

[Sign in](#) · [Register](#)Go to:  [Read today's paper](#) · [Jobs](#)Search:   Guardian Unlimited  Web**Guardian**Unlimited[Home](#) [UK](#) [Business](#) [Audio](#) [Podcasts](#) [The Wrap](#) [News blog](#) [Talk](#) [Search](#)  
[The Guardian](#) [World](#) [News guide](#) [Arts](#) [Special reports](#) [Columnists](#) [Technology](#) [Help](#) [Quiz](#)

## Spectre orange

Nearly 30 years after the Vietnam war, a chemical weapon used by US troops is still exacting a hideous toll on each new generation. Cathy Scott-Clark and Adrian Levy report

Search this site

 **In this section**[The plot to bring back Benazir](#)[There's the rub](#)[But does it work?](#)[No more heroines any more](#)['I must do something to show my gratitude'](#)**Saturday March 29, 2003**[The Guardian](#)

Hong Hanh is falling to pieces. She has been poisoned by the most toxic molecule known to science; it was sprayed during a prolonged military campaign. The contamination persists. No redress has been offered, no compensation. The superpower that spread the toxin has done nothing to combat the medical and environmental catastrophe that is overwhelming her country. This is not northern Iraq, where Saddam Hussein gassed 5,000 Kurds in 1988. Nor the trenches of first world war France. Hong Hanh's story, and that of many more like her, is quietly unfolding in Vietnam today. Her declining half-life is spent unseen, in her home, an unremarkable concrete box in Ho Chi Minh City, filled with photographs, family plaques and yellow enamel stars, a place where the best is made of the worst.

Article continues ▾

[Those were the days, my friend](#)

[One million tiny plays about Britain](#)

[Locker room secrets](#)

[Power play](#)

[Beach tones](#)

[All you need to know about: Windsurfing](#)

[The man who taught himself to talk](#)

[This column will change your life](#)

[Doctor, doctor](#)

[A peek at the diary of ...](#)

[Are you happy?](#)

[Sweet little lies](#)

[What women don't understand about men](#)

[I make a home with homeless people](#)

[Space solves](#)

[Snooping around](#)

[Let's move to ...](#)

[You little beauty](#)

[Mulching orders](#)

**1000**  
Whenever minutes  
**PLUS** nights  
and weekends  
**\$39.99**  
/mo  
T-Mobile  
Get It Now

Hong Hanh is both surprising and terrifying. Here is a 19-year-old who lives in a 10-year-old's body. She clatters around with disjointed spidery strides which leave her soaked in sweat. When she cannot stop crying, soothing creams and iodine are rubbed into her back, which is a lunar collage of septic blisters and scabs. "My daughter is dying," her mother says. "My youngest daughter is 11 and she has the same symptoms. What should we do? Their fingers and toes stick together before they drop off. Their hands wear down to stumps. Every day they lose a little more skin. And this is not leprosy. The doctors say it is connected to American chemical weapons we were exposed to during the Vietnam war."

There are an estimated 650,000 like Hong Hanh in Vietnam, suffering from an array of baffling chronic conditions. Another 500,000 have already died. The thread that weaves through all their case histories is defoliants deployed by the US military during the war. Some of the victims are veterans who were doused in these chemicals during the war, others are farmers who lived off land that was sprayed. The second generation are the sons and daughters of war veterans, or children born to parents who lived on contaminated land. Now there is a third generation, the grandchildren of the war and its victims.

[Clippings](#)[Anatomy of a garden](#)[The green house](#)[A climber with flowers and a sweet scent](#)[On the road](#)[Experience](#)[How to ... fix a computer](#)[Q&A](#)[Your letters](#)[The 50-word version](#)[The measure](#)[What I see in the mirror](#)

This is a chain of events bitterly denied by the US government. Millions of litres of defoliants such as Agent Orange were dropped on Vietnam, but US government scientists claimed that these chemicals were harmless to humans and short-lived in the environment. US strategists argue that Agent Orange was a prototype smart weapon, a benign tactical herbicide that saved many hundreds of thousands of American lives by denying the North Vietnamese army the jungle cover that allowed it ruthlessly to strike and feint. New scientific research, however, confirms what the Vietnamese have been claiming for years. It also portrays the US government as one that has illicitly used weapons of mass destruction, stymied all independent efforts to assess the impact of their deployment, failed to acknowledge cold, hard evidence of maiming and slaughter, and pursued a policy of evasion and deception.

Teams of international scientists working in Vietnam have now discovered that Agent Orange contains one of the most virulent poisons known to man, a strain of dioxin called TCCD which, 28 years after the fighting ended, remains in the soil, continuing to destroy the lives of those exposed to it. Evidence has also emerged that the US government not only knew that Agent Orange was contaminated, but was fully aware of the killing power of its contaminant dioxin, and yet still continued to use the herbicide in Vietnam for 10 years of the war and in concentrations that exceeded its own guidelines by 25 times. As well as spraying the North Vietnamese, the US doused its own troops stationed in the jungle, rather than lose tactical advantage by having them withdraw.

On February 5, addressing the UN Security Council, secretary of state Colin Powell, now famously, clutched between his fingers a tiny phial representing concentrated anthrax spores, enough to kill thousands, and only a tiny fraction of the amount he said Saddam Hussein had at his disposal.

The Vietnamese government has its own symbolic phial that it, too, flourishes, in scientific conferences that get little publicity. It contains 80g of TCCD, just enough of the super-toxin contained in Agent Orange to fill a child-size talcum powder container. If dropped into the water supply of a city the size of New York, it would kill the entire population. Ground-breaking research by Dr Arthur H Westing, former director of the UN

Environment Programme, a leading authority on Agent Orange, reveals that the US sprayed 170kg of it over Vietnam.

John F Kennedy's presidential victory in 1961 was propelled by an image of the New Frontier. He called on Americans to "bear the burden of a long twilight struggle ... against the common enemies of man: tyranny, poverty, disease, and war itself." But one of the most problematic new frontiers, that dividing North and South Vietnam, flared up immediately after he had taken office, forcing him to bolster the US-backed regime in Saigon. Kennedy examined "tricks and gadgets" that might give the South an edge in the jungle, and in November 1961 sanctioned the use of defoliants in a covert operation code-named Ranch Hand, every mission flown signed off by the president himself and managed in Saigon by the secret Committee 202 - the call sign for defoliating forests being "20" and for spraying fields "2".

Ngo Luc, 67, was serving with a North Vietnamese guerrilla unit in the Central Highlands when he saw planes circling overhead. "We expected bombs, but a fine yellow mist descended, covering absolutely everything," he says. "We were soaked in it, but it didn't worry us, as it smelled good. We continued to crawl through the jungle. The next day the leaves wilted and within a week the jungle was bald. We felt just fine at the time." Today, the former captain is the sole survivor from his unit and lives with his two granddaughters, both born partially paralysed, near the central Vietnamese city of Hue.

When US troops became directly embroiled in Vietnam in 1964, the Pentagon signed contracts worth \$57m (£36m) with eight US chemical companies to produce defoliants, including Agent Orange, named after the coloured band painted around the barrels in which it was shipped. The US would target the Ho Chi Minh trail - Viet Cong supply lines made invisible by the jungle canopy along the border with Laos - as well as the heavily wooded Demilitarised Zone (DMZ) that separated the North from the South, and also the Mekong Delta, a maze of overgrown swamps and inlets that was a haven for communist insurgents.

A reporter for the St Louis Dispatch witnessed a secret spraying mission and wrote that the US was dropping "poison".

Congressman Robert Kastenmeier demanded that the president abandon "chemical warfare" because it tainted America's reputation. Instead, William Bundy, a presidential adviser, flatly denied that the herbicide used by America was a chemical weapon, and blamed communist propagandists for a distortion of the facts about the Ranch Hand operation. Only when the Federation of American Scientists warned that year that Vietnam was being used as a laboratory experiment did the rumours become irrefutable. More than 5,000 American scientists, including 17 Nobel laureates and 129 members of the Academy of Sciences, signed a petition against "chemical and biological weapons used in Vietnam".

Eight years after the military launched Operation Ranch Hand, scientists from the National Institute of Health warned that laboratory mice exposed to Agent Orange were giving birth to stillborn or deformed litters, a conclusion reinforced by research conducted by the US department of agriculture. These findings coincided with newspaper reports in Hanoi that blamed Agent Orange for a range of crippling conditions among troops and their families. Dr Le Ke Son, a young conscript in Hanoi during the war and now director of Vietnam's Agent Orange Victims Fund, recalls, "The government proposed that a line of runners carry blood and tissue samples from the front to Hanoi. But it was more than 500 miles and took two months, by which time the samples were spoiled. How could we make the research work? There was no way to prove what we could see with our own eyes."

In December 1969, President Nixon made a radical and controversial pledge that America would never use chemical weapons in a first strike. He made no mention of Vietnam or Agent Orange, and the US government continued dispatching supplies of herbicides to the South Vietnamese regime until 1974.

That year, Kiem was born in a one-room hut in Kim Doi, a village just outside Hue. For her mother, Nguyen, she should have been a consolation because her husband, a Viet Cong soldier, had been killed several months earlier. "The last time he came home, he told me about the spray, how his unit had been doused in a sweet-smelling mist and all the leaves had fallen from the trees," Nguyen says. It soon became obvious

that Kiem was severely mentally and physically disabled. "She can eat, she can smile, she sits on the bed. That's it. I have barely left my home since my daughter was born."

By the time the war finally ended in 1975, more than 10% of Vietnam had been intensively sprayed with 72 million litres of chemicals, of which 66% was Agent Orange, laced with its super-strain of toxic TCDD. But even these figures, contained in recently declassified US military records, vastly underestimate the true scale of the spraying. In confidential statements made to US scientists, former Ranch Hand pilots allege that, in addition to the recorded missions, there were 26,000 aborted operations during which 260,000 gallons of herbicide were dumped. US military regulations required all spray planes or helicopters to return to base empty and one pilot, formerly stationed at Bien Hoa air base between 1968 and 1969, claims that he regularly jettisoned his chemical load into the Long Binh reservoir. "These herbicides should never have been used in the way that they were used," says the pilot, who has asked not to be identified.

Almost immediately after the war finished, US veterans began reporting chronic conditions, skin disorders, asthma, cancers, gastrointestinal diseases. Their babies were born limbless or with Down's syndrome and spina bifida. But it would be three years before the US department of veterans' affairs reluctantly agreed to back a medical investigation, examining 300,000 former servicemen - only a fraction of those who had complained of being sick - with the government warning all participants that it was indemnified from lawsuits brought by them. When rumours began circulating that President Reagan had told scientists not to make "any link" between Agent Orange and the deteriorating health of veterans, the victims lost patience with their government and sued the defoliant manufacturers in an action that was finally settled out of court in 1984 for \$180m (£115m).

It would take the intervention of the former commander of the US Navy in Vietnam, Admiral Elmo Zumwalt, for the government finally to admit that it had been aware of the potential dangers of the chemicals used in Vietnam from the start of Ranch Hand. The admiral's involvement stemmed from a deathbed pledge to his son, a patrol boat captain who

contracted two forms of cancer that he believed had been caused by his exposure to Agent Orange. Every day during the war, Captain Elmo Zumwalt Jr had swum in a river from which he had also eaten fish, in an area that was regularly sprayed with the herbicide. Two years after his son's death in 1988, Zumwalt used his leverage within the military establishment to compile a classified report, which he presented to the secretary of the department of veterans' affairs and which contained data linking Agent Orange to 28 life-threatening conditions, including bone cancer, skin cancer, brain cancer - in fact, almost every cancer known to man - in addition to chronic skin disorders, birth defects, gastrointestinal diseases and neurological defects.

Zumwalt also uncovered irrefutable evidence that the US military had dispensed "Agent Orange in concentrations six to 25 times the suggested rate" and that "4.2m US soldiers could have made transient or significant contact with the herbicides because of Operation Ranch Hand". This speculative figure is twice the official estimate of US veterans who may have been contaminated with TCCD.

Most damning and politically sensitive of all is a letter, obtained by Zumwalt, from Dr James Clary, a military scientist who designed the spray tanks for Ranch Hand. Writing in 1988 to a member of Congress investigating Agent Orange, Clary admitted: "When we initiated the herbicide programme in the 1960s, we were aware of the potential for damage due to dioxin contamination in the herbicide. We were even aware that the military formulation had a higher dioxin concentration than the civilian version, due to the lower cost and speed of manufacture. However, because the material was to be used on the enemy, none of us were overly concerned."

The Office of Genetic Counselling and Disabled Children (OGCDC) operates out of a room little bigger than a broom cupboard. Dr Viet Nhan and his 21 volunteers share their cramped quarters at Hue Medical College with cerebral spinal fluid shunt kits donated from Norfolk, Virginia; children's clothes given by the Rotary Club of Osaka, Japan; second-hand computers scavenged from banks in Singapore.

Vietnam's chaotic and underfunded national health service

cannot cope with the demands made upon it. The Vietnamese Red Cross has registered an estimated one million people disabled by Agent Orange, but has sufficient funds to help only one fifth of them, paying out an average of \$5 (£3) a month. Dr Nhan established the free OG CDC, having studied the impact of Agent Orange as a student, to match Vietnamese families to foreign private financial donors. "It was only when I went out to the villages looking for case studies that I realised how many families were affected and how few could afford help," he says. "I abandoned my research. Children need to run before they die."

The walls of his room are plastered with bewildering photographs of those he has helped: operations for hernias and cleft palates, open-heart surgery and kidney transplants. All of the patients come from isolated districts in central Vietnam, villages whose names will be unfamiliar, unlike the locations that surround them: Khe Sanh, Hamburger Hill, Camp Carroll and the Rock Pile. "I am not interested in apportioning blame," Nhan says. "I don't want to talk to you about science or politics. What I care about is that I have 60 sick children needing financial backers. They cannot wait for the US to change its policy, take its head out of the sand and clear up the mess."

He takes us into an intensive care ward to meet nine-year-old Nguyen Van Tan, who two weeks before had open-heart surgery to correct a birth defect thought to be connected to dioxin poisoning. There is no hard proof of this, but his father, who sits beside the bed, talks of being sprayed with defoliants when he fought with the Viet Cong. The area they live in was repeatedly doused during the war. Almost all of his former battlefield comrades have disabled children, he says. Nhan ushers us away. "I don't want to tell the family yet, but their boy will never fully recover. He is already suffering from total paralysis. The most we can do now is send them home with a little money."

Back in his tiny office, the doctor gestures to photocopies of US Air Force maps, sent by a veterans' organisation because the US government refuses to supply them. These dizzying charts depict the number of herbicide missions carried out over Quang Tri, a province adjacent to the DMZ, from where almost

all Nhan's patients come. Its topography is obliterated by spray lines, 741,143 gallons of chemicals dropped here, more than 600,000 of them being Agent Orange. "I'm just scratching the surface," he says.

The Vietnamese government is reluctant to let us travel to Quang Tri province. It does not want us "to poke and prod" already dismal villagers, treating them as if they are medical exhibits. We attempt to recruit some high-powered support and arrange a meeting in Hanoi with Madame Nguyen Thi Binh, who until last year was the vice-president of Vietnam. She receives us at the presidential palace in a teak-panelled hall beneath an enormous photograph of Ho Chi Minh in a gold frame writhing with dragons. "Thank you, my young friends, for your interest in Vietnam," Madame Binh says, straightening her grey silk ao dai, a traditional flowing trouser suit.

She looks genteel, but old photographs of her in olive fatigues suggest she is a seasoned campaigner. As minister of foreign affairs for the Provisional Revolutionary South Vietnamese government, she negotiated at the Paris peace talks in 1973. "I must warn you, I will not answer questions about George W Bush," she says, casting a steely gaze, perhaps conscious of the fact that, since the lifting of the US economic embargo in 1994, trade with America has grown to £650m a year. Madame Binh does, however, want to talk about chemical warfare, recalling how, when she returned after the war to her home province of Quang Nam, a lush region south-west of Hue which was drenched in defoliants, she found "no sign of life, just rubble and grass". She says: "All of our returning veterans had a burning desire for children to repopulate our devastated country. When the first child was born with a birth defect, they tried again and again. So many families now have four or five disabled children, raising them without any hope."

What should the US do? Madame Binh laughs. "It's very late to do anything. We put this issue directly on the table with the US. So far they have not dealt with the problem. If our relationship is ever to be normal, the US has to accept responsibility. Go and see the situation for yourself."

She sends us back to Hue. Over chilled water and tangerines, we talk to a suspicious party secretary who asks us why we

have bothered to come after all these years. "There is no point," he says. "Nothing will come of it." But he opens his file all the same and reads aloud: "In Hue city there are 6,633 households affected by Agent Orange and in them 3,708 sick children under the age of 16." He eventually agrees to take us north-west, over the Perfume river, beyond the ancient royal tombs that circle this former imperial city, towards the DMZ. We arrive at a distant commune where a handyman is sprucing up a bust of Ho Chi Minh with white gloss paint. Eventually, the chairman of the People's Committee of Dang Ha joins us, and our political charabanc stuffed with seven officials sets out across the green and gold countryside, along crisscrossing lanes. The chairman tells us proudly how he was born on January 31 1968, the night of the Tet offensive, the turning point of the war, when the Viet Cong launched its assault on US positions. By the time we stop, we are all the best of friends and, holding hands, he pulls us into the home of the Pham family, where a wall of neighbours and an assembly of local dignitaries dressed in shiny, double-breasted jackets stare grimly at a moaning child. He lies on a mat on the floor, his matchstick limbs folded uselessly before him, his parents taking it in turns to mop his mouth, as if without them he would drown in his own saliva.

Hoi, the boy's mother, tells us how she met her husband when they were assigned to the same Viet Cong unit in which they fought together for 10 years. But she alone was ordered to the battle of Truong Hon mountain. "I saw this powder falling from the sky," she says. "I felt sick, had a headache. I was sent to a field hospital. I was close to the gates of hell. By the time I was discharged, I had lost the strength in my legs and they have never fully recovered. Then Ky was born, our son, with yellow skin. Every year his problems get worse." Her husband, Hung, interrupts: "Sometimes, we have been so desperate for money that we have begged in the local market. I do not think you can imagine the humiliation of that."

And this family is not alone. All the adults here, cycling past us or strolling along the dykes, are suffering from skin lesions and goitres that cling to necks like sagging balloons. The women spontaneously abort or give birth to genderless squabs that horrify even the most experienced midwives. In a yard, Nguyen, a neighbour's child, stares into space. He has a hydrocephalic head as large as a melon. Two houses down,

Tan has distended eyes that bubble from his face. By the river, Ngoc is sleeping, so wan he resembles a pressed flower. "They told me the boy is depressed," his exhausted father tells us. "Of course he's depressed. He lives with disease and death."

This is not a specially constructed ghetto used to wage a propaganda war against imperialism. The Socialist Republic of Vietnam has long embraced the free market. This is an ordinary hamlet where, in these new liberal times, villagers like to argue about the English Premiership football results over a glass of home-brewed rice beer. Here live three generations affected by Agent Orange: veterans who were sprayed during the war and their successors who inherited the contamination or who still farm on land that was sprayed. Vietnam's impoverished scientific community is now trying to determine if there will be a fourth generation. "How long will this go on?" asks Dr Tran Manh Hung, the ministry of health's leading researcher.

Dr Hung is now working with a team of Canadian environmental scientists, Hatfield Consultants, and they have made an alarming discovery. In the Aluoi Valley, adjacent to the Ho Chi Minh trail, once home to three US Special Forces bases, a region where Agent Orange was both stored and sprayed, the scientists' analysis has shown that, rather than naturally disperse, the dioxin has remained in the ground in concentrations 100 times above the safety levels for agricultural land in Canada. It has spread into Aluoi's ponds, rivers and irrigation supplies, from where it has passed into the food chain, through fish and freshwater shellfish, chicken and ducks that store TCCD in fatty tissue. Samples of human blood and breast milk reveal that villagers have ingested the invisible toxin and that pregnant women pass it through the placenta to the foetus and then through their breast milk, doubly infecting newborn babies. Is it, then, a coincidence that in this minuscule region of Vietnam, more than 15,000 children and adults have already been registered as suffering from the usual array of chronic conditions?

"We theorise that the Aluoi Valley is a microcosm of the country, where numerous reservoirs of TCCD still exist in the soil of former US military installations," says Dr Wayne

Dwernychuk, vice-president of Hatfield Consultants. There may be as many as 50 of these "hot spots", including one at the former US military base of Bien Hoa, where, according to declassified defence department documents, US forces spilled 7,500 gallons of Agent Orange on March 1 1970. Dr Arnold Schechter, a leading expert in dioxin contamination in the US, sampled the soil there and found it to contain TCCD levels that were 180 million times above the safe level set by the US environmental protection agency.

It is extremely difficult to decontaminate humans or the soil. A World Health Organisation briefing paper warns: "Once TCCD has entered the body it is there to stay due to its uncanny ability to dissolve in fats and to its rock solid chemical stability." At Aluoi, the researchers recommended the immediate evacuation of the worst affected villages, but to be certain of containing this hot spot, the WHO also recommends searing the land with temperatures of more than 1,000C, or encasing it in concrete before treating it chemically.

At home, the US takes heed. When a dump at the Robins Air Force Base in Georgia was found to have stored Agent Orange, it was placed on a National Priority List, immediately capped in five feet of clay and sand, and has since been the subject of seven investigations. Dioxin is now also a major domestic concern, scientists having discovered that it is a by-product of many ordinary industrial processes, including smelting, the bleaching of paper pulp and solid waste incineration. The US environmental protection agency, pressed into a 12-year inquiry, recently concluded that it is a "class-1 human carcinogen".

The evidence is categoric. Last April, a conference at Yale University attended by the world's leading environmental scientists, who reviewed the latest research, concluded that in Vietnam the US had conducted the "largest chemical warfare campaign in history". And yet no money is forthcoming, no aid in kind. For the US, there has only ever been one contemporary incident of note involving weapons of mass destruction - Colin Powell told the UN Security Council in February that, "in the history of chemical warfare, no country has had more battlefield experience with chemical weapons since world war one than Saddam Hussein's Iraq".

The US government has yet to respond to the Hatfield Consultants' report, which finally explains why the Vietnamese are still dying so many years after the war is over, but, last March, it did make its first contribution to the debate in Vietnam. It signed an agreement with a reluctant Vietnamese government for an \$850,000 (£543,000) programme to "fill identified data gaps" in the study of Agent Orange. The conference in Hanoi that announced the decision, according to Vietnamese Red Cross representatives who attended, ate up a large slice of this funding. One of the signatories is the same US environmental protection agency that has already concluded that dioxin causes cancer.

"Studies can be proposed until hell freezes over," says Dr Dwernychuk of Hatfield Consultants, "but they are not going to assist the Vietnamese in a humanitarian sense one iota. We state emphatically that no additional research on human health is required to facilitate intervention or to protect the local citizens."

There is cash to be lavished in Vietnam when the US government sees it as politically expedient. Over the past 10 years, more than \$350m (£223m) has been spent on chasing ghosts. In 1992, the US launched the Joint Task Force-Full Accounting to locate 2,267 servicemen thought to be missing in action in Vietnam, Cambodia and Laos. Jerry O'Hara, spokesman for JTF-FA, which is still searching for the remains of 1,889 of them, told us, "We don't place a monetary value on what we do and we'll be here until we have brought all of the boys back home."

So it is that America continues to spend considerably more on the dead than it does on the millions of living and long-suffering - be they back home or in Vietnam.

The science of chemical warfare fills a silent, white-tiled room at Tu Du hospital in Ho Chi Minh City. Here, shelves are overburdened with research materials. Behind the locked door is an iridescent wall of the mutated and misshapen, hundreds of bell jars and vacuum-sealed bottles in which human foetuses float in formaldehyde. Some appear to be sleeping, fingers curling their hair, thumbs pressing at their lips, while others with multiple heads and mangled limbs are listless and

slumped. Thankfully, none of these dioxin babies ever woke up.

One floor below, it is never quiet. Here are those who have survived the misery of their births, ravaged infants whom no one has the ability to understand, babies so traumatised by their own disabilities, luckless children so enraged and depressed at their miserable fate, that they are tied to their beds just to keep them safe from harm

### **Special report**

[United States of America](#)

### **More coverage from around the web**

[Weblog special: terror in the US](#)

[Weblog special: America at war](#)

### **World news guide**

[North America](#)

### **Media**

[New York Times](#)

[Washington Post](#)

[CNN](#)

### **Government**

[US government portal](#)


[White House](#)

[Senate](#)

[House of Representatives](#)

---

[Printable version](#) | [Send it to a friend](#) | [Save story](#)

Daily sections 

Weekly sections 



[Privacy policy](#) | [Terms & conditions](#) | [Advertising guide](#) | [A-Z index](#) | [About this site](#)  
[Join our dating site today](#)

Guardian Unlimited © Guardian News and Media Limited 2007