

**THE WAR IN INDOCHINA**

Arthur H. Westing

A stand of mangroves destroyed by herbicide: 'Remember, only we can prevent forests'

## When the Landscape Is the Enemy

Once again, U.S. policy in Vietnam was on public trial. And once again, an odd assortment of public figures—U.N. Secretary-General Kurt Waldheim, World Council of Churches head Dr. Eugene Carson Blake and actress Jane Fonda—were hurling the charges. The U.S., they claimed, was bombing North Vietnam's elaborate system of dams and dikes and thus threatening to cause disastrous flooding in the rainy months ahead. Gradually, the critics began to find an audience, and last week, obviously feeling the heat of world opinion, the Nixon Administration moved to counter the attacks. Calling Waldheim and similar critics "well-intentioned [but] naïve," the President himself coolly told a news conference: "If it were the policy of the United States to bomb the dikes, we could take them out . . . in a week." Then, to document Mr. Nixon's defense, State Department officials released an intelligence report concluding that "stray" U.S. bombs had inflicted only minor damage on North Vietnam's dikes.

The report—an eight-page assessment compiled largely by the Central Intelligence Agency—was based on recent reconnaissance photos of North Vietnam's entire 1,100-mile dike system. And although Washington

did not release the intelligence pictures, it gave some newsmen a peek. "Of the 12 locations where damage has occurred [to the dikes]," said the report, "10 are close to identified [military] targets." In addition, the report charged that the North Vietnamese were making no serious effort to repair the damage, presumably because they want to use the "evidence" for propaganda purposes.

It seemed unlikely, however, that the Administration's own propaganda campaign would change many minds one way or the other. For, in a sense, the controversy over the bombing of the dikes has become a symbol of a far larger issue—the intense debate over the way the U.S. has waged war in Indochina as a whole. In Vietnam, on a scale unprecedented in the history of warfare, the landscape itself has become an enemy subjected to systematic destruction. In order to get at the elusive Communists, the U.S. has ravaged jungles with millions of tons of bombs and shells, sprayed thousands of acres of farmlands and forests with deadly herbicides and sent teams of giant bulldozers to cut huge swaths through the jungles. Today, from the skies over some parts of Vietnam, the tary observer put it: "The land looks as

if it had been torn by an angry giant."

But how serious and long-lasting is the impact of a decade of ecological warfare likely to be? In the eyes of many scientists, the U.S. has been guilty of nothing less than ecocide—that is, the intentional destruction of a functioning, life-supporting environment. Last week, that charge appeared to strike a responsive chord on Capitol Hill when the Senate voted to outlaw two of the more exotic ecological weapons: firestorms and rain making.

**Moral Question:** To other equally reputable scientists, however, the damage appears far too limited to warrant the term ecocide. In fact, not enough field studies have been made to support either view and, so far, much of the speculation on both sides seems inextricably bound up with the larger moral question of the legitimacy of U.S. entry into the war in the first place. Yet whatever the ultimate judgment on that, one thing seems certain: the long American involvement has literally changed the face of Indochina.

By far the most widely used weapons in the U.S. arsenal of ecological warfare (see page 26) have been herbicides, or defoliants. Designed to remove the thick canopy of jungle, they were intended to uncover enemy troop movements, the defoliants—la-



U.S. bomb craters disfigure Vietnam farmland: 'The land looks as if it had been torn by an angry giant'

beled according to the color on their containers as "Agents Orange," "Blue" and "White"—were first used as far back as 1961. By the time mounting pressure from scientists forced the Nixon Administration to abandon the program (code-named operation "Ranch Hand") in 1970, U.S. pilots had sprayed almost one-tenth of South Vietnam's cropland and nearly one-third of the country's total forest acreage. The unofficial motto of the pilots who conducted "Ranch Hand": "Remember, only we can prevent forests."

To a considerable degree, they made good on their boasts. Two years ago, Harvard Prof. Matthew S. Meselson and a team of researchers under the auspices of the American Association for the Advancement of Science found that half of South Vietnam's mangrove forests—or roughly 540 square miles—had been "utterly destroyed" by herbicides and showed no signs of recovery. But the damage to the nation's hardwood forests has been somewhat less dramatic. Sprayed into the dense triple canopy jungle, Agent Orange usually dissipated in the tree tops, and generally such areas have regenerated quickly. Often, however, the removal of the upper canopy has caused subtle changes at ground level, allowing bamboo and other worthless but hardy jungle weeds to invade the rich forests.

In addition to the massive defoliation campaign, the U.S. military also relied on pure explosive power to clear South

Vietnamese territory. To provide instant helicopter landing zones, the Air Force has dropped so-called "Daisy Cutter" or "Cheeseburger" bombs. Detonated a few feet above the ground, the bombs leave no crater but level an area the size of a football field. For bigger jobs, the U.S. turned to the 32-ton Rome Plow bulldozers. Sometimes operating twenty abreast, these monsters scraped away some 800,000 acres of land (roughly the area of Rhode Island) before retiring early this year. As they ripped through the landscape, they piled precious topsoil in heaps—leaving it to wash away with the next rain. Occasionally, moreover, the tractor operators exhibited a rather cavalier attitude toward the land. In Binh Long Province, some gouged a mile-long image of the First Infantry Division's "Big Red One" insignia into the earth.

**Exotic:** Another ecological weapon turned out to be an expensive failure. After years of testing, the U.S. military—with the help of experts detached from the U.S. Forest Service—attempted in 1966 and 1967 to ignite huge firestorms to clear parts of the South Vietnamese jungle. These missions, nicknamed "Pink Rose" and "Sherwood Forest," failed because the jungle was simply too moist to burn. "It produced a lot of smoke and not a whole heck of a lot of fire at all," recalled one Pentagon official recently. Also in the realm of exotic weaponry, the U.S. has reportedly seeded clouds and

attempted—with only limited success—to increase rainfall over the Ho Chi Minh Trail in order to hinder the movement of enemy supplies.

Oddly, in fact, these arcane ecological weapons proved less damaging than more conventional types, such as ordinary bombs and shells. According to two longtime students of Vietnam's ecology, Profs. Arthur H. Westing and E.W. Pfeiffer, the U.S. has gouged more than 21 million bomb craters—each roughly 30 feet in diameter and more than 5 feet deep—into the South Vietnamese landscape over the past decade. Like a giant pox, the craters cover some 345,000 acres and have displaced a total of more than 3 billion cubic yards of earth. In the Mekong Delta, says Pfeiffer, where the water table is less than 5 feet below ground level, the craters fill quickly with water, and since there are no predatory fish in the craters to eat larvae, the ponds soon become vast breeding grounds for malaria-bearing mosquitoes.

But that is not the only problem caused by the massive outpouring of heavy ordnance. By the Pentagon's own estimate, 1 to 2 per cent of all U.S. bombs and shells are duds, which means that after years of bombing, some areas of the countryside have become virtual minefields of unexploded devices. Worse yet, shrapnel has lodged in countless trees, promoting fungal rot and making timbering extremely difficult. And since heavy bombs tend to compact the earth

rather than heaving it out of the holes they create, filling the craters will be no simple task. In some cases, moreover, the violent concussions have changed the very composition of the soil. "We know that the bomb craters, the defoliants and chemical influences of the war have had effects," says A. Van Der Sluijs, a UNESCO geologist who is advising the South Vietnamese Government on ecological problems. "But the soil is a living world. It's a whole cycle, and when just one element is upset, it interrupts a whole chain of processes and living things which depend on it."

Some scientists contend that the U.S. campaign of deliberate destruction has inflicted permanent ecological damage. As evidence, they point to some World War I battlefields in France that have yet to recover from that conflict.\* Other scientists, however, do not think the situation is quite that bad. In the first place, they cite the astonishing paucity of rigorous scientific study of the impact of U.S. weaponry on Vietnam's ecology. While a component of Agent Orange has been shown to cause birth defects in

\*In the cataclysmic trench warfare at Verdun, more than 39,000 wooded acres were almost totally devastated. And although French forestry officials long ago launched a massive reclamation project, the land still bears the scars of war. Unexploded shells remain buried in the earth, and pine trees planted in the 1920s have grown uncommonly slowly and are malformed and unusually susceptible to disease. Says one official: "It will take at least another hundred years before all the World War I damage has been repaired and we have a normal forest again."

laboratory animals, for example, there have been no studies linking the herbicide with any human ailment. What's more, some observers say that such men as Westing and Pfeiffer simply do not have enough data to justify their pessimistic projections. Administration scientists, in particular, point out with pride that malaria rates in South Vietnam actually declined last year and that the extensive Rome plowing has paradoxically contributed to an increase in South Vietnam's available crop land.

**'Lunarized':** Many of the Administration's arguments sound self-serving. But many people, both in and out of government, take issue with the pessimists—particularly on the extent of the damage. To be sure, certain areas such as Quang Tri, Pleiku and Kontum provinces and the so-called Iron Triangle have taken a vicious battering and the local ecosystems have surely suffered serious damage. But South Vietnam is by no means the parched, "lunarized" country some war critics depict. Even along the Ho Chi Minh Trail, which has been bombed almost daily for years, there was enough jungle vegetation left to cover the movement of a staggering number of Communist tanks and trucks before this spring's enemy offensive. "Hard as it is to credit, the countryside of Vietnam is *not* a desert," wrote Edmund Stillman, a harsh critic of the military conduct of the war, after a recent visit

to Indochina. "The eco-system is surprisingly hard to destroy."

At the same time, many people contend that the devastation in Vietnam is no worse than that wreaked upon Dresden or Tokyo during World War II. And in terms of pure physical damage, their point seems well-taken. But these cities, say the critics, are manmade eco-systems, which are relatively easy to rebuild. The Vietnamese countryside, on the other hand, is a delicate natural system—once disrupted, it may never fully recover.

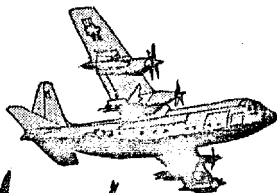
Ultimately, however, perhaps the most serious and long-lasting effect of the U.S. war against the land in Vietnam has been the expulsion of the people from it. Although the land has always been the cornerstone of Vietnamese life, the fury of war has forced millions of peasants to abandon their rural heritage and to move into the nation's squalid cities. Social scientists say these people will never be the same, and therein may lie the ultimate tragedy of the war and the apogee of ecocide. The damaged trees may grow back, but Vietnam's centuries-old culture has suffered permanent damage. For with many areas still seeded with booby traps and mines, with farms and forests cratered and stripped and with the addiction to urban living now established, it seems certain that many of Vietnam's onetime countryfolk will never return to enjoy and use the land they were once so much a part of.

## Weapons That Changed the Face of Vietnam

### Fire Bombing

PROJECTS "SHERWOOD FOREST" AND "PINK ROSE"

Using World War II magnesium incendiary bombs, the U.S. has tried to burn large sections of damp rain forests —unsuccessfully



### Land Clearing

"DAISY CUTTER" AND "CHEESEBURGER"

A 15,000-pound concussion bomb creates helicopter landing zones by scything everything that grows in a 3-acre area

### Ground Stripping

ROME PLOWS

Bulldozers with 11-foot blades have scalped 800,000 acres of forests to deny coverage to North Vietnamese and Viet Cong troops

### Rain Making

PROJECTS "POPEYE" AND "INTERMEDIARY COMPATRIOT"

By dropping silver iodide crystals above Vietnam, the U.S. has attempted to make it rain on the flow of troops and matériel from North Vietnam into the south

### Defoliation

AGENTS "BLUE," "ORANGE" AND "WHITE"

Named for the color codes on their shipping drums, these herbicides have denuded 6 million acres of trees and crops—an area the size of the State of Massachusetts

