indicated a complete shut down [sic] of all herbicide operations in SEA. RANCH HAND IS STILL IN OPERATIONS [sic]." Despite this bravado, the demise of the unit was only matter of time. In October COMUSMACV ordered consolidation of the remaining 1.6 million gallons of Orange herbicide in Vietnam, following instances of unauthorized use by the Army's Americal Division. On 4 December, further shipments of Blue herbicide to Vietnam were cancelled by DOD, leaving RANCH HAND insufficient chemical stocks to complete even the targets already approved. Thus, it was no surprise when the White House announced on 26 December that the United States had decided on an "orderly, yet rapid phase-out" of the herbicide program. Meanwhile, the announcement said, there would be "strict conformance in Vietnam with policies governing the use of herbicides in the United States."[51]

Three days later, the American Association for the Advancement of Science (AAAS) released a special committee's report which was highly critical of crop destruction in Vietnam. The committee's main finding was that the civilian populace, rather than the Viet Cong, bore the primary burden of the program. The study noted that the same conclusion had been reached earlier by Defense Department-sponsored studies, but had been disregarded by military leaders.[52]

RANCH HAND flew its last three sorties on 7 January 1971, exactly nine years to the day from the arrival of the first C-123 spray planes at Tan Son Nhut Airport. The final herbicide mission was against a target in Ninh Thuan Province, not far from Phan Rang. On 28 January, the JCS officially cancelled all further USAF crop destruction missions.[53] RANCH HAND crewmen continued flying the two insecticide aircraft for several months more, but the project to save lives at the cost of vegetation was ended. The controversy over America's experiment in herbicidal warfare would continue, but ~~the men who flew~~ the lumbering unarmed transports at tree-top level completed their task ~~in the same way they began, undaunted and unashamed.~~ Like the other veterans of the war in Vietnam, the members of RANCH HAND, which the press called the most shot-at Air Force unit in South Vietnam, returned home unwelcomed, unhonored, and unknown.

CHAPTER XII

CRITICS OF HERBICIDAL WARFARE: PROPAGANDA, PROTEST, AND INVESTIGATIONS

From the beginning, the herbicide program in Vietnam aroused intense opposition through the world, partially as a product of an international movement dating from the 1890s against chemical warfare in general, partly because of scientific concerns for the environment as expressed in Rachel Carson's Silent Spring, and, in a large measure, as the result of propaganda aimed against American intervention in Southeast Asia.[1] As the program in Vietnam grew, so did ~~expressed opposition~~ public outcry, particularly ~~within~~ in the United States. Eventually, domestic political pressure helped lead the American government to renounce herbicidal warfare, despite objections from United States military officials in South Vietnam who viewed it as necessary to troop security. Ironically, ~~the~~ a ~~one~~ military weapon specifically intended not to cause direct injury to living beings became the center of a controversy akin to that aroused by ~~the debate over~~ the most massive death-dealing (causing) weapon, the nuclear bomb.

As already noted, intra-governmental discussions concerning the experimental and test phases of the herbicide project revolved at first around balancing potential military gains against the obvious "chemical warfare" propaganda advantage it would give to the North Vietnamese and their supporters. The results of the first tests appeared to favor the latter--"operational benefits of defoliant operations is assessed as only marginal." An early criticism of the program, ~~the comment of~~ the senior Australian military representative in Saigon, Colonel Serong, argued that defoliation actually aided ambushers by removing foliage along the roads which could be used for cover by those ambushed. ~~was~~ Repeatedly quoted ~~by~~ later ~~critics~~ as an example of the uselessness of the project, ~~although it~~ his was, in fact, only one person's view. Roger Hilsman,* a constant critic, was among those who made an aerial inspection of initial test areas and pronounced them "not very impressive." Hilsman reported:

* ----

> The leaves were gone, but the branches and trunks remained. Even if they had not, it was not leaves and trunks that guerrillas used for cover, but the curves in the road and the hills and valleys.[2]

These criticisms ignored the experimental nature of the effort--researchers were trying to determine what chemicals and what amounts would be effective--and, in at least Hilsman's case, the observer hardly was qualified to provide a worthwhile evaluation after only a brief glimpse from high above the test site.[3]

The main issue in Washington was military utility versus political liability. Defense Department officials generally emphasized the tactical and strategic advantages of denying cover to the enemy as a vital aspect of a successful guerrilla campaign. Later, they supported the food denial program primarily because it would help separate active guerrillas from the general populace upon whom they were dependent. Politically sensitive strategists, on the other hand, focused on the negative aspects of the project which could be used by enemy propagandists to rally world opinion and moral condemnation against the United States for practicing, even peripherally, a particularly repugnant type of warfare. ~~This was a telling argument in a nation which took excessive pride in its self-perceived image of goodness and fair play.~~[4]

A related question concerned the morality of a form/image of warfare which placed a major burden on the civilian population, particularly since they often appeared either apathetic toward the enemy or supportive of the side favored by the United States. A constant theme of critics of the crop destruction program was that differentiation between civilian and VC cultivations was impossible. Nutritionist Jean Mayer also cited historical evidence that wartime food shortages also strike hardest at "the weakest element of the civilian population"--children, child-bearing women, and the elderly--while effecting the fighting men "last and least, if at all." Mayer concluded in 1967 that "from a military viewpoint, the attempt to starve the Viet Cong can be expected to have little or no effect."[5]

Defense Department-sponsored studies in 1967 came to the same conclusion. Through interviews with VC prisoners and civilians from

VC controlled areas, RAND Corporation investigators determined that, through coercion, the Viet Cong transferred the burden of deprivation to local peasants. At the same time, because most crops destroyed were civilian-owned and cultivated, the indigenous population blamed the United States and the Saigon government for their economic hardships. Local farmers knew little of the purpose of spray operations in the larger sense, seeing only the immediate damage to their personal property and their family's welfare by an apparently indifferent central government and its allies. An indemnification program to compensate innocent and friendly victims of the chemical attacks failed to provide relief where intended, and thus failed to counter the propaganda advantage the program gave the VC.[6]

The deciding factor in continuing the initial program, however, was President Kennedy's desire to strengthen the capacity of the United States to counter political instability brought on by guerrilla forces, interventions, and subversion in developing countries. Indeed, Kennedy reportedly had something of an obsession with counter-insurgency warfare in general. At the same time, the opposition of Hilsman and others was somewhat negated by the question of whether common plant-regulating agricultural compounds even fell within the body of proscribed materials associated with chemical warfare. Beyond that, herbicide experimentation was only one very small aspect of Kennedy's expanded conventional counterinsurgency role for the United States armed forces, in place of the Eisenhower reliance on massive nuclear deterence.[7]

Naturally enough, the strongest initial anti-herbicide reactions came from those targeted. Even before the arrival of the first C-123 spray planes in Vietnam in January 1962, local insurgent cadres were planning a propaganda campaign against the herbicide project, based on the effects of the 1961 tests. Villagers were warned that the defoliants were poisonous and were urged to flee the area "into the wind" as soon as spraying was observed. The NLF characterized the chemical attacks as a direct assault on the common people by the foreign-dominated Saigon government, rather than as a counter to the Viet Cong. The major international propaganda effort ~~was left to~~ came from the

Tass echoed accusations that the United States Air Force was using "poison gas" and called for an international investigation of the use of poisonous substances against civilians.[10]

Claims that the United States was killing innocent people in Laos, Cambodia, and South Vietnam with toxic chemicals were regularly repeated, frequently in association with reports that the fatal substance was a yellow powder. According to Voyennaya Mysl' (Military Thought), a classified monthly organ of the Soviet Ministry of Defense, the number of South Vietnamese victims of chemical agents increased from 150,000 in 1965 to "several hundred thousand" in 1966. In 1968, "Neo Lao Hak Sat, a representative of the Party Central Committee," reported the death of two hundred people in Lower Laos as a result of toxic sprays in March and April. In most cases, independent investigators were not allowed to immediately confirm the harm to human beings and animals, or to obtain samples of the "poisonous substances." When observers were permitted, it was usually well after the time of the incident, when definitive evidence was no longer available.[11]

In light of Cambodian charges in 1964 concerning the use of "poisonous yellow powder," it was significant that a 1968 Soviet article about chemical weapons listed dinitoorthocresol (Russian abbreviation: DNOK), "a yellow powder which is a derivative of nitrophenol," under the heading "toxic characteristics of some of the weed and pest killers being used in Vietnam," although American herbicides used in Vietnam were all liquids, not powders. This article also charged that "American aggressors" were "climbing the stairway of war escalation" while disregarding "morality, conscience and international law." Russian propaganda peaked in 1971 when Soviet Engineer Major L. Nechayuk claimed that during the "perfidious operation . . . massive spraying killed all forms of life--plants, birds, animals, and even human beings." Nechayuk charged "the barbarians from the Pentagon" with launching "chemical warfare on the soil of Vietnam" in violation of the most elemental standards of human conduct and of accepted international law, citing the Geneva Protocol of 1925.[12]

Innovative twists occasionally surfaced amid the barrage of communist charges and stories. In 1966, an attempt to influence Catholic opinion occurred when Joseph Mary Ho Hue Ba, Catholic representative of the NLF, announced that United States defoliants were killing newborn babies of Roman Catholic families. It was emphasized that these deaths were particularly reprehensible because they occurred before the babes could be baptized. Later, after initial US reports of 2,4,5-T related teratogenic effects on laboratory animals, Hanoi compared the victims of herbicide toxicology to the survivors of the atomic bombings of Nagasaki and Hiroshima, claiming that both suffered the same genetic future of "miscarriages, congenital anomalies and frequent monstrosities." Cuban authorities provided visual evidence of the herbicide results by issuing a series of postage stamps labeled "Genocide in Vietnam." On the stamp depicting the results of chemical warfare, the bodies of dead and dying Vietnamese were shown lying on the ground, supposedly the result of an American chemical attack.[13]

Considerable censure of American policies came from outside the Communist Bloc countries. The foremost British critic, Lord Russell, compared the use of napalm and herbicides in Southeast Asia to the illegal and immoral warfare of Germany and Japan in World War II, and sponsored an "international war crimes tribunal" to try various American officials in absentia on several charges, including "the use of poison chemicals against innocent victims." The defendants included President Lyndon Johnson, Secretary of State Dean Rusk, and Secretary of Defense Robert McNamara.[14]

It was announced that the trial would feature testimony only from people such as journalists, former servicemen, and victims from both North and South Vietnam; no "decision-makers" would be allowed to testify. Besides Lord Russell, the tribunal was made up of sixteen prominent leftists, including Dr. Josue de Castro, former head of the United Nations Food and Agriculture Organization, ex-President Lazaro Cardenas of Mexico, French playwright Jean Paul Sartre, French author Simone de Beauvoir, and Italian lawyer Lelio Basso, editor of the International Socialist Journal. Initially, the trial was to be held

in either London or Paris, but government opposition in these capitals eventually caused it to convene in Stockholm after a delay of several months. In the interim period, Russell maintained media interest by repeatedly promising to produce documentary evidence of toxic chemical effects. When the panel finally met, however, the trial served merely as a reiteration of previous communist propaganda, and Russell's evidence proved to be no more than unsubstantiated statements by several Vietnamese and the diary of a North Vietnamese "doctor." The Royal Shakespeare Company in London took advantage of the notoriety of the subject by performing a play entitled "US," which featured "screams and allusions to napalm, gas, bullets, defoliation, and immolation."[15]

In Japan, Yoichi Fukushima, head of the Japanese Science Council's Agronomy Section, claimed that "appalling inhumane acts" had ruined over 3.8 million acres of land in Vietnam, while destroying more than 13,000 livestock and killing over 1,000 peasants. The Science Council, which included seventy senior Japanese scientists, protested the use of herbicides in war as "an abuse of the fruits of science." The Foreign Ministry of mainland China saw the chemical operations as evidence of the desperation of western governments, commenting that "all decadent reactionary forces invariably resort to the most ruthless and dispicable means in putting up a last-ditch struggle."[16]

This international reaction to the American herbicide program had little immediate impact on the United States government; its primary effect was to refocus American scientific attention onto this particular aspect of the US war effort. Although the main thrust of Rachael Carson's 1962 publication had been to arouse widespread apprehension over the biological and ecological results of indiscriminate use of pesticides, Carson also had warned of the unknown consequences of using weedkillers: "The full maturing of whatever seeds of malignancy have been sown by these chemicals is yet to come." Written before the Vietnamese experiments, the author's focus was on common domestic weedkillers used in the United States, but two of the chemicals she specifically singled out (2,4-D and 2,4,5-T) were

primary ingredients in the military herbicides developed for the Asian conflict. Now, as the use of these herbicides expanded in 1965-66, so did the amount of critical literature from within American scientific circles.

Initial articles concerning the herbicide project were little more than informative, but limited, reports of the existence of the program, primarily appearing in major newspapers as part of the continuing coverage of the conflict in Vietnam, and in professional military journals, such as Army and the Armed Forces Chemical Journal. An article in the former magazine in 1963 by Lieutenant Colonel Stanley D. Fair discussed both initial spray tests and operational evaluations, including descriptions of the chemicals used, the methods of application, and the general effectiveness of this tactic. A short discussion (six pages) of the use of herbicides also appeared in a controversial 1963 book by Wilfred G. Burchett which was very critical of the role of the United States in Vietnam and Laos.[18]

The first detailed reports of American chemical operations appeared in the popular press in 1965, paralleled by several stories describing damage to civilian crops as a result of USAF spraying. These stories caused the Federation of American Scientists to condemn "field testing" by the United States of "weapons of indiscriminate effect," noting that their use would hurt the United States in the long run, "even if military effectiveness in a specific situation can be demonstrated."[19]

The controversy expanded rapidly in 1966, with more descriptions of the herbicide project appearing regularly in newspapers and such diverse publications as Flying, Farm Chemicals, and Christian Century. In January, twenty-nine scientists and physicians from schools and institutions around Massachusetts issued a statement condemning the crop destruction program and urging the President to forbid the use of such weapons. Jean Mayer, of the School of Public Health at Harvard University, added his voice to the protest with a letter in Science in April in which he claimed that the entire food denial program would fail in its aim. In September, President Johnson received a letter from the American Society of Plant Physiologists indicating their

1967 convention, in particular, was torn by dissidence, resignations, and interruptive tactics of radical activists supporting various causes. At the Dallas convention in 1968, the AAAS Board finally agreed to a compromise resolution to name a committee to prepare plans for a field study of both ecological risks and benefits. In the meantime, the Society for Social Responsibility in Science arranged to send two prominent scientists, Gordon H. Orians and Egbert W. Pfeiffer, on a fifteen-day inspection tour of Vietnam during March 1969. In their report, Orians and Pfeiffer urgently called for a major research effort to determine the long-term effects of herbicide use in Vietnam, specifically urging the AAAS to play a leadership role in setting up the organization.[23]

A study of far-reaching consequences to the herbicide issue also came to light in 1969. Five years earlier, in 1964, the National Cancer Institute of the Department of Health, Education, and Welfare had commissioned the Bionetic Research Laboratory of Bethesda, Maryland, to study the carcinogenic and teratogenic effects of several widely-used chemical compounds. A preliminary report in 1966 indicated, among other results, that small amounts of 2,4-D and even smaller amounts of 2,4,5-T caused birth defects in laboratory rats and mice. This report apparently did not reach the Food and Drug Administration until 1968, and was not seen by Agriculture or Defense Department officials until 1969, when part of the report was made public. The teratogenic results of the study were later verified by Dr. Jacqueline Verrett of the FDA, using chick embryos.[24]

When questioned about why the report was suppressed, a White House staffer reportedly claimed that release of the report would have helped the anti-war movement and added to international criticism of American chemical warfare. An FDA spokesman blamed pressure from chemical companies, particularly Dow Chemical, as the main cause.[25]

The United States government was not alone in suppressing news of possible human-damaging effects of the defoliants. The Saigon government shut down Tin Sang, when that newspaper published reports of fetus deformations in Tan Hoi hamlet; three others were also closed down for "interfering with the war effort" after printing stories

continued long after phase-out of RANCH HAND operations. Numerous books and articles kept the argument alive, although public interest ebbed over time. Wartime conditions and, subsequently, an unfriendly government in Saigon, prevented actual on-scene investigation, leaving authors to rely on past incomplete data and speculation. Even the most carefully researched studies, moreover, were subject to misinterpretation or misreporting.

In 1970, while the AAAS commission was preparing its report, Congress finally had ordered the independent study of herbicide effects that scientists had been demanding. Under Public Law 91-441, the Department of Defense was directed to contract with the National Academy of Sciences (NAS) for an extensive investigation. NAS appointed a committee of seventeen experts from six countries, chaired by Dr. Anton Lang from Michigan State University, a plant physiologist and world authority on plant hormones, and aided by the President of the National Scientific Council of South Vietnam, Le Van Thoi. After an exhaustive investigation, the committee made a report to Congress in 1974 which differed significantly from the pessimistic tone of earlier anti-herbicide articles. In particular, the NAS Forestry Study Team disagreed with Arthur Westing, and others, on the loss of merchantable timber in Vietnam, estimating loss at no more than two million cubic meters, versus the forty-five million cubic meters estimated by Westing.[37]

The NAS committee also found no evidence to verify birth defects or other direct health damage to human beings, in spite of considerable effort in this area. Despite earlier claims of sterilized soil and permanent damage to agricultural lands caused by defoliant chemicals, Dr. Lang reported soils were capable of sustaining growth as soon as six weeks after spraying and that a year after spraying the effect on plant growth was "undetectable."[38]

Unfortunately, when released the impact of the studies' findings was negated by a widely publicized fraudulent earlier report of the results. An Academy member, who disagreed with the study findings, gave the New York Times a "summary" of the report on 22 February, before the actual study was released. According to later critics, the

story the Times rushed into print, either through deliberate misinformation or accidental misunderstanding, "grossly misrepresented the findings of the scientific study group." The distortion was compounded because the story was fed to 362 newspapers subscribing to the New York Times News Service. Despite numerous protests, the Times did not correct the front-page headlined article for several months, and did not print a letter to the Times from Dr. Lang, the committee chairman, complaining about the proported inaccuracies. The Times later was criticized by the National News Council for its actions, and the Council of the National Academy of Sciences had the President of the Academy publish an apology to the study committee for the adverse effect on their report of the distorted article.[39]

The exposés of Watergate and the collapse of the Saigon government before the VC/NVA onslot in 1975 pushed the herbicide issue into the backwater of history, but it had not sunk wholly out of sight. When the Defense Department ordered suspension of the use of herbicide orange in 1970, it created another dilemma, the problem of disposing of nearly 2.25 million gallons of the controversial chemical. After several military units illegally used stored stocks of Orange during 1971, in April 1972 all herbicides in Vietnam were ordered moved to remote Johnston Island in the Pacific for storage pending disposal instructions (Project PACER IVY). In addition to the Johnston Island storage site, another fifteen thousand drums of Orange (860,000 gallons) lay in open storage at the Naval Construction Battalion Center at Gulfport, Mississippi. One of the problems facing disposal managers was that leaking or damaged barrels from Vietnam had been redrummed as "Orange," even though some were actually ancient barrels of high-dioxin content "Purple." Thus, each of almost twenty-five thousand fifty-five gallon drums on Johnston Island required individual testing for content before the chemical could be used, a further cost to be added to the Air Force's already large expenditure of nearly $400,000 per year to maintain the stored chemical. In any case, spreading stains on the ground along the long rows of aging, rusting drums indicated that a disposal decision soon had to be made.[40]

Initial plans to sell the herbicide back to producers for reprocessing met with widespread disinterest, and another scheme by private exporters to dilute the chemical and sell it to South America for agricultural use was rejected by the Environmental Protection Agency and the State Department. State and EPA opposition also doomed proposals to incinerate the materials at Deer Park, Texas and Sauget, Illinois, or to pour it into an empty two-and-one-half-mile-deep well in Lea County, New Mexico. Another Air Force project, to reprocess Orange herbicide to remove enough dioxin contamination to make the chemical commercially acceptable, also failed because the concentrated dioxin residues would create an even greater disposal problem.[41]

Eventually, the Air Force decided that high-temperature incineration at sea was the only way to dispose of this chemical albatross. Not until nearly three years later, however, after prolonged review by the EPA, was the necessary permit issued. In June 1977, the Dutch-owned incinerator ship Vulcanus loaded the herbicide from the Mississippi site and sailed for the Pacific. Under Project PACER HO, the Johnston Island stocks were ~~dedrummed~~ by a civilian contractor and burned in a remote area of the Pacific Ocean by the Vulcanus. The last of the herbicide was destroyed on 3 September 1977--the final step in a weapons program first suggested some thirty-five years before, during the early days of World War II.[42] Contrary to the hopes of many government officials, however, destruction of the final stores of military herbicides did not end the controversy over its use, particularly as a new apparent victim of herbicidal warfare emerged, American veterans of the war in Southeast Asia.

CHAPTER XIII

AGENT ORANGE: THE CONTROVERSY REBORN

The herbicide topic should have been dead and buried--the RANCH HAND operation was terminated, American forces withdrew from Vietnam (although without winning the "honorable peace" pledged by Richard Nixon during his 1968 campaign), victorious North Vietnamese closed the doors of Vietnam to the gaze of the outside world, and Americans gladly turned their eyes away from the discordance of their longest war and the embarrassment of abandoned South Vietnam's final days; news media ~~hawked~~ domestic disagreements and ~~new international~~ crises in Africa and the Middle East. The herbicide issue ~~would not stay buried~~, however, ~~particularly~~ as reports began to circulate concerning long-term genetic and mortality changes among American veterans of Vietnam. ~~A growing number of veterans were~~ complaining to Veterans Administration medical officers of mysterious rashes, numbness in extremities, radical behavioral changes, various malignancies, decreased sexual drive, and unexplainable weakness. Especially disquieting were the stories of increased cancer rates among veterans, and an unusually large number of severe birth deformities among children fathered by Vietnam returnees. In 1977, a Veterans Administration employee in Chicago, Maude de Victor, brought this emerging pattern of similar claims to the attention of television newsmen. A subsequent CBS network program, "Agent Orange: Vietnam's Deadly Fog," roused a storm of publicity, a fresh wave of herbicide injury claims, and a number of lawsuits against herbicide manufacturing companies. Despite a lack of scientific data substantiating the veterans claims--or even evidence documenting actual individual exposure--the issue soon achieved national prominence.[1]

The controversy led to the formation of several Vietnam veteran groups, including Agent Orange Victims International (AOVI), founded by Paul Reutersham, a terminally-ill former helicopter crew chief who blamed herbicide exposure for his colon cancer. Among the more vocal anti-herbicide organizations were the National Veterans' Task Force on

Agent Orange, National Association of Concerned Veterans, Vietnam Veterans of America, and the National Veterans Law Center. Blocked by the Feres decision of the Supreme Court, a 1950 ruling that the federal government could not be sued by military personnel for injuries suffered on active duty, even when resulting from recognized negligence, various veterans groups turned to individual suits against chemical manufacturers.[2]

The veterans also sought assistance from state legislatures, and ~~sympathetic legislators in~~ eight states passed bills providing various degrees of support or relief for the supposed victims of herbicide poisoning. One of the most comprehensive programs was that of Texas. Under ~~the~~ prodding ~~of~~ the Brotherhood of Vietnam Veterans, an Austin-based organization, and several Texas state representatives, Texas House Bill 2129 was passed in 1981 directing the State Health Department to collect data on those who claimed contact with Orange herbicide and to conduct an epidemiological study of health problems reported by Texas veterans.[3]

By the 1980s, several of the largest lawsuits had been combined into class-action suits on behalf of the thousands of servicemen who supposedly had been exposed to herbicides in Southeast Asia. These suits were being handled by some of the country's best environmental lawyers, including Victor J. Yannacone, Jr., who successfully engineered the ban on DDT a score of years before. If successful, these suits could lead to the largest awards in legal history ~~and to equally record-setting attorneys' fees.~~ The cases promised to drag on for many years, with first one court and then another allowing or disallowing various legal strategems.[4]

Although the government initially denied US ground forces were near spray areas while defoliation took place, General Accounting Office (GAO) studies identified numerous instances of possible exposure of entire units of United States Marines. Documentation for Army personnel was less reliable due to inadequate record-keeping. The Comptroller General reported to Senator Charles Percy on 10 November 1979 that "DOD's contention that ground troops did not enter sprayed areas until 4 to 6 weeks afterward is inaccurate; the

chances that ground troops were exposed to herbicide orange are higher than DOD previously acknowledged."[5]

The chances for widespread exposure appeared even more likely when the Comptroller General revealed thirty-three instances of emergency dumps of herbicide loads by RANCH HAND aircraft. Several of these emergencies occurred in the vicinity of major American airbases, and at altitudes where the chemical could have drifted over large areas, according to the Comptroller General's report. Two years later, Secretary of Health and Human Services Richard Schweiker announced that the number of identified emergency jettisons had increased to ninety, including forty-one which were "directly over or near U.S. air bases and other military installations."[6]

What Schweiker and the Comptroller General did not explain was that these emergencies almost always occurred either on take-off or while on-target; thus, the forty-one instances near US installations would almost always have involved low-altitude dumps off the end of runways at Bien Hoa, Tan Son Nhut, or Da Nang, areas in which few US servicemen were present. On-target jettisons were due to aircraft battle-damage, which meant only that a higher than normal concentration of herbicide was released in a limited area of heavy enemy activity, again, an area where no US ground forces would be at the time. Failure of officials to clarify such reports to newsmen merely served to confuse an issue already blurred by conjecture and misinformation.

The public could hardly be blamed for becoming concerned after reading accounts by investigative reporters. Reutersham claimed to have flown through "clouds of Agent Orange" as an eighteen-year-old in Vietnam, and reported the chemical so potent that "within two days [it] could topple a hardwood tree 150 feet tall." Another veteran describing his experiences remembered "a tanker plane lumbered 600 feet above, spraying an umbrella of mist on the trees below--and into the helicopter onto [him] . . ." A widow stated: "Dioxins are what they sprayed in Vietnam. They make plants grow so fast they explode, so when it gets into humans, it must do much the same."[7] Even the respected "Eric Sevareid's Chronicle," in a feature on Agent Orange,

described it as a powerful herbicide whose major component was dioxin (TCDD), a deadly poison.[8]

Story after story quoted veterans of Vietnam as saying that after the spray planes flew overhead the jungles were dripping with herbicide, or that they were "drenched" or "soaked" with the chemicals. These claims ignored the fact that at a dispersal rate of three gallons per acre (the maximum dispensing rate) the fluid coverage would amount to only .0529 teaspoons (or 4.232 drops) per square foot, assuming that all the herbicide and its fuel-oil carrier reached the surface. Scientists estimated, however, that only 6 percent of the herbicide actually reached the jungle floor in triple-layer-canopy forests, which would reduce the amount available to "soak" personnel to approximately one-fourth drop per square foot. Even the maximum rate would equate to only two and three-fourths drops in an area the size of a piece of typing paper--a rather sparse "drenching."[9]

Public sympathy and support for Agent Orange victims also was elicited by media stories and pictures of deformed children born to veterans. Birth defects ran a horrible gantlet of twisted limbs, incomplete internal organs, malfunctioning body chemistry, and mental retardation. "The defects in our children are the proof we have our problems were caused by Agent Orange," stated Frank McCarthy, a 1965 veteran of Vietnam who replaced Reutersham as president of AOVI. (FN) Rolling Stone magazine announced "the effects of dioxin on humans have been documented by veterans . . ." (FN) While such statements were obviously made by people who sincerely believed what they were saying, media repetition of these sensational [redacted] facts may have diverted attention away from other possible causal factors. Almost unnoticed in the controversy were laboratory tests indicating genetic damage in dioxin-exposed laboratory animals required exposure of the female in the species, not the male, due to the fact that male sperm production is continuous and exposure-damaged sperm would normally be cleared and replaced with healthy sperm in a matter of months. Conception of a defective fetus several years after male exposure would therefore be medically unlikely.[10]

The problem of identifying the cause of the veterans' misfortunes was compounded by the presence of various other possible causal factors, e.g., medications, illicit drug and medical narcotic use, exposure to various diseases in Southeast Asia, and even other toxic agents. The extent and frequency of drug abuse among American servicemen in Vietnam was widely known, especially among those of an age to most likely be initiating a family after their return from overseas. A rare Southeast Asian bactrial, meliodosis, also was identified in a Dow Chemical Company medical study as having effects which might explain some of the ailments blamed on Agent Orange.[11]

Even the publicity surrounding the growing controversy may have, in itself, generated some of the claims. Veterans with medical problems, or with children suffering from defects, were quick to identify their difficulties with the stories they read daily, although this may have led to inconsistencies. For example, a Florida veteran filed suit against the chemical companies, charging that defoliant exposure caused him to loose his teeth and father two children with birth defects. The claimant, however, served in Vietnam from 1970 to 1971, after the Defense Department suspended the use of Orange herbicide.[12]

The emergence of Agent Orange as an American cliche was confirmed when it served as a central plot device in the 5 March 1981 episode of a popular television comedy series, "Barney Miller." A minor criminal arrested by Police Sergeant Wojohowitz was portrayed as a RANCH HAND veteran, who claimed to have liver damage, rashes, cancer, and other miscellaneous ailments as a result of exposure to the herbicide. The story-line further implied that 2,4,5-T exposure could be a contributing factor in the character's criminal activities.[13]

Despite a continuing lack of evidence to support claims of medical problems due to herbicide exposure, in 1979 the Department of Defense bowed to pressure from veterans and their supporters and announced a long-range epidemiological study to identify possible effects of herbicide contamination. The study was slated to be under the control of the USAF School of Aerospace Medicine at Brooks AFB, Texas, and its subjects would be the approximately 1200 surviving

members of the RANCH HAND organization, the only group whose herbicide exposure could be accurately documented by type, time, and frequency. Simulated spray mission experiments also indicated that exposure levels for airmen on spray missions was as much as 1,000 times the maximum levels experienced by personnel on the ground in target areas. Thus, if health or genetic damage were a resultant of defoliant exposure, it could be expected to be most prevalent among the former aircrew members and the servicing personnel who handled the chemicals on a daily basis.[14]

Although some litigants and claimants hailed the RANCH HAND study as a step in the right direction, there were complaints concerning the limited spectrum of persons selected for evaluation, and protests that Air Force control of the project might lead to suppression of findings unfavorable to military interests. A special panel of the National Academy of Sciences and the National Research Council criticized the USAF study protocol because of the limited size of the study group, the short time for which the study proposed to follow the health of the group (six years), and the credibility of conclusions, "given the temper of the times and the sense of diminishing public trust in the institutions of American society."[15]

need some dates in here

While the size of the study group could not be changed--RANCH HAND was the only group whose exposure rate was documented at the time of original exposure, and their numbers were limited--DOD again bowed to public and scientific pressure and agreed that the study would be conducted by an independent civilian organization with monitoring and review by scientists from outside the government, although supervision of the program would remain under the Surgeon General of the Air Force. NRC's suggestion that the study extend over a period of forty years was rejected, but the plan was expanded to a twenty year program, with examinations at the first, third, fifth, tenth, fifteenth, and twentieth years. This concession however, was dependent on future congressional funding of the continuing investigation. In addition to medical checkups, the program included a morbidity (disease and birth defects) study and a mortality (death) study.[16]

Since most of the subject airmen had retired or separated from the Air Force, a personal appeal to these men was made by the Air Force Surgeon General, Lieutenant General Paul W. Myers, through the RANCH HAND Vietnam Association, a reunion organization of ex-RANCHERS, asking them to volunteer their time and their bodies for the extensive physical and mental tests. Also selected from volunteers was a control group, or clone group, approximating the former defoliators in age, background, physical attributes, etc., to be evaluated on a one-for-one basis for comparative purposes of morbidity. Another control group, on a five-to-one basis, would be used for the mortality study.[17]

Because much of the difficulty facing resolution of the herbicide problem was a result of the confusion surrounding attempts to scientifically determine exactly what the medical effects of dioxin exposure are on human beings, the RANCH HAND study was not the only investigation initiated. By mid-1982, thirty-six government-sponsored research projects were underway, and at least twelve more projects were under consideration. In addition to the RANCH HAND findings, preliminary data was expected by late 1983 from three other major studies: a mortality study of the general death rates and causes of death of Vietnam-era military personnel; a birth-defects study comparing 7,500 babies born with birth defects to 3,000 normal babies, to see if there is any relationship to parental service in Vietnam or exposure to 2,4-D/2,4,5-T herbicides; and a registry of workers in herbicide manufacturing plants, developed by the National Institute of Occupational Safety and Health, to compare their health status to that of Vietnam veterans. It seemed unlikely, however, that data from any of these studies would satisfy Agent Orange activists demanding immediate action on their claims, since these studies would require years of evaluation before reaching any definitive conclusions. Although litigants' expectations had been raised by private biopsies of a few individuals which found dioxin residues in fatty tissues, these hopes suffered a setback when a preliminary report from the first round of the RANCH HAND physical and neurological examinations indicated these high-exposure personnel had normal to below-normal

mortality rates.[18]

Studies of workers exposed to dioxins through industrial accidents also seemed to confirm a lack of significant increase in mortality rates. Of particular interest was research among 121 workers exposed during an autoclave rupture at the Monsanto Company plant in Nitro, West Virginia, in 1949. Although all workers were heavily exposed and developed immediate symptoms typical of dioxin contamination, including chloracne, "the mortality experience of these workers indicated no apparent excess of total mortality or of deaths due to malignant neoplasms or circulatory diseases." A study of 204 Dow Chemical Company employees engaged in 2,4,5-T manufacture during varying periods between 1950 and 1971, released in 1980, also found "no adverse effects . . . with respect to occupational exposure to 2,4,5-T or its feedstock, 2,4,5-trichlorophenol."[19]

While other, more limited studies with smaller sample populations suggested some association between exposure and later development of various neoplasms, they did not document increases in herbicide or TCDD related deaths of children or adults, nor did these studies confirm any increases in congenital defects among children. An Air Force Environmental Laboratory report of 1978 noted that "reports published by North Vietnamese scientists provide insufficient data on which to draw contrary conclusions." A study of the largest industrial accident exposure in history, at Seveso, Italy, seemed to deny claims of human birth defects from even large concentrations of dioxin, finding no derangement of gestation, no foetal lethality, no gross malformations, no growth retardation at term, and no cytogenetic adnormalities as a result of the accident exposure. Further support for this conclusion came when a case-controlled study of birth defects in children in Australia indicated that Australian army veterans who could have been exposed to defoliants in Vietnam "suffered no increased risk of fathering children with birth defects."[21]

The most important study as far as Agent Orange claimants were concerned, however, was the congressionally mandated Veterans Administration investigation of the effect of herbicides on Vietnam veterans' health, which was still in the planning stages more than three years

after Congress ordered the study. A $114,288 contract awarded to a team of University of California at Los Angeles scientists in May 1981 resulted only in a protocol that President Reagan's cabinet-level Agent Orange Working Group, overseer for all herbicide investigation programs, called inadequate. Veterans' groups criticized the delays as deliberate stalling, and charged the VA plan as nothing more than "a pile of garbage." The Veterans Administration, on the other hand, claimed their problems were a result of the agency having neither the doctors nor the technical expertise on its staff to do the extensive epidemiological study required.[20] The problem was further complicated by the lack of adequate documentation to confirm the kind and extent of exposure of claimants, providing little scientific basis for an accurate epidemiological study. Even if disability due to herbicide exposure could be scientifically confirmed, the length of time since possible contact in Southeast Asia, together with the widespread domestic use of various herbicides in agriculture, horticulture, forestry, and common household operations, were certain to make it difficult to determine the extent of harm resulting from service-connected exposure versus non-military domestic exposure.

Pending formulation of the herbicide study, the Veterans Administration took steps to evaluate and record claims of veterans who reported herbicide exposure related illnesses, even to the extent of offering free medical screening for all veterans who served in Vietnam. Veterans reporting to VA hospitals for treatment, however, became increasingly dissatisfied with the care they received for Agent Orange-related problems, claiming that tests were inadequate, doctors unsympathetic and untrained to look for herbicide symptoms, and records poorly maintained. General Accounting Office investigators agreed in part, calling the VA's computerized registry for herbicide incidents "so unreliable the system should be scrapped," and finding many VA doctors suspicious of veterans' complaints--several doctors indicated they believed the program "served only to pacify veterans who were exploiting the Agent Orange issue for personal gain."[22]

When the VA reported in 1982 that its long-delayed herbicide study would not provide results until at least 1988, the reaction from

veterans' groups and Congressmen was immediate and loud. One hundred members of the House of Representatives wrote the VA Administrator, Robert Nimmo, protesting the announcement. Yielding to Congressional pressure, the VA agreed to turn control of the herbicide study over to the Center for Disease Control in Atlanta, Georgia, including the data already obtained from more than 95,000 Vietnam veterans given day-long physical screening. By late 1982, 14,236 claims had been filed for service-connected disabilities attributed to herbicide exposure. The VA, however, denied over 13,000 of these claims, with most of the remainder still under review.[23] Unless the current herbicide health-studies find a provable link between exposure in Vietnam and the veteran's claims to ill-health, the ratio of approved disability claims seems likely to continue to be infinitesimally small, and the possibility of monetary compensation non-existent.

Subsequently, the issue of indemnification was further clouded by the actions of the Environmental Protection Agency in relation to cleanup of various toxic waste disposal sites around the United States. While veterans continued their protracted fight for mere official acknowledgment that a problem existed, they read of plans for the federal government to buy entire communities, such as Love Canal, New York, and Times Beach, Missouri, because of residual dioxin contamination from one of the manufacturers of 2,4,5-T. These identified waste sites also complicated the ability of the veterans to gain a sympathetic ear from lawmakers and the public, since the sites' measurable levels of dioxin well exceeded the most pessimistic claims of the veterans' lawsuits.[24]

In any case, at the time of this analysis, the exact nature of dioxin's effect on humans, and that of other herbicide-associated chemicals, and the extent of actual exposure in Vietnam remained as unclear as they did a decade before. Despite numerous on-going scientific studies on all aspects of the effects of Agent Orange and its TCDD contaminate, public perception of the issues continues to be shaped of a bitter controversy, and the contentious ~~guided by media presentation, mainly in the form of statements by~~ of veterans, government officials, scientists, lawyers, and others. A recent study of the Agent Orange controversy found it conformed to

other environmental crisis "models" in which public and scientific concern was aroused by a potential threat to the "quality of life," placing "scientists, government officials, and individual citizens in adversary relationships." The study concluded that the Agent Orange question has "reached the crossroads of science and social concern," quoting Fred H. Tschirley, who said:

> Scientists may debate chemical hazards; legislators may evaluate them; administrative agencies may examine them; courts may adjudicate them. But ultimately the public must decide the critical issues.[25]

The problem with ~~an~~ such complex emotional, exploitative issue, hinging on the use of science, such as the Agent Orange controversy, is ~~whether~~ how close the public ~~will~~ can ever get ~~an~~ to an adequate degree of "truth" upon which to base a qualitative decision.

- who was exploiting whom? a very long list of host-parasite relationships, I should think.

No implication for civilian or military decision makers in all this ....??

I think the dissertation ends here, unless you want an epilogue that is less a defense and more a real set of issues to look for when all / more docs. are opened - and implications

∴ rework / pare / tighten / retitle

Melosi & Krammer
Error pages from final draft — picked up on 3 Apr 1984?

RANCH HAND: AIR FORCE HERBICIDE OPERATIONS IN SOUTHEAST ASIA

A Dissertation

by

PAUL FREDERICK CECIL

Submitted to the Graduate College of
Texas A&M University
in partial fulfillment of the requirements for the degree of

DOCTOR OF PHILOSOPHY

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Major Subject: American History

ABSTRACT

RANCH HAND: Air Force Herbicide Operations in Southeast Asia. (May 1984)

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Chairman of Advisory Committee: Dr. Roger A. Beaumont

In 1961, the United States began an experiment in unconventional warfare which ultimately raised a storm of protest throughout the world and helped to destroy the credibility of an American government. Even after the experiment was terminated ten years later, the controversy continued, expanding from the original charge that the United States was doing irreparable harm to the Asian environment to an eventual accusation that the weapon used had doomed American servicemen and their future offspring to lives of pain, lessened capabilities, and even death. The weapon used was chemical herbicides; the charges are as yet unproven.

Almost unnoticed amid the furor arising over Air Force use of herbicides in Southeast Asia was the actual performance of a small group of officers and men, flying a mission virtually without precedent, originating techniques even while in contact with the enemy. Code named "Operation RANCH HAND" and dubbed the "most shot-at Air Force unit in South Vietnam," the herbicide organization dispensed over eleven million gallons of herbicides on Southeast Asian jungles and croplands, while flying unarmed, obsolescent aircraft at minimum speed and tree-top level. The handful of spray planes were hit by enemy ground fire nearly five thousand times. Nine aircraft were lost and

twenty-six crewmen killed, in addition to numerous wounded. Besides hundreds of decorations given to individuals, the herbicide organization received ten unit awards, including four Presidential Unit Citations.

Despite the turmoil aroused over the question of long-term effects of herbicide application, military commanders continued to regard it as a necessary counter to the guerrilla-warfare-favorable ecology of Southeast Asia, although some studies called part of the program "counter-productive." Cancellation of the project in 1971 was a political, rather than military, decision. More than a decade after the last spray mission in Vietnam, the herbicide issue still attracts media attention, primarily due to continuing revelations of dioxin contamination in the United States and on-going liability lawsuits concerning "Agent Orange" exposure. The questions raised during the 1960s remain unanswered, and the men of RANCH HAND remain misunderstood.

C:ght (word)

Still an apologia in many sections

PREFACE

But the writing is quite strong

At the time of this writing, more than a decade has passed since the last RANCH HAND mission in Vietnam. The realities of new ground-to-air defensive weapons make it unlikely that such a role will again be attempted, even if chemical warfare is used on future battlefields. The twelve-hundred men who served in RANCH HAND have gone their own ways--most retired or separated from the Air Force, some having attained high rank, at least five becoming flag officers. Annually, near the anniversary of the organizational date for the 12th Air Commando Squadron, a number of these "RANCHERS" meet for three days of partying, reminiscing, and paying tribute to the men who did not come home. Each year they get greyer and the tall tales get taller. As one veteran put it: "We have to tell lies, the truth is just too unbelievable."

Like most veterans of Vietnam, RANCH HAND returned to no celebrations or speeches of welcome, no banquets or parades; but because it had been associated in the media with "chemical warfare," RANCH HAND was even more a pariah than most Vietnam returnees. The unique aspects of their episode in the history of aerial warfare were buried under the adverse publicity of the controversies over ecological warfare and the use of 2,4,5-T. At the reunions, the men and their wives jokingly wear tee-shirts emblazoned with phrases like "I married Agent Orange," "Retired Tree Killer," and "Have defoliant, will travel"; but underlying the humorous attire is a vein of frustration, born of the sense that the American public has never realized that the program saved many lives. Beyond that is a bitterness that their accomplishments have been transfigured into something unclean and indecent. The RANCH HAND veterans are as eager as anyone else that the truth about herbicide effects be fully determined, but they also want the record set straight concerning the job done in Vietnam by the men who wore the purple scarves.

how?

At the urging of several RANCH HAND veterans, and against the advice of my dissertation director, this work attempts to describe the RANCH HAND mission and the controversies that surrounded it. It is

neither an apologia nor a justification. There is a sameness and repetition of events from year to year because that is the way the war was. Very little is said about the upper-level political and military decisions that guided RANCH HAND because most of that material remains classified, or locked in the memories of individuals who chose not to discuss it. In any case, it makes little difference; the men of RANCH HAND knew little of the policy making, or even of the controversies among scientists and politicians. Men in combat are concerned primarily with staying alive, alleviating the discomforts of heat, filth, and "jock itch," and getting letters from home; anything else is unimportant. These men did not heed the headlines of stateside newspapers or scholarly journals, nor the bombasts of military leaders citing records in body counts or bombs dropped. The drive to excel at what they did was the drive of professionals to do the best possible job, to finish the task, to get the war over so all could go home. Let other scholars read more into it than this, if they wish.

Given a choice, I would not begin this project again. Research into the available records and into the memories of fellow veterans has resurrected painful images better left buried. Time and nature seem to help ex-warriors recall only good times and humorous incidents, which may explain why war is so glamorous and heroic in later prose; but serious scholarship exposes the unpleasantries, misery, and terror of reality. To the difficulty of describing the events is added the burden of reliving them, when the author was one of the participants. Personal and emotional biases assume a major role, and it becomes almost impossible to remain clinical. Hopefully some sense of what RANCH HAND really was will come from these pages.

A serious problem in dealing with a topic of such recent military import and continuing controversy is the difficulty of gaining access to classified materials. The task has been made much easier by the cooperation of the Office of the Secretary of the Air Force, Office of Air Force History, and staff of the Albert F. Simpson Historical Research Center at Maxwell AFB, Alabama. Especial thanks must go also to the personnel of the Air University Library and the Inter-Library Loan Office of the Texas A&M University Library for their patient

the entire RANCH HAND program. Thus ended a combat organization dedicated solely to the purpose of conducting war upon the environment --to attacking plants instead of people. Created in secrecy and disbanded in controversy, this specialized warfare unit occupies a unique place in American aviation history.

The story of environmental warfare, however, did not end with the deactivation of the defoliation units in Vietnam. During the mid-1970s, while the extent and permanence of damage to the Vietnamese ecology declined to a matter of scholarly debate, a new controversy arose. As increasing numbers of American veterans of the Vietnam War claimed serious health and genetic damage from exposure to one of the primary herbicides, the "Agent Orange" issue caught the public eye far more than had the previous critiques and postmortems of the scientific and academic communities.[3]

The topic of chemical warfare was also kept before the public by allegations of Soviet activities, including reports of the use of noxious gases and toxic sprays by Russian troops against Afghan insurgents. Rumors of a new, third-generation chemical weapon, so-called "Yellow Rain," in use by communist forces against the Hmong tribesmen of Laos and other Southeast Asian opposition, attracted the attention of the press and American Congressmen. Once assailed for its gas/herbicide policies in Vietnam, the United States in the 1980s played the role of the accuser in the realm of chemical/biological warfare and counter-guerrilla tactics.[4]

Chemical/biological warfare, however, is not a recent development. Indeed, chemical weapons predate the use of bullet and bomb, themselves normally dependent on a chemical reaction as propellent or exploder, or both. One of the earliest recorded uses of chemical warfare appeared in the Peloponnesian War, when the Spartans burned wood, saturated with pitch and sulphur, under the city walls of Plataea in 428 B.C. to created choking, poisonous chemical fumes. This tactic also was used in 424 B.C. at the siege of Belium. Ironically, this crude chemical warfare surfaced again in the same area 2,300 years later when burning sulphur fumes were used against guerrilla-occupied caves during the Greek Civil War. The use of

CHAPTER III

DEFOLIATION COMES TO VIETNAM

After World War II, France reimposed colonial government on the associated states of Indochina, despite the objections of many Americans who felt that this act violated wartime pronouncements concerning the rights of self-determination of peoples. The United States, however, was busy disbanding its wartime military forces and, in the press of other postwar matters, nothing was done. Within Indochina, the French presence was actively opposed by several nationalistic groups and full-scale guerrilla war broke out in 1946 in the region known as Vietnam, under the insurgent leadership of the Vietnam Doc-Lap Dong Minh Hoi (Revolutionary League for the Independence of Vietnam, popularly contracted to Vietminh). Grudging American toleration of the French position gradually changed to acceptance and, in 1950, the United States began providing active military and economic support to the French regime in Indochina. By 1954, 78 percent of France's Indochina War costs were being met by United States aid, and Americans were directly assisting French forces through a Military Assistance Advisory Group (MAAG) in Saigon and on-scene maintenance support of American-loaned aircraft.[1]

Following defeat of the French forces at Dien Bien Phu in 1954, the French and Vietminh signed the Geneva Protocols which required a phased French withdrawal from northern Vietnam, stabilization of local military forces, temporary division of Indochina into four states (including separation of North and South Vietnam), and creation of an International Control Commission (ICC) to oversee compliance. The accords did not require withdrawal of the 342-man United States MAAG. Neither the United States nor the new government of South Vietnam, which had been granted full independence by France six weeks earlier, were signatories to the Geneva accords, a fact later cited by the Saigon government as partial justification for its abrogation of the agreements. When France withdrew military assistance from the southern armed forces, the South Vietnamese government requested help

from the United States and, on 12 February 1955, the American advisory group assumed responsibility for training the South Vietnamese Army.[2]

During 1956, the French-sponsored Bao Dai government in the south was replaced by a new regime entitling itself the Republic of Vietnam, under the leadership of a northern-born Catholic politician, Ngo Dinh Diem. When the new government refused to participate in the general elections called for in the Final Declaration of the Geneva Conference, sporadic fighting broke out between government forces and various insurgent groups collectively known as the Viet Cong (VC), a pejorative term coined by the South Vietnamese government. Inevitably, American advisors came under attack. On 22 October 1957, the Military Assistance Advisory Group headquarters and the United States Information Services (USIS) facility in Saigon were damaged by terrorist bombs, injuring several Americans. Frequent ambushes along public highways and the national railroad made travel increasingly dangerous for foreigners and Vietnamese alike. By 1959, Viet Cong forces were strong enough to make unit attacks. In an assault on the Vietnamese Air Base at Bien Hoa on 8 July, two American advisors, a Major and a Master Sergeant, were killed.[3]

As a result of the increasing terrorism, the South Vietnamese government appealed to President Dwight Eisenhower for military aid. In partial response, the size of the American advisory group was doubled in early 1960. Later, after Vietnamese Air Force (VNAF) Commander Colonel Nguyen Xuan Vinh grounded his only fighter squadron's decrepit World War II Navy F8Fs as unsafe, the United States replaced them with twenty-five more modern, but still obsolete, AD-6 aircraft. When the first of eleven H-34 helicopters were delivered to the VNAF in December 1960, these force changes were cited by the International Control Commission as violations of the provisions of the Geneva Protocols prohibiting upgrading of local military forces. The charges were rejected by the South Vietnamese and United States governments on the basis that neither had signed the 1954 accords and that their actions were necessary to counter violations supported by the North Vietnamese government. By the end of the year, over 900 American advisors were in South Vietnam, including US