, a professor emerita at Columbia University's Mailman School of Public Health. Using US Air Force flight records and a sophisticated geographic information system, Stellman calculated that between 1961 and 1971 about 20 million gallons of herbicides were dropped on South Vietnam, exposing as many as 4.8 million people to the toxic chemicals. The spraying began modestly, with small amounts to clear the perimeter of roads, waterways and military bases. But as it escalated, it took on the dual purpose of destroying crops that might feed the Vietcong and removing forest cover to make their presence more visible to spotter planes and airstrikes. Most of the herbicides were delivered by modified Fairchild C-123 aircraft, though smaller quantities were delivered by helicopter, patrol boat, truck and backpack spray tanks.

Agent Orange accounted for more than 60 percent of the spraying, but actually it was just one in a rainbow spectrum of herbicides, each employing a different cocktail of chemicals and color-coded by a painted band around its fifty-five-gallon storage barrel. Agent White was the second most widely used defoliant, while substantial amounts of Agent Blue were also sprayed, mainly to kill crops by desiccation. Agents Pink, Green and Purple were used in smaller quantities during the early years of the war.

Agent Orange was a fifty-fifty mix of two components, 2,4-dichlorophenoxyacetic acid (2,4-D) and 2,4,5-trichlorophenoxyacetic acid (2,4,5-T). Seven different companies manufactured it on government contracts, Monsanto and Dow Chemical being by far the biggest. They insisted the stuff was safe, as did the US military. Psywar teams were routinely sent into villages after a spraying run to deliver the message, in the words of a declassified Air Force document, that these were "standard defoliants which are widely used throughout the world in controlling weeds and other vegetation. They have no harmful effects of any kind on human or animal life." American and South Vietnamese troops often sluiced out the residue from the empty barrels, cut them in half and used them as barbecue pits, or punched holes in them to make improvised showers. Chuck Searcy heard tales of Marines drinking cupfuls of dilute Agent Orange as an initiation ritual.

But there were two problems with the assertion, true enough on its face, that these were just your everyday weed killers. First, they were sprayed on Vietnam in concentrations up to ten times higher than when used in the United States. More important, a combination of military imperatives and market forces turned them lethal. In the course of accelerated production, the Agent Orange was contaminated with an unwanted byproduct, 2,3,7,8-tetrachlorodibenzo-para-dioxin, or TCDD. This is sometimes referred to as the most toxic substance known to man, depositing itself in fat cells, disrupting hormone systems and triggering complex cellular and genetic changes. In the natural environment, dioxin can persist for decades, passing through soil into water, where it gloms on to organic matter in sediment and from there can move on up the food chain.

But the other herbicides were toxic too, Stellman told me when we met in New York. Cacodylic acid, the active ingredient in Agent Blue, is an arsenical that has promoted a variety of cancers in rats. Agent White was a mixture of 2,4-D and Picloram, a proprietary product of Dow Chemical that contains hexachlorobenzene, a probable human carcinogen. Agent Purple, Stellman said, had even higher levels of TCDD than Agent Orange.

After disturbing patterns of disease began to appear in American veterans, the wall of denial about the toxicity of Agent Orange began to crumble. A 1990 report by Adm. Elmo Zumwalt Jr., who had commanded US naval forces in Vietnam, was a searing takedown of corporate and official mendacity, written in language that still burns holes in the page. Monsanto's studies were "fraudulent." Dow Chemical was aware of the TCDD levels in Agent Orange and knew that exposure could cause "general organ toxicity." The Chemical Weapons Branch of the US Air Force knew about the risks, but "because the material was to be used on the 'enemy,' none of us were overly concerned." It seems not to have occurred to anyone that the 4.8 million villagers who were exposed to the spraying were precisely those on whose behalf the war was ostensibly being fought.

After years of political pressure and class-action suits and out-of-court settlements, the Department of Veterans Affairs eventually drew up a list of fourteen diseases, including several kinds of cancer, that were presumptively related to Agent Orange. A vet suffering from any one of these would be entitled to disability compensation. A separate list of birth defects was later added—spina bifida in the children of male veterans, and eighteen other conditions for the offspring of women who had served in Vietnam.

***In one of Quang Tri's ten districts, an astonishing 117 house holds had five or more family members who were classified as Agent Orange victims.***

All this was more politics than science. There was no doubt, Stellman said, that Agent Orange, the larger herbicide program and the war in general had done terrible things to people, both Americans who served in Vietnam and the much greater number of Vietnamese whose lives were torn apart. But cause and effect? It was one thing, she said, to step on a cluster bomb in Quang Tri and have your legs blown off. No great debate there. But serving in Vietnam and later contracting a soft-tissue sarcoma or Parkinson's disease, let alone Type 2 diabetes? Those links could never be convincingly demonstrated without a large-scale epidemiological study—and the fact that none had ever been conducted was, to her, the real scandal.

For the Vietnamese, meanwhile, the burden of proof was infinitely higher.

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In Dong Ha, Chuck Searcy and I went to see Le Van Dang, president of the Quang Tri chapter of the nongovernmental Vietnam Association of Victims of Agent Orange/Dioxin (VAVA). About 10 percent of Quang Tri's population of 600,000 suffer from a disability of some kind, he told me, well above the national average, and thousands of them are the consequence of stepping on unexploded ordnance. Dang's list of "Victims Affected by Toxic Chemicals" included 15,485 people, though he acknowledged that the statistics were out-of-date. The most striking thing on the list was the number of homes with multiple disabilities. In one of Quang Tri's ten districts, an astonishing 117 households had five or more family members who were classified as victims of Agent Orange.

But who was to say that the herbicide was responsible? Well, Dang answered, that's the presumption if they're diagnosed with one of the conditions on the official list. He read these from a sheet of paper on his desk, and I checked them off one by one against the VA list, starting with the cancers. They all tallied until we got to the end, where the Vietnamese version added a category that Hien translated as "unusual births, deformities and birth defects"—language that might embrace anything from stillbirth to Down syndrome. Casting such a broad net has led to the US government's continued rejection of Vietnam's claims as no more than propaganda without scientific merit.

To American vets who had returned to Vietnam to address the legacies of the war, this blanket dismissal of humanitarian concerns was an insult that "we jumped on like a chicken on a june bug," Searcy said. Whatever the shortcomings of Vietnamese science, there was a lack of basic fairness here, an evasion of responsibility.

It was also an oversimplification of Vietnam's position. Dang's list embodied the sense of injustice felt by VAVA, the military and government agencies concerned with health, social welfare and the environment. But those more focused on Vietnam's integration into the global economy kept their mouths shut. In fact, Stellman told me, when Vietnam was offered a high-performance mass spectrometer capable of testing for dioxin, it was used only to check for contamination in catfish, raised in the heavily sprayed Mekong Delta and destined for export.

Faced with government inaction, private organizations in the United States, led by the Ford Foundation, put more than \$20 million into research on dioxin contamination in Vietnam and possible remedies. A Canadian firm, Hatfield Consultants, began field tests in 1996, collecting samples from three former US Special Forces bases in the A Luoi valley in Thua Thien-Hue province, immediately adjacent to Quang Tri. Hatfield's lead scientist, Wayne Dwernychuk, told me in an e-mail, "The data retrieved through a general comparison of sprayed vs base levels early on in our studies, in my mind, triggered the 'model' of contamination pointing at the former U.S. military bases in Vietnam as being 'hot spots' or 'reservoirs' of dioxin." In time, this produced a list of twenty-eight such locations, although, Dwernychuk added, "there are quite conceivably many more."

By far the worst were the three air bases that acted as the nodal points for Ranch Hand operations. These were where the chemicals were shipped, stored, mixed, pumped aboard the C-123s and not infrequently spilled. Flights over the Mekong Delta operated out of Bien Hoa; Phu Cat covered the Central Highlands; and the worst hot spot of all, Da Nang, was where the planes took off for Quang Tri, Thua Thien-Hue and the northern section of the Ho Chi Minh Trail. The toxicity of dioxin is such that it is measured in parts per trillion. Anything above 1,000 ppt is dangerous. In some soil samples from Da Nang, Hatfield found levels of 365,000 ppt. In the A Luoi valley, Dwernychuk's team had detected the heaviest concentration of dioxin in the food chain in fish and ducks, which root around in contaminated pond sediment and are the main source of protein for local farmers.

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That was one kind of hot spot, but there was also the other kind—the thousands of rural villages that had the misfortune to find themselves in the flight path.

As Project RENEW has progressively eliminated the threat of UXO, Searcy has begun to look for ways of providing material assistance to those worst affected by disabilities and birth defects—knowing that there’s no scientific way of proving that their sufferings can be ascribed to Agent Orange. “It’s a matter of presumption and guesswork,” he said when we visited one such village in Cam Lo district. “You have to do a kind of triage.”

The few studies that have been conducted in the province fall far short of the peer-review standards demanded by the US government or by rigorous scientists like Jeanne Stellman. Nonetheless, they offer some fragmentary shards of evidence. A team from the Asian Development Bank, looking to promote reforestation efforts in Cam Lo district, found elevated levels of 2,4-D and 2,4,5-T in household wells and concluded that they were the result of runoff from Agent Orange (though Stellman questions this). A joint study by Vietnamese and Japanese scientists found a high rate of reproductive failure in women in two sprayed communes in Cam Lo, as well as disturbing levels of dioxin in breast milk. Dr. Nguyen Viet Nhan, a physician at Hue Medical School, found strikingly high numbers of certain disabilities among children in Cam Lo, many of which appear on the VA’s list of congenital disorders in the offspring of female veterans. In comparison with a nearby unsprayed area, Nhan found twice as many cases of cleft lip and cleft palate; three times the incidence of clubfoot, polydactyly (extra fingers and toes) and syndactyly (where the digits are fused); four times that of hypospadias (where the urethra emerges from the underside rather than the tip of the penis); and six times as many children with oscheocele (a swelling or tumor of the scrotum).

Until now, reconstructing exactly what happened in these localities during the war would have been next to impossible. But after years of painstaking research, Stellman has opened up radical new possibilities. With funding from the National Academy of Sciences, she and her colleagues at Columbia have crunched vast quantities of data about the Ranch Hand program, including details of more than 9,000 flights, to calculate the precise “exposure risk” of those who were in or near the spray path on particular days. Using Stellman’s database, which is not yet public, I was able to go into some of the worst-affected villages of Quang Tri and mesh the flight records and the exposure index with the accounts of families with disabled children who were present at the time.

The broad contours of the program in the province have long been known. The western mountains around Khe Sanh and the Ho Chi Minh Trail were relentlessly sprayed throughout the war. In 1965–66, the focus was on destroying food crops in the southern part of Quang Tri. Declassified Air Force documents in the Stellman archive show that these missions were timed according to the harvest cycles—three annual rice crops, roughly in March, August and October; potatoes, sweet potatoes, corn and cassava between April and June. Later in 1966, the first defoliation missions targeted Cam Lo district. Then, in 1967–68, dozens of sorties crisscrossed the area immediately south of the DMZ, focusing on an area known as “Leatherneck Square.” On March 30, 1967, Gen. William Westmoreland, commander of US forces in Vietnam, issued instructions that this 222-square-mile section of Quang Tri was “the priority one defoliation task” in South Vietnam.

By my count, going through the Air Force flight records, more than 700,000 gallons of herbicides were dropped on Quang Tri—600,000 of Agent Orange and another 100,000 of Agents White and Blue. In total gallons sprayed, this ranks Quang Tri ninth among Vietnam’s fifty-eight provinces. But arguably a more meaningful yardstick would be the volume of herbicides in proportion to land area. Measured that way, Quang Tri would rank closer to fifth.

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When Searcy and I reached the hamlet of Tan Hiep, a mile or so north of the Cam Lo River, we could hear the guttural cries of Nguyen Van Bong's elder daughter well before we reached his house. We found her and her younger sister sprawled diagonally across a bare wooden bed frame, swaddled in a thick, floral-patterned blanket. Their mother, Tran Thi Gai, sat at the end of the bed, stroking their short-cropped hair and making small soothing noises. The older girl thrashed and writhed and clutched at her legs; the younger lay rigid and motionless, staring at the ceiling. I judged them to be 10 or 12 years old. Bong told me they were 26 and 21. Doctors had said that neither would survive childhood, but here they were still.

The elder daughter rarely slept, but moaned and screamed all night, so Bong and his wife traded round-the-clock shifts. This made it difficult for him to work, leaving the family heavily reliant on the pittance they receive from the government—about \$17 a month for each child. Dr. Nhan, who knew the family well, had certified both girls as Agent Orange victims, although his diagnosis was cerebral palsy, which is on neither the American nor the Vietnamese list of diseases. Two of Bong's younger children are also disabled. A son has abnormal bone growths in his knees. Another daughter is in her first year of college in Dong Ha, though her disabilities are more severe. "Her arms stick out at strange angles," Bong said. "She's tiny and stunted. She weighs only thirty kilos [sixty-six pounds], and she's always sick."

Project RENEW had just given the family a cow, at a cost of about \$800, and Bong and Searcy chatted for a bit about ways that this might produce some long-term income by breeding and selling her calves in the local market.

***Did it never occur to America's rural development experts that bombing and burning people out of their villages was not the best way to win their allegiance?***

When I went back to see the family later, Bong talked more about the war. Born in 1958, he was still just a boy during the worst of the ground fighting around Tan Hiep. The GIs were always friendly. They liked to play with the children and shared their C rations. Once he was asked to help carry two dead Americans across the river. He remembered that one was white, the other black.

The Ranch Hand records showed that three spraying runs passed right over Tan Hiep, with two others about a mile away. In the Stellman database, the hamlet registered an exposure risk of 5.98, which is quite high. (Like the Richter scale for earthquakes, risk is calculated on a logarithmic scale, not a linear one; Stellman told me that the highest recorded number is 6.95.) Air Force documents identifying the targets made a point of stressing that the area was uninhabited. True enough, Bong said with a half-smile, but not the whole story.

By late 1967, the population had been moved at gunpoint into a ramshackle refugee-cum-concentration camp in Cam Lo town after a series of military operations, with names like Buffalo, Bear Claw and Beaver Track, turned the whole area between the river and the DMZ into a free-fire zone. It was hard, listening to his account, not to think of all the tombs one sees in the fields of Vietnam, some just small cement slabs, and others like miniature pagodas. Ancestors are buried here where the rice grows, binding people to the land that is the source of their sustenance, history and identity. Did it never occur to the rural development experts who wrote the reports analyzed by Chuck Searcy in Saigon that

bombing and burning people out of their villages and herding them into squalid encampments was perhaps not the best way to win their allegiance?

The flights would go over early in the day, Bong recalled. Dead fish would float to the surface of the river, an unexpected addition to the family diet. As soon as the planes were gone, his wife—then a girl of 8—would walk back across the river with her parents to work their land, tending to the fields of rice and peas and peanuts that were still damp from the spray.

Le Van Dang at VAVA said that a special kind of curse had fallen on the commune of Cam Nghia, four or five miles south of Cam Lo. Cam Nghia is also known as Làng Chat Doc Da Cam—the Agent Orange Village. In the center of it, sandwiched between Camp Carroll, an old artillery base, and a Special Forces base and airstrip at Mai Loc, is the hamlet of Phuong An 2. It has about 100 homes, Dang said. Twenty have two or more children with birth defects.

There were fewer Ranch Hand missions on this side of the river, but the flight paths boxed in Cam Nghia along three and a half sides of a tight parallelogram. Although Phuong An was destroyed by B-52s and napalm strikes, the inhabitants stayed put, living in tunnels and improvised shelters. Le Thi Mit would probably have seen the first of the flights on September 19, 1966, when she was 18. Ranch Hand mission 1087 made a west-to-east pass over the hills to the south of her village before kicking a right-angled dogleg to the north, spraying 1,800 gallons of Agent Orange along the way. Eleven days later, mission 1125 came much closer, another 1,800 gallons; 1126 followed on the same day, this time slightly west of Phuong An, three aircraft delivering their maximum load of 3,000 gallons. On October 11, the Air Force switched to Agent White, missions 1155 and 1156, a combined 4,400 gallons, and it may have been one of these flights that caught Mit out in the fields. She remembered coming home with a furious itch all over her body, a characteristic reaction to Dow Chemical's Picloram. She boiled some wild leaves in water and rubbed the liquid on her skin, a common local remedy, but it didn't help. All her cassava died, and all the vegetables, but the family had no alternative but to eat them. On the Stellman scale, the exposure risk in Phuong An was 5.78.

Mit's first child was born five years later. He was a healthy boy, and today he works in Cam Nghia as a forester. A second son followed in 1978. He had six fingers on one hand and was mentally disabled. He lay motionless in bed for four years, never recognizing his parents, then died.

"It was like sugarcane with a pest inside," Mit said. "Maybe the next crop would be better. But if one stalk has a problem, the next one may be infected too."

A third boy arrived in 1982, and a fourth in 1988, both with grotesque birth defects. I found these two at home. Thirty-two-year-old Nguyen Van Lanh lay on the bed, moaning and grimacing. He had an enlarged skull and suffers from excruciating headaches. Two of his toes appeared to be webbed together, and he had no teeth. Mit thought perhaps a worm had eaten them. Dr. Nhan had diagnosed hydrocephalus, which is on the VA's list of birth defects in children of female Vietnam veterans. However, Stellman told me later, the sheer multitude of disabilities in the families I visited tended to point away from exposure to environmental toxins as the sole cause. The epic scale of their suffering suggests a multitude of possible reasons. After all, on top of being sprayed with three different kinds of herbicide, these people were also carpet-bombed, napalmed, starved, burned out of their homes and forced to live in tunnels.

Lanh's younger brother, Nguyen Van Truong, sat on the cement floor, his matchstick legs splayed out at thirty-degree angles. He let out sharp little barks of laughter as he tried to wrap the family's 6-week-old kitten in a plastic bag. Like Bong's daughters in Tan Hiep, the diagnosis was cerebral palsy. Mit told me that the family had sold everything it owned to pay the \$140 for medical tests, including all the jackfruit trees that they marketed for timber. Her terror, she said, was that she and her husband were growing old. What would happen to the boys when they were gone?

***“I think the fiftieth anniversary of the start of the war gives us a real opportunity to close the book on [Agent Orange]” —Chuck Searcy***

As we left, I asked her what felt like the inevitable question. Did she blame the Americans for the family's torment? No, she said, she imagined ghosts were to blame.

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In 1975, the new government of Vietnam opened the Museum of Chinese and American War Crimes in Ho Chi Minh City, the former Saigon. In time, as part of the rapprochement with the United States, it was given a new name, the War Remnants Museum. But its three floors are still a chamber of horrors.

The foreign tourists don't say much as they walk from room to room, taking in the photographs of B-52s, deformed fetuses, bodies incinerated by napalm and white phosphorus, the My Lai massacre. On one visit, I saw a group of older Americans quietly studying a picture of soldiers from the First Air Cavalry waterboarding a prisoner.

Vietnamese visitors tend to cluster outside in the courtyard, where high school kids mug for selfies in front of captured tanks and Chinook helicopters. I struck up a conversation with a middle-aged man named Quy, who was hawking pirated photocopies of the Lonely Planet guide to Vietnam and knew a little English. He had no arms and one eye, and I asked him what had happened. He said that when he was 8 years old, he had stepped on a land mine in his village in the Central Highlands. Didn't that make him feel bitter toward Americans? I asked. No, he said: “The war is over; it was a long time ago.” He offered his stump, which was amputated above the elbow, and said, “Please shake my hand. We can be friends, yes?”

Ever since he returned to Vietnam, Chuck Searcy has wondered at the mystery of Vietnamese forgiveness, not least because of the healing it has brought to the American vets who come back to confront their demons. He told me of a friend in Da Nang, a former Marine from the Bronx, who had summoned the courage to go back to My Lai. “There was a woman there, one of the survivors,” Searcy said, “and she reached out to him and held his hand and said, ‘We have forgiven you, now you need to forgive yourself.’”

This ability to forgive seemed unfathomable, given all the destruction the United States rained down on this country. The Vietnamese I spoke to offered a multitude of explanations: It all happened a long time ago. We need to put the past behind us. War was part of the natural cycle of life. Perhaps it was punishment for some wrong done in the past. We are by nature a forgiving people. Confucius said that to show anger was to sink to the level of the barbarians. To achieve prosperity, we need friendship with America. The Chinese abused us more than you did. It was all the work of ghosts.

In the end, Col. Bui Trong Hong had said after his crew blew up those grenades, “Maybe because you’re from the Western side it’s hard for you to understand our Oriental culture.” He was a man who loved to laugh, and we both laughed over that one, because it echoed the oldest cliché of colonialism: the Inscrutable Orient.

Agent Orange is the last remaining obstacle to full reconciliation, Searcy said, “and I think the fiftieth anniversary of the start of the war gives us a real opportunity to close the book on it, in ways that give us some small measure of satisfaction, a recognition that finally we did the right thing.”

For those in Vietnam who still feel resentment, the terms on which the book is closed will probably involve some reluctant concessions. On my last day in Hanoi, Searcy and I went to see retired Gen. Nguyen Van Rinh, the head of VAVA, who fought in Quang Tri during the siege of Khe Sanh and came under the spray several times himself. I asked him what it would take for the United States to make amends. Admit the truth, he said; acknowledge that a great crime was committed here. It was hard to tell him that this was never going to happen, that America didn’t make a habit of apologizing. Besides, Searcy said, an apology would open up questions of legal liability, and Monsanto, he added, was a powerful corporation that made \$4 billion in profit last year.

Though it’s not all that General Rinh might wish, the Obama administration has finally committed serious money to cleaning up the worst of the dioxin hot spots. Work on the Da Nang airport began in 2012 and is now projected to cost \$84 million. And USAID, which half a century ago was part of a military-run committee that evaluated new Ranch Hand targets, is now set to disburse another \$21 million in humanitarian aid for people with serious birth defects and disabilities. While it may never be said in so many words, the tacit understanding is that this will include many of those the Vietnamese government regards, correctly or not, as “victims of Agent Orange.”

After we left Dong Ha, Chuck Searcy and I took the train south from Hue to Da Nang. It’s a beautiful ride, switchbacking across the green divide of the Bach Ma range. As we approached Da Nang, hugging the coast, a sudden sweeping view opened up, a crescent of sand and surf hundreds of feet below, and I realized that we were looking down on Red Beach, where the first US Marines came ashore on March 8, 1965.

“In so many ways the Vietnamese hold us in high esteem, aspiring to match our idealism as they understand it from afar, assuming that we are such decent and honorable people,” Searcy said. “In a lot of ways it makes those of us who live here want to be as good as we can be as Americans.”

It sounded as if he was looking to make the United States worthy of the forgiveness Vietnam seems so willing to offer; he agreed that this wasn’t a bad way of putting it.

It’s impossible, of course, to put a dollar value on the harm that was done to Vietnam, and in that larger scheme of things the money that is now on offer for the country’s legions of disabled people doesn’t amount to much. But Searcy prefers to see it as an implicit acceptance of responsibility, a modest acknowledgment that the Vietnamese, so long held to impossible standards of proof, should finally, like American veterans, be granted some benefit of the doubt. Again, this may be more politics than

science, but it's a belated leveling of the moral playing field, and the blasted hamlets of Quang Tri province would seem an excellent place to start.

**George Black**