

LOCAL ACTION/RESEARCH GUIDE NO. 1

**WEAPONS
FOR
COUNTERINSURGENCY
CHEMICAL/BIOLOGICAL
ANTI-PERSONNEL
INCENDIARY**

NARMIC = NATIONAL ACTION/RESEARCH ON THE MILITARY INDUSTRIAL COMPLEX

A PROJECT OF AMERICAN FRIENDS SERVICE COMMITTEE

What Is NARMIC?

The NARMIC program was designed to dramatize the need to demilitarize the American system and create a consciousness of the depth of impingement of the military on the institutions of this society and on our own lives.

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Guides to help community, professional, campus and religious groups develop research techniques on the military/industrial complex in their own communities.

A national clearing house for information and reports on the military/industrial complex and action/research projects in progress around the country.

Local Research

Action Guide No. 1

WEAPONS FOR COUNTERINSURGENCY

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Prelude to Action

This first NARMIC handbook is specifically written for local activists. We hope it is a good handbook. "Good" in the sense of being action-useful for people who already have become aware of the pervasive intrusion of militarism and corporate power in many aspects of their lives. "Good" as an action-tool for people who are asking, "What can we do about it - how can we change it?"

There is tyranny in the process which produces acceptance, accommodation, and at last apathy in the face of the worst horrors and the most flagrant injustices committed against peoples who are struggling for self-determination. Once this process has been built into the system and becomes part of the environment, it can be overcome only if truth is boldly published and acted upon.

As in every social struggle, from the days of the early Quaker George Fox to this present moment, the art of publishing truth as a mode of action has been developed and employed in bringing about social change.

The publishing of factual information about counterinsurgency weapons and defense contracts is such a mode of action. By publishing it, NARMIC hopes to assist and encourage local action/research groups to resist the power of militarism and defense industries over their social, economic and cultural development.

NARMIC expects that local groups will write the enduring chapters of this handbook. We are pleased to begin the process.



Stewart Meacham
Peace Education Secretary
American Friends Service Committee

**1.
FROM
DETERRENCE
TO
COUNTERINSURGENCY**

"Parry, Riposte and Attack"

A political and military strategy of counterinsurgency against wars of national independence in the Third World was not made a dominant part of American foreign policy until the early years of the Kennedy Administration.¹ The large-scale development of the weapons described in this handbook began at that time, as a result of the enlargement of the undeclared war in Southeast Asia and, more broadly, of a shift in U.S. military and political priorities. The weapons of counterinsurgency—anti-crop sprays, napalm, anti-personnel bombs, etc.—filled a "weapons gap" created by the new emphases of the Kennedy strategy.

¹The practice of military intervention, the assumptions of "national security," and an anti-communist rhetoric were elements of policy also during the Truman and Eisenhower years. For the history and causes of such policy, see the bibliography at the end of this section.

The military capability inherited by Kennedy in January, 1961, consisted of a multitude of nuclear-armed ICBM's and Strategic Air Command bombers. Underlying this build-up had been the policy of "massive retaliation" which held that the very threat of nuclear reprisal was enough to deter a Russian attack on this country or on any of the NATO nations. Such military planning was inadequate for meeting challenges to the "national interest" that Kennedy's advisors perceived—Cuba, the Congo, Laos and Vietnam—challenges, both as immediate troublespots and to the maintenance of U.S. hegemony in the formerly colonial areas and Latin America. Perhaps more important, the nuclear strategy was not intended to extend the perimeters of U.S. dominance. As one long-time advocate of preparation for "limited war" (that is, non-nuclear or "conventional" war) explained it:

Initially, the concept had been that ground forces in Europe and the Far East were the shield behind which the U.S. could deliver the devastating blows of its atomic sword. Now the role was being reversed. The atomic retaliatory forces had become the shield of protection warding off the threat of hostile atomic attack, while the forces of limited war provided the flexible sword for parry, riposte, and attack.²

The campaign to increase the power of the U.S. to wage conventional conflicts was begun after the Korean War (fought with the weapons of World War II despite overwhelming U.S. superiority in nuclear arms). This campaign was mounted and sustained by propagandists in a few select university-based foreign policy research institutes and in the Army, which suffered gradual reductions in strength throughout the Eisenhower period.

While inside chroniclers of the Kennedy Administration point to Khrushchev's speech of January 6, 1961, as if it were an announcement of a new "red menace" from guerrilla war,³ evidence suggests the speech may have been an excuse, but hardly a cause for Kennedy's counterinsurgency strategy.

In the first place, counterinsurgency strategy is aimed at independent Third World revolutions which by their nature cannot be created and controlled from Moscow. Secondly, the capacity for limited war involves an aggressive strategy, not—as the association with the U.S.S.R. and its modern arsenal was meant to imply—a response to attack. The Soviet Union does have the physical capacity to deliver a strike at the continental U.S.; the Vietnamese liberation fighters do not. And third, of course, the strategy of limited war was developed and argued by critics of "massive retaliation" long before Khrushchev made his speech. Briefly, we shall examine how these strategists went from policy critics to policy makers.

²General Maxwell D. Taylor, The Uncertain Trumpet (Harper, 1959) p. 64.

³For example, Arthur Schlesinger, Jr., A Thousand Days (Fawcett Crest, 1965) p. 499; W. W. Rostow, View from the Seventh Floor (Harper & Row, 1964) p. 112; and Roger Hilsman, To Move a Nation (Dell, 1968), p. 414. Hilsman, however, also recognizes that "Mao and his closest disciples, such as Lin Piao, consistently argued then and later that 'revolutionary wars' cannot be either initiated from outside or sustained by outside help, but that virtually the entire burden must be carried by the people of the country fighting for its 'national liberation.' And experience, certainly, has shown that a revolutionary group can come at least close to doing the job by itself." (loc. cit.)

The Strategy of Flexible Response

No more urgent task confronts the free world than to separate itself from nostalgia for the period of its invulnerability and to face the stark realities of a revolutionary period.

- Henry Kissinger, The Necessity for Choice, 1960

By the late 1950's, a handful of military theorists and dissident Army generals began calling for a military build-up for "limited" or "conventional" war in order to assure a U.S. military victory in any armed encounter. Through books, articles and speaking engagements, these strategists attempted to convince the American public that it was vitally necessary for the U.S. to acquire a limited-war capability, despite the costs. "A bigger bang for a buck," they argued, was false economy.⁴

Maxwell D. Taylor, who served as Army Chief of Staff from 1955 to 1959, was one of the leading spokesmen. Taylor wrote The Uncertain Trumpet in 1959 to warn the public that their leaders had "only two" military choices: "the initiation of general nuclear war or compromise and retreat."⁵ In place of massive retaliation, Taylor proposed the "strategy of flexible response" which would give the U.S. "a capacity to react across the entire spectrum of possible challenge . . . The new strategy would recognize that it is just as necessary to deter or win quickly a limited war as to deter general war."⁶

Similar views were propounded by a group of influential academicians, primarily from the Council on Foreign Relations in New York City, Harvard University's Center for International Affairs, the Massachusetts Institute of Technology's Center for International Studies, and Columbia University's Institute of War and Peace Studies. In 1957 a Special Committee to Study the Foreign Aid Program, which included a team of academic strategists, criticized the U.S. reliance on nuclear weapons.⁷

These views were further elaborated by the Special Studies Project of the Rockefeller Brothers Fund, headed by Henry Kissinger (presently Special Assistant to the President for National Security Affairs). Its report called for development of a modern airlift and sealift and mobile forces to fight "the gamut of possible limited wars."⁸

⁴Robert E. Osgood of the Washington Center for Foreign Policy Research has described this group as "strategic revisionists" who "rejected the thesis of the Eisenhower-Dulles Administration that the United States would spend itself into bankruptcy if it prepared to fight aggression locally at places and with weapons of the enemy's own choosing." Adelphi Papers, No. 54 (February 1969), Institute for Strategic Studies, London, p. 44.

⁵Taylor, op. cit., p. 5.

⁶Taylor, op. cit., p. 6.

⁷In its report to the Senate, the committee (headed by Max Millikan of MIT and former Assistant Director of the CIA) concluded that the United States' "exclusive focus on Soviet-initiated action ignores the real possibility that the two-thirds of the world's population outside the Iron Curtain just emerging into political and economic awareness may become an independent source of turbulence and change, and that inter-action among the 'uncommitted' countries could overnight threaten the precarious East-West balance." (Emphasis added.) U.S. Senate Foreign Relations Committee, The Foreign Aid Program, Compilation of Studies and Surveys, 85th Congress, last session.

⁸Prospect for America: The Rockefeller Panel Reports (Doubleday, 1961) pp. 111-2.

W. W. Rostow, another sharp critic of Eisenhower's relatively conservative military strategy and budget, wrote in 1960 that:

The Administration had, on the whole, successfully resisted the pressures for expanded and accelerated military programs of attack and defense In part [this resistance] reflected a willingness of the Administration to continue to accept risks with the nation's security in the interest of economy beyond those advised by any of the nongovernmental groups which had examined the nation's security problem over the previous four years and by its own military advisers.

Rostow also criticized a "deterioration in relations between the government as a whole and the scientific community" during this period. Lacking sufficient direction and money, Rostow argued, the "nation's pool of breakthrough talent in science and technology" could not do adequate research and development in weaponry.¹⁰ Like Taylor, Rostow thought U.S. planning for "brushfire" (counterinsurgency) wars was a major weakness in military strategy.¹¹ However, as Rostow himself correctly understood, these and other changes would have to wait for a new Administration.

The Kennedy-McNamara Doctrine

Under the Kennedy Administration, flexible response became the leading military doctrine. Its proponents were appointed to key positions: Maxwell Taylor was named the President's principal military advisor and later Chairman of the Joint Chiefs of Staff, Walt W. Rostow of MIT became a Special Assistant to the President, Roger Hilsman of the Johns Hopkins School of Advanced International Studies (and an OSS guerrilla in Burma during World War II) was made Director of Intelligence and Research of the State Department and later Assistant Secretary of State for Far Eastern Affairs, and Robert McNamara was appointed Secretary of Defense.

Hilsman and others have explained that Kennedy was personally concerned with how the United States would fare in guerrilla combat.¹² When the President discovered that the Pentagon would not move quickly in this area, he set up a "Special Group for Counterinsur-

⁹W. W. Rostow, The United States in the World Arena (Harper, 1960) pp. 374-5. See pp. 368-75 for his enthusiastic discussion of the Rockefeller Report.

¹⁰Ibid., p. 311.

¹¹Ibid., pp. 319-23 for Rostow's opinions on counterinsurgency.

¹²Hilsman recalls that "Kennedy had read Mao on guerrilla warfare and Che Guevara and the others. He let us know of his interest in the subject and started us thinking about it. From the beginning of his administration, the President was convinced that the techniques of 'revolutionary warfare' constituted a special kind of threat. . . . 'This is another type of war,' he told the graduating class of West Point in 1962, 'new in its intensity, ancient in its origins—war by guerrillas, subversives, insurgents, assassins; war by ambush instead of by combat; by infiltration, instead of aggression, seeking victory by eroding and exhausting the enemy instead of engaging him. . . . It requires in those situations where we must counter it. . . a whole new kind of strategy, a wholly different kind of force, and therefore a new and wholly different kind of military training.'" Roger Hilsman, op. cit., p. 415. See also Schlesinger, op. cit., pp. 318-9 for a description of Kennedy's "preoccupation" with counterinsurgency.

gency," headed by Maxwell Taylor, with Robert Kennedy as the White House representative. President Kennedy, McNamara and the Special Group hammered out a counterinsurgency strategy for U.S. paramilitary missions in Vietnam, its test site,¹³ and other Third World countries.

The strategy called for larger numbers of Army ground forces with increased battlefield mobility. Given the reluctance of the public to support conscription and ever-larger military budgets in peacetime and, further, the political advantages of masking intervention, the plans stressed training and equipping indigenous armies.

Kennedy and McNamara were aware that countering the genuine appeal of the national liberation movements, with their promise of rapid escape from underdevelopment, would require the U.S. to engage in psychological warfare operation, civic action projects and institution-building programs which together could be offered as an alternative to revolutionary socialism.

A great number and range of specialists were mobilized from universities, private "think tanks," and government agencies to develop the necessary tools for counterinsurgency—from linguists, anthropologists, psychologists, intelligence operatives, etc., to the designers of "hardware," that is, the actual weapons.

In designing and evaluating counterinsurgency weapons systems, defense planners used guidelines similar to the following:

1. The weapons had to be effective against decentralized agricultural populations.
2. They had to be capable of a graduated response to various insurgency situations, ranging from localized and low-intensity conflicts to full-scale "people's war," as in Vietnam.
3. They had to be available to pro-U.S. regimes in underdeveloped countries with a minimum input of U.S. resources.

Vietnam: Proving Ground for Counterinsurgency

With the Kennedy Administration, Vietnam became the showcase for proving that the United States could stop national revolutions in developing countries.

Maxwell Taylor explained in 1963:

....Here we have a going laboratory where we see subversive insurgency, the Ho Chi Minh doctrine, being applied in all its forms. This has been a challenge not just for the armed services, but for several of the agencies

¹³Robert E. Osgood, *loc. cit.*, writes that in the early years of the Kennedy administration, "after the Cuban missile crisis and before the large numbers of American forces got bogged down in Vietnam," the United States looked so powerful that the new military establishment "began to think of the world as virtually monopolar and of America's position in the world as comparable to that of a global imperial power. The only remaining gap in military containment might be closed if the United States could demonstrate in Vietnam that wars of national liberation must fail."

of government, as many of them are involved in one way or another in South Vietnam. On the military side, however, we have recognized the importance of the area as a laboratory. We have had teams out there looking at the equipment requirements of this kind of guerrilla warfare. We have rotated senior officers through there, spending several weeks just to talk to people and get the feel of the operation, so even though not regularly assigned to Vietnam, they are carrying their experience back to their own organizations.¹⁴

Recently General William C. Westmoreland explained that the Vietnam laboratory has produced a "quiet revolution in ground warfare—tactics, techniques, and technology" that will "influence the future directions of our Army both in fundamental concepts of organization and development of equipment."¹⁵

In addition to being a laboratory, Vietnam has become the dumping ground for new weapons.¹⁶ The change from deterrence to counterinsurgency led to an industrial boom in the research, development and manufacturing of counterinsurgency weapons. Southeast Asia provided the arms manufacturers—the war profiteers—with a ready and expanding market.¹⁷ As former President Johnson stated in 1967, "The Vietnam build-up virtually assured American businessmen that no economic reverse would occur in the near future."¹⁸

Conclusion

We have briefly sketched some of the strategic and military decisions of the Kennedy Administration which led to the use of these weapons systems in Vietnam, the most sustained and destructive example of U.S. intervention in the developing world. Although the U.S. government only comparatively recently made clear its intention of being the world's political policeman, U.S. military intervention on behalf of "free world" governments is hardly new, nor is the anti-communist theology used to persuade taxpayers of its necessity.

Richard Barnet has written:

As official explanations of the defense budget make clear, Vietnam is not a unique situation, only an unusually difficult one.... For more than twenty

¹⁴U.S. House Committee on Appropriations, Subcommittee, Department of Defense Appropriations for 1964: Hearings, 88th Congress, first session, Part I, pp. 483-4.

¹⁵Address to the Association of the U.S. Army, Washington, D.C., October 14, 1969. Westmoreland credited "military-industrial-labor-academic-scientific cooperation" for these advances.

¹⁶For further discussion of the U.S. use of Vietnam and other Third World countries as a dumping ground, see Juan Bosch, Pentagonism, A Substitute for Imperialism, translated by Helen R. Lane (Grove, 1968).

¹⁷See, for example, Aviation Week and Space Technology, May 22, 1967, Cecil Brownlow, "Viet-Generated Advances Reach Theater" for a description of "operational hardware developed in direct response to requirements generated by the environment and combat conditions of the Vietnam war."

¹⁸President Lyndon Johnson, "Economic Report of the President Transmitted to the Congress," January 1967, Government Printing Office.

years, the United States has carried on a global campaign against revolution and native insurgency movements, conducting a major military campaign or a CIA operation in an underdeveloped country about once every eighteen months. Greece (1948), Iran (1953), Guatemala (1954), Lebanon (1958), Cuba (1961), Congo (1964), British Guiana (1964) and the Dominican Republic (1965) are a few of the principal examples. The United States also took charge of the campaign against Che Guevara in Boliva and supplied men and equipment to defeat guerilla movements in Peru, Colombia and other places in Latin America.¹⁹

Important questions of how and why the United States has come to its present counterinsurgency stance in relation to the Third World and why wars of national liberation present a threat to the "national interest" are too complex to be discussed in this handbook. Instead, we recommend the following reading list, which includes critical examinations of Cold War history and studies of the importance and growth of U.S. corporate investments in the natural resources, and markets of the underdeveloped world:

American Friends Service Committee, Anatomy of Anti-Communism (Hill & Wang, 1969)

Richard J. Barnet, The Economy of Death (Atheneum, 1969)

----, Intervention and Revolution: America's Confrontation with Insurgent Movements around the World (World, 1968)

Noam Chomsky, American Power and the New Mandarins (Pantheon, 1969)

D. F. Fleming, The Cold War and Its Origins, 1917-1960, 2 vols (Doubleday, 1961)

David Horowitz, The Free World Colossus (Hill & Wang, 1965)

----, Containment and Revolution (Beacon, 1967)

----, The Corporations and the Cold War (to be published)

Steve Johnson, U.S. Foreign Policy and Imperialism (a bibliography available from the Radical Education Project, Box 561-A, Detroit, Michigan 48323. REP also publishes other relevant material.)

Gabriel Kolko, The Roots of American Foreign Policy (Beacon, 1969)

Harry Magdoff, The Age of Imperialism (Monthly Review Press, 1966)

Carl Oglesby & Richard Shaull, Containment and Change (MacMillan, 1967)

William A. Williams, The Tragedy of American Diplomacy (Dell, 1962)

David Wise & Thomas B. Ross, The Invisible Government (Random House, 1964)

The North American Congress on Latin America, Post Office Box 57, Cathedral Park Station, New York, New York 10025 and The Africa Research Group, Post Office Box 213, Cambridge, Massachusetts 02138, produce reports and current surveys on U.S. interests in their respective areas. Write them for their publications.

2. WEAPONS FOR COUNTERINSURGENCY

¹⁹Richard J. Barnet, The Economy of Death (Atheneum, 1969) p. 42. For a long but incomplete list of U.S. interventions before 1945, see the August-September issue of Congressional Digest, which reprints a House Committee on Foreign Affairs staff report (1951), "Background Information on the Use of United States Armed Force in Foreign Countries."

CHEMICAL BIOLOGICAL

CHEMICAL, BIOLOGICAL WARFARE VS. MAN

By NORMAN COUSINS

THE DANGER of surprise attack in modern warfare is not confined to nuclear explosives delivered by missiles. Modern scientific war research has developed advanced techniques against civilian populations quite apart from nuclear weapons.

U.S. Hushes Up Sickness of 3 Men In Army Sheep Poisoning Accident

DREW PEARSON and JACK ANDERSON

Washington Background

deaths. They performed several autopsies which indicated the sheep had died from disorders of the central nervous system. Not long afterward, both veterinarians came down with the symptoms that had afflicted the shepherd. This development was hushed up by

published by using chemical radiation, ultraviolet light and other agents to produce bacterial freaks or mutants. It is deadly that it

General Confirms Army Contaminated Area With Germs

SALT LAKE CITY, May 28 — The commander of a facility in Utah confirmed that the Army had a plot on with

Petition to Johns Gas Warfare Hit by 5000 Scientists

Special to The Inquirer And Washington Post WASHINGTON, Feb. 14. — More than 5000 scientists, including 17 Nobel Prize winners, in order to order an end to chemical warfare in Vietnam and a review of the

Army Developing Even More Heinous Weapons—Germ Clouds

By ROBERT BERNHARD (From The Boston Globe)

The atomic bomb dropped on Nagasaki killed 80,000 people. A fraction of an ounce of a microorganism causing Q-fever, a billion bacteria could kill as many as 100 million people.

particles generated from dilute substances subjected to great force as they are blown out of containers through fine holes can achieve concentrations of a thousand times greater than nature.

Pentagon Touchy Over Nerve Gas

By JEROME S. CAHILL Inquirer Washington Bureau WASHINGTON, May 28 — R. JAMES EPSTEIN is a former federal government official who has written a book on chemical warfare.

U.S. Stockpile Of Germ Agents Hit as Hazard

By VICTOR COHN Special to The Inquirer And Washington Post WASHINGTON, April 28 — U.S. stockpiles of chemical and biological agents have become so poisonous to the world, Rep. Richard D. Parry (D., N. Y.) charged today.

U.S. Accused Of Deploying Germ Agents

By VICTOR COHN Special to The Inquirer Washington Post WASHINGTON, June 1. — U.S. biological war agents are being restudied

planned surplus must be disposed of at sea, a spokesman for the Defense Department said Saturday.



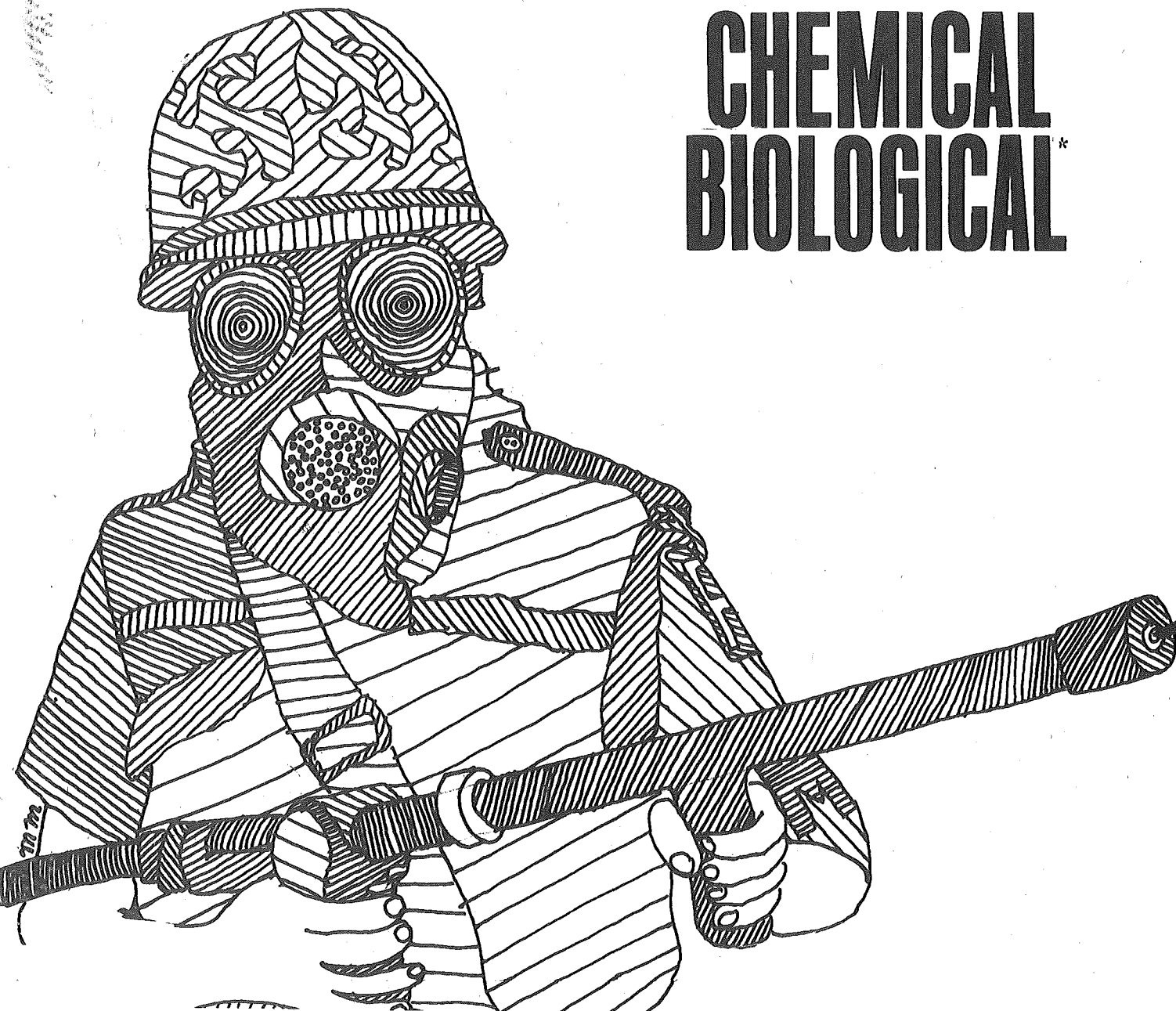
U.S. Admits Outdoor Testing of Nerve Gas

Permanent Eye Damage

By ROBERT A. LEVINE and CHARLES J. STANLEY Captain, U.S. Army Commander, U.S. Army

A Defense spokesman said in response to inquiries that after the sheep deaths an interagency committee was appointed. He said

* A close analysis of President Nixon's speech of November 25, 1969 reveals that it requires virtually no change in the U.S. current use of CBW munitions in Vietnam; nor will it drastically alter research and development in this field. For further information write NARMIC for a copy of LITTLE OR NO CHANGE INDICATED IN U.S. CBW ACTIVITIES. (Please send a stamped self-addressed envelope.)



In current practice, chemical warfare (CW) refers to the employment of chemical compounds toxic to men, animals or plants. These include "anti-food agents" which poison animals and crops, irritating and incapacitating agents which restrict the military effectiveness of the enemy (ranging from the mustard gases of World War I to the "psychochemicals" or hallucinogens which produce temporary mental derangement), and lethal chemical agents, primarily the nerve gases.

Biological warfare (BW) is defined as the intentional employment of living organisms or their toxic products to cause death, disability or disease in man, animals or plants. Operational BW agents include a variety of bacteria, viruses, rickettsiae, fungi and toxins. Some BW munitions are designed primarily as anti-crop weapons, while others can produce fatal epidemics among the human population of enemy nations.

Increased Emphasis on CBW Weapons in U.S. Arsenal

Prior to 1961, our chemical and biological warfare (CBW) arsenal consisted of the remnants of some WW I gases and nerve gases captured from the Germans at the end of WW II. The Army Chemical Corps¹ was the military's underfinanced step-child with a budget of around \$35 million a year. However, in the last years of the Eisenhower administration, changes in attitude toward CBW began to appear.

In 1959 the Chemical Corps launched "Operation Blue Skies," a public relations campaign aimed at higher Congressional funding. The generals in the Chemical Corps believed that if the American public could only understand the tremendous potential involved—the possibility of "war without death"—the Corps would be expanded and find its rightful place in the scheme of things.²

¹The Chemical Corps, which has traditionally handled the U.S. CBW program, was shuffled out of existence by Secretary McNamara in 1962. Although its operations are now carried out by the U.S. Army Materiel Command, the term "Chemical Corps" is still widely used to describe CBW officers, headquarters and operations.

²Walter Schneir, "The Campaign to Make Chemical Warfare Respectable," The Reporter, 1 October 1959. (This article is packed with good quotes from former officers in the Chemical Corps. Reprint available from AFSC for 5¢.)

But the Chemical Corps only came into its own when the military strategists of the Kennedy administration realized the limitations inherent in a policy of deterrence through the threat of nuclear retaliation. As soon as the generals switched from the language of the nuclear strategists to that of the counterinsurgency theoreticians, CBW found a new niche which merited the long-sought funding.

Under the Kennedy influence, spending on CBW research and development soared and CBW munitions, including nerve gases, were stored in forward staging areas such as Okinawa, South Korea, and the Philippines.³ By 1964 the Pentagon was spending over \$160 million a year on CBW research and another \$137 million for procurement of CBW munitions. Exact figures for more recent years are classified, but estimates of the present budget are around \$650 million.⁴

These funds have been used to provide the U.S. with a wide array of CBW agents and the delivery systems needed to disseminate them at any point on the globe.

Research & Development of CBW Weapons

The U.S. maintains an elaborate network of CBW research laboratories and production facilities, and awards millions of dollars annually to universities and corporations for additional research and development. The Army's CBW bases employ more than 3,750 officers and enlisted men and 9,700 civilians, and are worth an estimated \$1 billion.⁵ The Navy and Air Force did not begin CBW research until after WW II (while the Army produced its first CBW munitions during WW I), but they have established substantial development programs of their own. The principal CBW installations are described in Chart 1.

³When 24 Americans were injured by nerve gas July 8, 1969, on Okinawa, the Pentagon said that the gas had been deployed in Okinawa "several years ago as a result of decisions made in 1961 and 1963" during the Kennedy administration. New York Times, 23 July 1969.

⁴Seymour Hersh, "On Uncovering the Great Nerve Gas Coverup," Ramparts, June 1969:

The Defense Marketing Service (DMS), a private newsletter published for the aerospace industry, staffed largely by former officials and officers of the Defense Intelligence Agency, states that the military's main chemical base, the Edgewood Arsenal in Maryland, alone has a fiscal 1969 budget of \$421.5 million, of which \$57.3 million is earmarked for research, \$266.4 million for procurement, \$9.6 million for operating costs, and \$1.9 million for stock funds. According to DMS, another \$29.8 million will be spent at Ft. Detrick, Maryland, the main biological test center, and more than \$75 million in operating and production costs will be divided among the Army's other four chemical and biological warfare bases, including Dugway.

The Air Force has publicly announced that it will spend \$71 million on just the herbicides and defoliants used in South Vietnam in 1969. No statistics are available on other CBW operating costs for the Air Force or for the Navy, although both are running vigorous testing programs.

A Senate source with access to classified CBW spending totals told me: \$650 million a year on CBW is a conservative figure.

⁵Seymour M. Hersh, Chemical and Biological Warfare: America's Hidden Arsenal (Anchor, 1969), p. 29.

1. U.S. CBW INSTALLATIONS*

Name, location & size	Activities	History
Edgewood Arsenal. 15 miles NE of Baltimore, Md., on Route 40. 10,000 acres valued at more than \$130 million. Second largest employer in the county.	Headquarters of U.S. Army Chemical Research & Development Laboratories. Commands Rocky Mountain & Pine Bluff Arsenals. Engages in open-air testing of CBW agents.	1917, Army Ordnance Department bought the land & constructed a base for manufacture of gas shells. End of WW II, changed to R&D. First task was analysis of captured German nerve gases. Was first to test lethal agents on human beings. Now a major testing center. 1968 budget, \$228 million. 1965 payroll, \$46 million.
Fort Detrick. Frederick, Md., 45 miles NW of Washington, D.C. Self-described as "one of the world's largest microbiological research center." Worth \$75 million.	Headquarters of U.S. Army Biological Laboratories. Controls all BW research & the anti-crop program.	1943, Detrick was opened as a top secret base. Now controls procurement, testing, R&D of all biological munitions. Since mid-60's has used human volunteers in its experiments. 1966 budget, \$38 million.
Pine Bluff Arsenal. 14,000-acre base 8 miles north of Pine Bluff, Ark. Largest employer in Jefferson County. CW agent production facilities valued at \$32 million.	Major center for CW production. Also produces BW agents including bacteria, virus & rickettsia. Biological weapons stored in 273 refrigerated "igloos."	1942, opened as CW agent production center. 1950, to begin production of BW agents Army spent \$90 for new facilities. 1962, \$2 million spent for facilities to load BZ into bombs. 1966 budget, \$18.8 million, including \$5 million for BW operations.
Rocky Mountain Arsenal. 17,750-acre base 10 miles NE of Denver, Colo. Operated by Army Industrial Fund, a private corporation.	Major center for CW production & for loading gases into munitions.	1950, began production & stockpiling of GB. 1957, GB production halted but maintained on stand-by basis. 1961, \$1.5 million in contracts for filling munitions. 1962, \$6.9 million in contracts. 1964, \$25 million in contracts.
Newport Chemical Plant. Several miles south of Newport, Ind. Employs 300 civilians.	Primary contractor for the production of VX. Operated by Food Machinery & Chemical Corp. (FMC) of New York.	1959, contract for design & construction awarded to FMC, \$13.5 million. 1960, began production of VX on 24-hour schedule for 3 years. 1962 budget, \$3.5 million.

To supplement the Pentagon's research at its own laboratories, a large number of corporations, universities and non-profit research institutes receive contracts from the Department of Defense for research on particular aspects of CBW development. The tremendous extent to which civilian scientists, particularly those associated with the universities, contribute to the U.S. capacity to wage chemical and biological warfare cannot be overemphasized. Academic scientists have not only provided an essential expertise for basic research on CBW agents, they have also designed the theories and strategies used to justify the use of these weapons in efforts to crush national liberation movements.

Some universities and colleges doing CBW research can be found in Chart 2. A number of the private organizations involved in counterinsurgency research specifically related to chemical and biological warfare can be found in Chart 3.

The CBW Weapons - A Description

The Department of Defense identifies three categories of anti-personnel chemical munitions: lethal agents, incapacitating agents, and riot control agents. The lethal agents are used to

Chart 1, continued

Dugway Proving Grounds.** One million-acre base spread across the great salt desert 80 miles SW of Salt Lake City.	Main testing center for both BW & CW agents. Engaged in open-air testing of CBW agents.	1942, Chemical Corps begins use as testing station for CW munitions. 1953, start of BW munitions testing. 1959, began one-week CBW orientation course for officers with rank of Lt. Colonel & above. 1968, death of 6,000 sheep while testing VX over proving grounds. Yearly budget around \$15 million with \$8.4 million payroll.
Air Force Armaments Laboratory (AFAL) & Armament Development & Test Center. Eglin Air Force Base, Florida. Part of the USAF Systems Command.		Develops techniques and equipment for dispersion of defoliants & herbicides from aircraft. No research or production of CBW agents themselves.
Naval Biological Laboratory. Oakland, Calif. in the Naval Supply Depot;***	Performs epidemiological research relevant to biological warfare operations.	Administered & staffed by the University of California under contract to the Office of Naval Research.
Fort McClellan. Anniston, Ala. Home of Army Chemical Corps' School & Chemical-Biological-Radiological Agency (CREA) of Army Combat Development Command.	Trains regular army personnel to fight in "chemical-biological-radiological environment." Does open-air testing on limited scale for training purposes.	Offers 9-week & 9-month courses for foreign military officers. Since 1951 has trained officers from more than 35 foreign countries.****

*For more information see Seymour M. Hersh, Chemical & Biological Warfare: America's Hidden Arsenal (Bobbs-Merrill, 1968; also Anchor), pp.87-122.

**Associated with Dugway are Fort Douglas in Salt Lake City, the administrative headquarters for Dugway and its testing facilities, known as the Desert Test Center; Tooele Army Depot in Tooele, Utah, the shipment & storage point for CBW munitions tested at Dugway; and Baker Laboratory, Dugway's biological compound, which is kept under top security.

***The Naval Weapons Laboratory at Dahlgreen, Virginia, which deals with the defense of naval vessels, appears to have tested CBW weapons until 1966.

****The 9-month course for 1969 involved officers from South Korea, Taiwan and Thailand. In 1970, Australia, South Korea, The Philippines, Thailand, South Vietnam, Denmark & Israel.

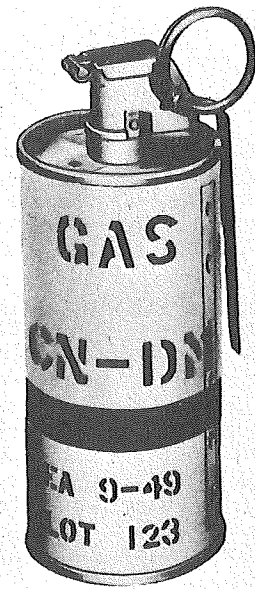
cause casualties upon inhalation of the vapor or penetration of the liquid through the skin. According to Army Field Manual FM 3-10, Employment of Chemical and Biological Agents, incapacitating agents are "employed on selected targets to incapacitate enemy forces when the use of lethal or destructive munitions is undesirable." The riot control agents are actually powders which are disseminated as aerosols to produce "temporary irritating or disabling physiological effects when in contact with the eyes or when inhaled."⁶

For the kinds of munitions loaded with these agents see Chart 4. These munitions range from howitzer and mortar shells, to bombs and land mines. There have been many innovations since 1966 and therefore the list should not be considered complete.

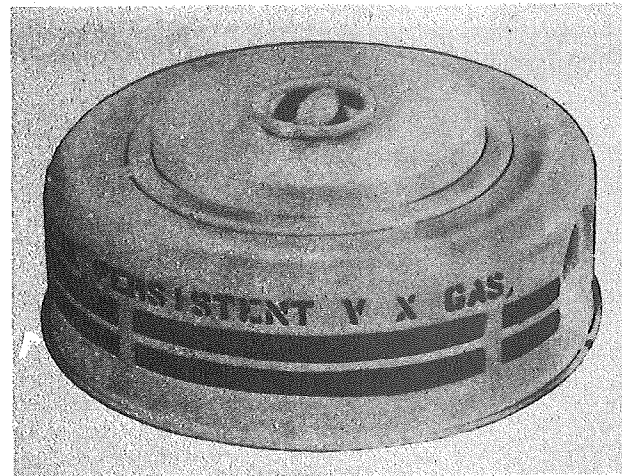
Information on biological warfare agents is harder to come by. DoD spokesmen never refer to any specific disease as being included in the American stockpile, and all references to BW in Congressional hearings are neatly deleted. Chart 5 is a list of the seven standardized CW agents. Chart 6 contains the suspected BW agents. Chart 7 is a partial list of producers of chemical agents and dispensers.

⁶ Army Field Manual FM 3-10, Employment of Chemical and Biological Agents, 31 March 1966, can be found in any government depository library. The earlier edition, Chemical and Biological Weapons Employment, published 20 February 1962, has more detail on the use of biological weapons.

GRENADE, HAND, RIOT, CN-DM, M6A1



MINE, GAS, PERSISTENT VX, 2-GALLON, M23



Use: The M23 2-gallon persistent VX gas mine is designed to provide obstacles which restrict enemy movement. The mine is used in barrier and interdiction minefields and to contaminate demolitions works.

Description: The M23 2-gallon persistent VX gas mine is similar in size, shape, and functioning to the M15 antitank mine. The mine is painted gray; the nomenclature and three bands are stenciled around the body in lusterless green enamel. Primary fuze consists of a top fuze activated by a Belleville spring assembly requiring a pressure of 300 to 400 pounds for activation. Secondary fuze consists of side and bottom fuze wells designed to accept the standard M1 activator and an M1A1, M2, M3, or M5 firing device. Secondary fuze provides an antipersonnel capability by boobytrapping.

Use: The M6A1 CN-DM riot hand grenade is used to control riots and other disturbances. It can also be used in training.

Description: The M6A1 CN-DM riot hand grenade is a cylindrical metal container, 2.5 inches in diameter and 4.5 inches high, filled with 0.31 pound of CN and 0.29 pound of DM and fitted with an M201A1 hand grenade fuze. The top surface of the DM filling and the walls of holes through both agents are coated with starter mixture. When the grenade is ignited, adhesive tape covering four ventholes in the top of the grenade and one venthole in the bottom is blown off, and CN-DM is disseminated through the holes. The burning time of the grenade is 20 to 50 seconds. The grenade weighs 1 1/4 pounds.

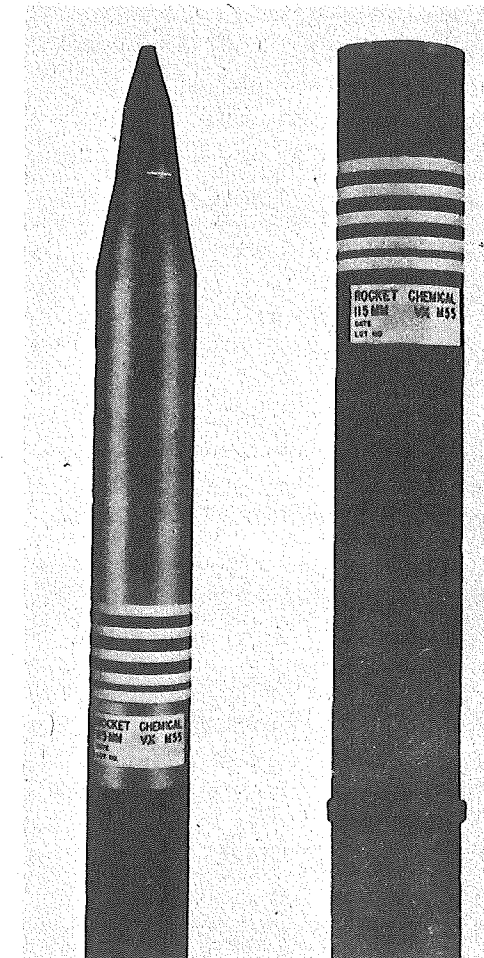
Figures 2-1 and 2-2. From U.S. Army Technical Manual TM 750-5-15, Chemical Weapons and Defense Equipment, February 1967, pp. 54, 63.

Use of CBW Munitions

One basic question that is seldom asked by liberal critics of the U.S. CBW program is the question of the projected use of these weapons. The theoretical basis for CBW planning can be found in the U.S. Marine Corps Field Manual FMFM 8-2, Counterinsurgency Warfare, published in December 1967:

...Toxic and nontoxic chemical shells are ideally suited to counter-guerrilla tactical operations... It is unlikely that guerrilla forces can obtain CB defensive equipment. Lethal C or B agent attacks over

ROCKET, GAS, PERSISTENT VX, 115-MM., M55



Use: The M55 115-mm. persistent VX gas rocket is designed to provide large-area contamination for persistent effect at ranges from 3,000 to 12,000 yards. The rocket is launched from the M91 multiple rocket launcher.

Description: The M55 115-mm. persistent VX gas rocket is packaged in a shipping and firing container which serves as the launching tube. The rocket is never removed from the shipping and firing container. The complete round consists of a VT fuze, a warhead, a rocket motor, and a fin assembly. The complete round less tube is 78 inches long and weighs 56 pounds.

Figure 2-3. From Chemical Weapons and Defense Equipment, p. 67.

large areas by aircraft... offer optimum means for destruction of these forces....

... [Biological weapons] are ideally suited to counter-guerrilla operations since non-lethal doses can be utilized to retard the activity of the guerrilla in areas that are inhabited by friendly or neutral civilians. These people can be treated or even inoculated against the biological agents used. Food can be issued to replace crops and animals of friendly civilians lost through this action.

The clearest use of CBW munitions has been Vietnam. The U.S. began supplying the South Vietnamese Army (ARVN) with CN and CS in 1962 under the Military Assistance Program (MAP). A third agent, DM, was given to the ARVN in 1964, and the halucinogen, BZ, was reportedly used by the U.S. 1st Cavalry (Airmobile) in March, 1966.⁷

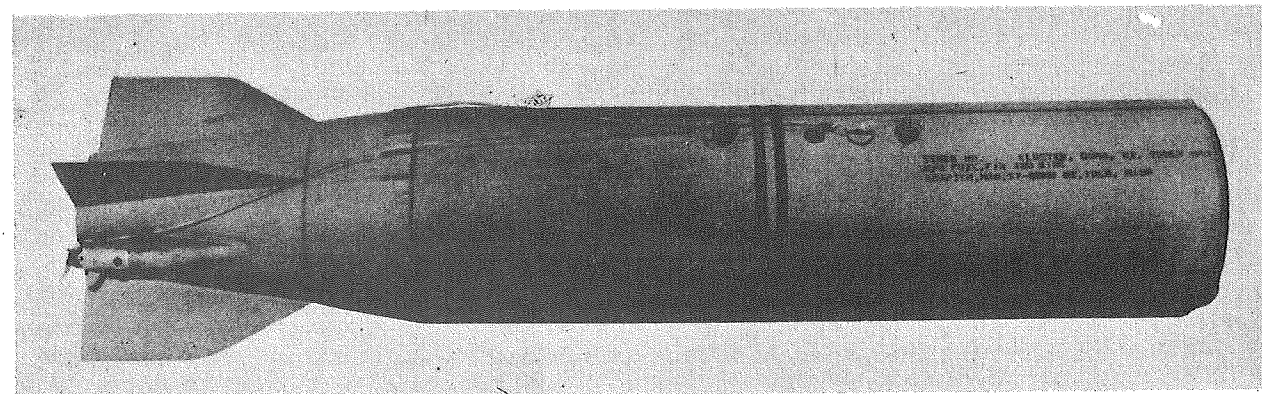
During the period since 1962 there has been a steady escalation in the use of gas in Vietnam. The South Vietnamese government began the use of CBW agents with the use of CS to break up a Buddhist protest in Saigon in November, 1964. Within a month the South Vietnamese (with U.S. supervision) were using CN, CS, and DM in regular military operations.⁸

(text continues p. 34)

⁷Pierre Darcourt, "Le Temps des Massacres," L'Express, 14-20 March 1966. Darcourt reported that the 1st Cavalry attacked Bongson using "3,000 grenades containing the gas BZ." He also said, "BZ is a lethargic gas which causes one to lose his memory.... Of the Vietcong battalion [350 to 500 men] treated with this gas, only 100 guerrillas escaped."

⁸Hersh, *op. cit.*, p. 143.

CLUSTER BOMB, INCAPACITATING BZ, 750-LB., M43



Use: The M43 750-lb. incapacitating BZ bomb cluster is intended to be used with Army airplanes or Air Force airplanes traveling at subsonic speed to deliver M138 incapacitating BZ bombs on selected targets.

Description: The M43 750-lb. incapacitating BZ bomb cluster consists of M138 incapacitating BZ bombs in an M30 cluster adapter, an M14 tail fin assembly, two M152A1 tail fuzes, and an M23 arming wire.

Figure 2-4. From *Chemical Weapons and Defense Equipment*, p. 7.

2. UNIVERSITIES & COLLEGES DOING CBW RESEARCH

Senator Gaylord Nelson (D.-Wisc.) announced in early August, 1969 that the following 47 universities and colleges held Pentagon contracts for CBW research:^{*}

Boston University	Indiana University Foundation	St. Louis University***
Brooklyn College	Iowa State University	Stanford Research Institute***
Buffalo University	Johns Hopkins University**,**	University of Tennessee
University of California (Berkeley)**	Kansas State University**	University of Texas (Austin)**
University of California (Los Angeles)**	University of Maryland (& its medical & dental schools)**	Texas Agricultural & Mechanical College
University of Chicago	University of Massachusetts	University of Utah***
University of Connecticut**	Massachusetts Institute of Technology	Utah State University***
Cornell University**	University of Michigan***	Medical College of Virginia
University of Delaware	University of Minnesota**	University of Washington***
George Peabody College**	University of North Carolina	Washington State University**
George Washington University	Ohio State University	Western Reserve University
Georgia Institute of Technology	University of Oklahoma***	College of William & Mary***
Hahnemann Medical College***	University of Oregon	University of Wisconsin
Harvard University	University of Pennsylvania	Yale University**
University of Illinois (Urbana)	University of Pittsburgh	
Illinois Institute of Technology***	Polytechnic Institute of Brooklyn	
	Rutgers University***	

Added to this list should be several academic centers mentioned by a Department of Defense spokesman in early September, 1966:

University of Alabama***	University of Kansas	Notre Dame University
Associated Universities (Brookhaven)	University of Nebraska	Ohio State University Research Foundation
Columbia University	University of New Mexico	Research Triangle Institute (North Carolina State & Duke University)
Fordham University	New York University	
University of Hawaii***	State University of New York Research Foundation	

^{*}Washington Post, 10 August 1969 and *Congressional Record*, 11 August 1969, pp. S9525-6. For research into college & university contracts see Michael Klare, "The University & CBW Research," *Viet-Report*, January-February 1967; Carol Brightman, "The Weed Killers: CBW in Vietnam," *Viet-Report*, June-July 1966; Elinor Langer, "Chemical & Biological Warfare (I): The Research Program," *Science*, 13 January 1967; Michael Klare, "CBW Research Directory," *Viet-Report*, January 1968.

^{**}For detailed information on these universities, as well as University of Arizona, Baylor University, University of California (Davis) and University of Florida (Gainesville), see *The University-Military Complex; A Directory & Related Documents*, compiled by Michael Klare, available from NACLA, P.O. Box 57, Cathedral Park Station, New York, N.Y. 10025 for \$1.00.

^{***}More recent information can be found in Michael Klare, "War Games," *Guardian*, 10 May 1969. Included is information on Brown University, University of Colorado Medical Center, University of New Hampshire, Albany Medical College and Union University.

3. RESEARCH ON CBW*

Company	Project title/description	Sponsoring agency/ Contract number/ Documentation
AEROJET-GENERAL CORP. Downey, Calif.	"CW Agent Prototype Munitions Dissemination Systems" --Experimental evaluation of "CW agent dissemination techniques & concepts as applied to prototype munitions systems to establish performance data...& to provide optimized systems-design criteria for utilizing agents."	Edgewood Arsenal, DA-18-035-AMC-117A (TAB, 7-1-66)

AEROJET-GENERAL, con'd.	"Tactical Incapacitating Munitions Study" & "Research on Army Air-Delivered Tactical CS Munition"--Research on battlefield use of incapacitating agents.	Edgewood Arsenal, DAAA15-67-R-0232, DAAA15-68-R-0011 (DMS '68)
	"Biological Line Source Dissemination System"--Research on aircraft dissemination of BW agents.	Army Biological Lab, DA-18-064-AMC-300A (TAB, 11-1-66)
AIRCRAFT ARMAMENTS, INC. Cockeysville, Md.	"Dissemination System for Chemical Agents, Lethal & Incapacitating."	(Edgewood Arsenal, DA-18-108-AMC-62A (TAB, 9-15-66)
AMERICAN INSTITUTES FOR RESEARCH Silver Springs, Md.	"Effects of Drugs on Human Performance"--Development of "ability tests which will evaluate the effects of incapacitating compounds on human performance."	Edgewood Arsenal, DA-18-035-AMC-282A (TAB, 7-1-66)
ATLANTIC RESEARCH CORP. Alexandria, Va.	"Investigation of Supersonic Delivery of Biological Agents"--Studies to establish "design criteria for delivery of dry biological agents at supersonic delivery."	USAF Armament Lab, AF-08(635)-4396 (TAB, 11-1-66)
	"Rapid Gelling Systems for Chemical Munitions"--Development of CW agent bomblets.	USAF Armament Lab, AF-08(635)-5156 (TAB, 4-1-67)
ANALYTIC SERVICES, INC. Falls Church, Va.	"The Technical Feasibility of Biological Warfare"--Operations research on biological warfare, including computations of area coverage and casualties from simulated BW attacks.	USAF, AF-49(638)-1259 (TAB, 4-1-67)
AVCO CORP. Wilmington, Mass.	"Determination and Disposition of Submarginal Biological Weapons"--Evaluation of "concepts for the determination and disposition of submarginal biological weapons containing either anti-personnel or anti-crop agents."	USAF Armament Lab, AF-08(635)-4679 (TAB, 7-15-66)
BATTELLE MEMORIAL INSTITUTE Columbus, Ohio	"Biological Munitions for Small Targets"	Army Biological Lab DA-18-064-AMC-332A (TAB, 4-15-66)
BOOZ-ALLEN APPLIED RESEARCH, INC. Chicago, Ill.	"Mathematical, Statistical & Operations Research Relative to Effects of BW & CW Agents When Tested & Evaluated Under Operational Conditions"--Operations research in support of CBW field test program at Dugway Proving Ground.	Dugway Proving Ground DAAD09-67-R-0272 (DMS '68)
	"Technical Development Plan for the Army's Air-Delivered Tactical CS Munition"--Reliability studies & field tests of air-delivered incapacitating agents.	Edgewood Arsenal DA-18-035-AMC-734A (TAB, 8-15-66)
C-E-I-R, Inc. Washington, D.C.	"Mathematical & Statistical Research & Data Analysis of CBW Testing Program"	Army Biological Lab DAAA13-68-C-0063 (DMS '68)
DOW CHEMICAL CORP. Midland, Mich.	"Evaluation of the Sensitivity of Some Common Food Crops to the Herbicide 4-amino-3,5,6-Trichloropicolinic Acid"--Research on the effectiveness of picloram in poisoning non-gramineous crops, including soybean, potato & manioc.	Army Biological Lab DA-18-064-AMC-119A (TAB, 7-1-65)
ETHYL CORP Ferndale, Mich.	"Synthesis & Screening of Defoliants"--Research on the effectiveness of various metalorganic compounds used as defoliants.	Army Biological Lab DA-18-064-CML-2850 (TAB, 3-1-67)

GARRETT CORP. AiResearch Mfg. Co. El Segundo, Cal.	"Services to Design & Develop the XM26 Riot Control Dispenser."	Edgewood Arsenal DAAA15-69-C-0061 (CBD, 9-4-68)
GCA CORP. Bedford, Mass.	"New Techniques for the Dissemination of Chemical Agents"--Investigation of "new techniques & concepts for the dissemination of solid & liquid chemical agents."	Edgewood Arsenal DA-18-108-AMC-249A (TAB, 11-1-66, 3-15-67)
	"Aerosol Dissemination Assessment" & "Research on the Dissemination of Inhalable Aerosols"--Research on the dissemination of CBW aerosols.	Edgewood Arsenal DA-18-035-AMC-376A DAAA15-67-C-0509 (TAB, 6-15-67, R&DD '68)
	"Services to provide meteorological data system integration, operation & maintenance at Dugway Proving Ground" & "Services for the development of dosage prediction models & concepts"--Operations research & computer services in support of CBW field test program of Dugway Proving Ground.	Dugway Proving Ground DAAD09-68-C-0094 DAAD09-67-R-0009 (DMS '68, R&DD '68)
GEOMET INC. Rockville, Md.	"Services to collect, evaluate, statistically summarize & tabulate all pertinent data & information as appropriate on offensive-defensive systems, their subsystems & components, for CBW agents."	Dugway Proving Ground DAAD09-69-R-0082 (CBD, 4-23-69)
GOODYEAR AEROSPACE CORP. Akron, Ohio	"Study of Materials & Methods for Subpackaging Biological Munitions" & "Exploratory Development for a Chemical & Biological Bomblet"--Research on the fabrication of CBW bomb components.	USAF Armament Lab, AF-08(635)-5404 AF-08(635)-5392 (TAB, 10-1-66, 10-15-66)
W. R. GRACE & CO. Clarkesville, Md.	"Development of Chemical Agent Suspensions"--Research on aerosol dissemination of CW agents.	Edgewood Arsenal DAAA15-67-C-0059 (TAB, 7-1-67)
	"Research on New Concepts for the Dissemination of Agents for Tunnel Denial"--Research on the use of CW agents to drive people from tunnels (as in Vietnam).	Edgewood Arsenal DA-18-035-AMC-747A (TAB, 1-15-67)
HARVEY ENGINEERING LABS Torrance, Cal.	"Implosion Dissemination of Solid Chemical Agents (BZ)"--Research on the aerosol dissemination of incapacitating agent BZ.	USAF Armament Lab, AF-08(635)-4416 (TAB, 10-1-66)
HONEYWELL, INC. Ordnance Div. Hopkins, Minn.	"BZ Bomblet (BLU-20/B23)"--Fabrication of a bomblet containing incapacitating agent BZ compatible with the SUU-13/A bomb dispenser for "high-speed, low-altitude aircraft delivery."	USAF Armaments Lab, AF-08(635)-3691 (TAB, 6-1-67)
ARTHUR D. LITTLE, INC. Cambridge, Mass.	"Research on Incapacitating Agents"--Research on the military use of "psychochemicals" (hallucinogens), including THC, a synthetic form of marijuana.	Edgewood Arsenal DAAA15-68-C-0023 (DMS '68)
MELPAR, INC. (Subsidiary of Westington Air Brake Co.) Falls Church, Va.	"Fluctuating Meteorological Parameters"--Study of "the environmental fluctuations experienced by a freely-travelling BW aerosol particle."	Dugway Proving Ground DA-42-007-AMC-224R (TAB, 10-1-66)
	"Provide Meteorological Support & Participate in Tests & Surveys in Various Environments, Areas & Terrains," "Development of Instrumentation for Real Time Measurements of Field Disseminated CBW Agents" & "Development of Tracer Materials & Detection Methodology to be Used in Tracing Biological Aerosols in Field Testing"--Provide scientific services in support of CBW field testing program of Dugway Proving Ground.	Dugway Proving Ground DA-42-007-AMC-339Y DA-42-007-AMC-305R DA-42-007-AMC-312R (R&DD '68)

MONSANTO RESEARCH CORP. Dayton, Ohio	"Physical & Colloid Research on Chemical Agents," "Properties of Bromophenylacetonitrile (Agent CA)" & "Studies of Surface Chemistry of Solids in Dissem- ination"--Studies of Chemical agents "in order to support the search for new agents, evaluate candi- date agents & improve the stability & effectiveness of operational agents."	Edgewood Arsenal DA-18-035-AMC-136A DAAA15-68-C-0006 (TAB, 12-15-66, 7-15-67, DMS '68)
	"Study of Simulants (Test Expedients) for Toxic Chemical Agents"--Selection of "nontoxic simulants for chemical simulants for chemical agents BZ, GB & VX" for use in test exercises.	USAF Armament Lab DA-18-035-AMC-387A (TAB, 1-1-67, 7-1-67)
NORTHROP CORP. Anaheim, Cal.	"Non-linear Dispensing System"--Research on the aircraft dissemination of CBW agents.	USAF Armament Lab AF-08(635)-5034 (R&DD, '67)
OPERATIONS RESEARCH, INC. Silver Springs, Md.	"Project PHAROS: Sensitivity Analysis of the Opera- tional Effectiveness of CBW Weapons Systems"--Devel- opment of a "methodology for analyzing & evaluating the CBW weapons system in a militarily useful manner."	Edgewood Arsenal DA-18-108-CML-6554 (TAB, 4-15-66)
	"Project PHAROS II: A Revised CBW Weapons Systems Simulator"--Computerized simulations of CBW attacks, including projections of casualties.	Dugway Proving Ground DA-42-007-AMC-163Y (TAB, 7-1-67)
PENNSALT CHEMICALS CORP. King of Prussia, Pa.	"Defoliants & Foliar Desiccants Synthesis & Screen- ing"--Evaluation of the effectiveness of various compounds for use as anti-crop agents.	Army Biological Lab DA-18-064-CML-2847A (TAB, 6-1-66)
RESEARCH ANALYSIS CORP. McLean, Va.	"Economic-Crop Destruction as a Cold War/Counterin- surgency Weapon"--Strategic analysis of the military usefulness of crop-destroying campaigns.	Army Research Office DA-44-180-ARO-1 (TAB, 6-15-67)
SHOCK HYDRODYNAMICS, INC. Sherman Oaks, Cal.	"Study of Supersonic Delivery of Liquid CB Agents"-- Research on aircraft dissemination of CBW agents.	USAF Armament Lab AF-08(635)--4435 (TAB, 10-15-66)
TRAVELERS RESEARCH CENTER, INC. Hartford, Conn.	"CBW Effectiveness Methodology: An Analysis of Needs & Current Status" & "Methodology & Applied Studies Relevant to CBW Operations Research"--"The range of likely uses of antipersonnel toxic CBW munitions is considered & the requirements for computing their effectiveness are identified."	Edgewood Arsenal DA-18-035-AMC-727A (TAB, 8-1-67, R&DD '68)
	"Techniques for Dosage Prediction"--Development of mathematical models for the computation of dosage levels resulting from CBW attack.	Dugway Proving Ground DA-42-007-AMC-247R (TAB, 7-1-67, 8-15-67)
	"Study of Aerosol Diffusion over a Woodlot Complex"	Dugway Proving Ground DAAD09-68-C-0042 (DMS '68)
UNIDYNAMICS Phoenix, Ariz.	"New Methods of Chemical Agent Dissemination by Thermal Means"--Development of a CW dissemination system "in which the hot gases from a burning pyrotechnic melt, ablate & vaporize the agent."	Edgewood Arsenal DA-18-035-AMC-371A (TAB, 3-1-67)
VITRO CORP. OF AMERICA Eglin AFB, Fla.	"An Ecological Study of the Effects of Certain Con- centrations of Cacodylic Acid on Selected Fauna & Flora"--Tests to determine toxicity of cacodylic acid, an anti-crop agent used in Vietnam.	Air Proving Ground AF-08(635)-5150 (TAB, 8-1-67)

*Abbreviations: CBD, Commerce Business Daily (published by U.S. Department of Commerce); DMS, De-
fense Marketing Service (published annually by McGraw-Hill); R&DD, Research & Development Directory
(published annually by Government Data Publications, Inc.); & TAB, Technical Abstract Bulletin (pub-
lished bi-weekly by the Defense Documentation Center of the U.S. Department of Defense).

4. CHEMICAL MUNITIONS & WEAPON DELIVERY SYSTEMS*

Weapon system	Agent		Munition	Using service	Employment data				Average unit (column C) capabilities		
	Type	Avg wt (lb)			a	b	c	d	e	f	g
4.2-inch mortar	HD	6.0	Cartridge, M2A1	ARMY USMC	4,500	PD	4/Sec (6/Btry USMC)	50 rds/3 min 105 rds/15 min	5.0 4.5	15 min 15 min	Casualty-producing vapor (skin). Contamination of troops or terrain.
	GB	1.8	Cartridge, M360	ARMY USMC	11,100 14,800 *****	PD	6/Btry	3 rds/15 sec 30 rds/3 min 66 rds/15 min	0.5 2.5 2.5	TOT 15 min 15 min	Casualty-producing dosage. Casualty-producing vapor (skin). Contamination of troops or terrain.
105-mm howitzer	HD	3.1	Cartridge, M60	ARMY USMC	16,460 10,200	PD	Variable	16-18 rds/min 40 rds/1 min	Variable	.....	Casualty-producing dosage.
	GB	6.5	Projectile, M121	ARMY USMC	14,000 18,000 *****	PD	6/Btry	1 rd/15 sec 12 rds/3 min 24 rds/15 min	1.0 2.5 3.5	TOT 15 min 15 min	Casualty-producing dosage. Casualty-producing vapor (skin). Contamination of troops or terrain.
5-inch gun	GB	3.2	Shell, 5"/38, MK53	NAVY	16,460 10,200	PD	Variable	16-18 rds/min 40 rds/1 min	Variable	.....	Casualty-producing dosage.
	GB	4.2	Shell, 5"/54, MK54	NAVY	16,460 10,200	PD	Variable	16-18 rds/min 40 rds/1 min	Variable	.....	Casualty-producing dosage.
155-mm howitzer	GB	6.5	Projectile, M121	ARMY USMC	14,000 18,000 *****	PD	6/Btry	1 rd/15 sec 12 rds/3 min 24 rds/15 min	1.0 2.5 3.5	TOT 15 min 15 min	Casualty-producing dosage. Casualty-producing vapor (skin). Contamination of troops or terrain.
	VX	6.5	Projectile, M121	ARMY USMC	14,000 18,000 *****	VT	6/Btry	1 rd/15 sec 12 rds/3 min 24 rds/15 min	1.0 2.5 3.5	TOT 15 min 15 min	Casualty-producing dosage. Casualty-producing vapor (skin). Contamination of troops or terrain.
155-mm gun	GB	6.5	Projectile, M122	USMC	23,500	PD	6/Btry	1 rd/15 sec 4 rds/3 min 10 rds/15 min	1.0 1.0 1.4	TOT 15 min 15 min	Casualty-producing dosage. Casualty-producing vapor (skin). Contamination of troops or terrain.
	HD	9.7	Projectile, M104	USMC	23,500	PD	6/Btry	1 rd/15 sec 4 rds/3 min 10 rds/15 min	1.0 1.0 1.4	TOT 15 min 15 min	Casualty-producing dosage. Casualty-producing vapor (skin). Contamination of troops or terrain.
8-inch howitzer	GB	15.8	Projectile, M426	ARMY USMC	16,800	PD	4/Btry (6/Btry USMC)	1 rd/15 sec 4 rds/3 min 10 rds/15 min	2.0	TOT	Casualty-producing dosage. Contamination of troops or terrain.
	VX	14.1	Projectile, M426	ARMY USMC	16,800	VT	4/Btry (6/Btry USMC)	1 rd/15 sec 4 rds/3 min 10 rds/15 min	2.0	TOT	Casualty-producing dosage. Contamination of troops or terrain.
5-inch rocket	GB	4.8	Warhead, MK40	NAVY	4,200	PD	Variable	48 rkt/15 min	.....	.....	Casualty-producing dosage.
115-mm rocket launcher	GB	11.0	Rocket, M55 (THE BOLT)	ARMY	10,600	PD	3/Dir Spt Bn	45 rkt/15 min	.....	15 sec	Casualty-producing dosage. Contamination of troops or terrain.
	VX	10.0	Rocket, M55 (THE BOLT)	ARMY	10,600	PD	3/Dir Spt Bn	45 rkt/15 min	.....	15 sec	Casualty-producing dosage. Contamination of troops or terrain.
318-mm rocket, LITTLE JOHN.	GB	71.5	Warhead, M206 (M139 bomblets)	ARMY	20,400	MT	4/Btry	3 rkt/hr	.....	NA	Casualty-producing dosage.
762-mm rocket, HONEST JOHN	GB	478.0	Warhead, M190 (M139 bomblets)	ARMY	38,000	MT	4/Bn	2 rkt/hr	.....	NA	Casualty-producing dosage.
SERGEANT missile	GB	429.0	Warhead, M212 (M139 bomblets)	ARMY	139,000	Baro- metric	2/Bn	2 rkt/hr	.....	NA	Casualty-producing dosage.
Chemical land mine	VX	11.5	M23 mine	ARMY	NA	Variety	NA	NA	.....	NA	Contamination of troops or terrain.
	HD	9.9	1-gallon mine	ARMY	NA	Variety	NA	NA	.....	NA	Contamination of troops or terrain.
Fighter, bomber, aircraft.	GB	.....	Spray tank, Aero-14B	USMC	.....	NA	.....	NA	.....	.....	Casualty-producing dosage. Contamination of troops or terrain.
	VX	.....	Spray tank, TMU-28B	USAF	.....	NA	.....	NA	.....	.....	Contamination of troops or terrain.
	VX	.....	Spray tank, TMU-28B	USAF	.....	NA	.....	NA	.....	.....	Contamination of troops or terrain.
	GB	152.0	Dispenser, CBU-15/A (bomblets in line)	USAF	.....	Impact	.....	.....	.....	.....	Casualty-producing dosage. Incapacitation-producing dosage.
	BZ	68.0	Dispenser, SUU-13/A (bomblets in line)	USAF	.....	Impact	.....	.....	.....	.....	Casualty-producing dosage. Incapacitation-producing dosage.
	GB	.....	Bomb, WETEYE (MK116, Mod O)	USMC NAVY	.....	Impact	See FM 3-10B for employment data.	Bomb load varies with type aircraft.	.....	.....	Casualty-producing dosage. Incapacitation-producing dosage.
	GB	.....	Bomb, MISTEYE II ⁹ (clustered bomblets)	USMC NAVY	.....	MT	.....	.....	.....	.....	Casualty-producing dosage. Incapacitation-producing dosage.
	BZ	.....	Dispenser, PADEYE I ⁹ (bomblets in line)	NAVY	.....	Impact	.....	.....	.....	.....	Casualty-producing dosage. Incapacitation-producing dosage.
	GB	198.0	Bomb, M34A1, 1000-lb (clustered bomblets)	USAF	.....	MT	.....	.....	.....	.....	Casualty-producing dosage. Incapacitation-producing dosage.
	GB	220.0	Bomb, MC-1, 750-lb	USAF	.....	Impact	.....	.....	.....	.....	Casualty-producing dosage. Incapacitation-producing dosage.
GB	110.0	Bomb, MK94, 500-lb	USMC NAVY	.....	Impact	.....	.....	.....	.....	Casualty-producing dosage. Incapacitation-producing dosage.	
BZ	85.5	Bomb, M43, 750-lb (CBU-5B) (clustered bomblets)	ARMY USAF	.....	MT	.....	.....	.....	.....	Incapacitation-producing dosage.	

*From Army Field Manual FM 3-10, Employment of Chemical & Biological Agents, pp. 15-6.

**Abbreviations: PD, point detonating; VT, variable time; MT, mechanical time; NA, not applicable.

***Rate of fire varies with training & experience of gun crews, weather conditions & number of changes in elevation & deflection required during the fire mission.

****One hectare equals 10,000 square meters.

*****A casualty-producing dosage consists of lethal dosages & incapacitating dosages. For maximum effectiveness in a GB surprise dosage attack, the maximum number of artillery should be used in the minimum period of time to obtain time-on-target (TOT) effects.

*****Extended range capability.

5. STANDARD U.S. WAR GASES

Type	U.S. Army Code	Name	Smell	Symptoms & remarks*
Riot Control Agents	CN	CAP (standard tear gas)	apple blossom	"...burning of the eyes; copious flow of tears; and irritation of the respiratory passages."
	CS	OCBM (super tear gas)	peppery	"...burning of the eyes; copious flow of tears; coughing; difficulty in breathing & chest tightness. Heavy concentration causes nausea." Can incapacitate in 20 seconds.
	DM	adamsite	none	"...irritation of the eyes & mucous membranes...; discharge from the nose; pain & tightness in the chest; nausea & vomiting." "DM alone is not approved for use in riot control dispersers in any operation where deaths are not acceptable."***
Incapacitating Agent	BZ	(classified)	(classified)	"...incapacitating physical & mental effects. Prevents exposed personnel from performing their missions." BZ is "either a psychochemical or a strong anesthetic which can produce temporary paralysis, blindness, or deafness in its victims. BZ has been known to cause maniacal behavior. Its precise makeup is secret."***
Harassing Agent	HD	distilled mustard	faint garlic	"...affects the eyes & lungs & blisters the skin." "Caused one-fourth of the U.S. gas casualties in WW I."***
Nerve Gases	VX	(classified)	(classified)	"...causes muscles to contract, breathing stops, and death occurs. Very high toxicity; much greater through the eye than through the skin." Paralyzes the nervous system.
	GB	sarin	none	"...causes muscles to contract, breathing stops & death occurs." Paralyzes the nervous system.

*All quotes not otherwise identified are from Army Field Manual FM 3-10, Employment of Chemical & Biological Agents, March 1966, p. 61.

**Ibid., p. 7.

***Seymour Hersh, Chemical & Biological Warfare: America's Hidden Arsenal (Bobbs-Merrill, 1968) pp. ix-xii.

6. SUSPECTED U.S. BIOLOGICAL WEAPONS*

Type	Disease	Antibiotic therapy	Vaccine	Infectivity	Epidemicity	Effects & remarks
Bacterial Diseases	anthrax	effective if given very early	available	moderately high	low	Normally fatal. Death can result in 24 hours if untreated. When exposed to air, germs form spores that can remain alive for more than 20 years.
	brucellosis	moderately effective	under development	high	none	Long-lasting, severe fever. Mortality less than 5 per cent. Symptoms can linger for months. Also known as undulant fever.

Bacterial Diseases	pneumonic plague	moderately effective	available	high	high	Almost 100 per cent fatality. Germ remains viable in water for 2 to 30 days, in moist areas for 2 years & in freezing temperatures for 2 to 12 months.
	tularemia	effective	available	high	none	Severe fever. Usually low fatality, but sometimes up to 60 per cent. Also known as rabbit fever.
Viral Diseases	psittacosis	effective	none	high	moderately high	Severe fever. Moderately high mortality. Birds may act as reservoir of disease.
	Eastern equine encephalitis	none	none	high	none	Mortality higher than 60 per cent. Can severely cripple the nervous system of survivors.
	Venezuelan equine encephalitis	none	none	high	none	Mortality less than 1 per cent. A mild disease that can last as few as 3 days.
Rickettsial Diseases	Q-fever	effective	under development	high	none	Fever for 1 week. Mortality less than 1 per cent. Organism can remain alive & infectious for years in dry areas. Fever can last up to 3 months.
	Rocky Mountain spotted fever	effective	under development	high	none	Usually 80 per cent mortality. Fevers range up to 105° F. Can kill within 3 days
Biological Toxin	botulism	none	available as toxoid	high	none	Severe poisoning. 60 to 70 per cent mortality. First isolated at Ft. Detrick during WW II. Theoretically 8 ounces could wipe out the world.**

*Information taken from Steven Rose, Chemical & Biological Warfare (Beacon, 1969), Seymour M. Hersh, Chemical & Biological Warfare: America's Hidden Arsenal (Anchor, 1969) and U Thant, Report to the General Assembly of the U.N. on Chemical & Biological Weapons & the Effects of their Possible Use, July 1969.

**U Thant's international committee of 14 experts reclassified botulinus toxin as a chemical weapon. The reason for this is as yet unexplained. However, on 31 October 1969 the New York Times ran a story "exposing" the fact that the U.S. Army has stockpiled 20,000 bullets poisoned with botulinum at the Pine Bluff Arsenal. The article stated, "Knowledgeable sources indicate that the poison bullets could logically serve only one purpose: assassination."

7. PRODUCERS OF CHEMICAL WEAPONS*

Company	Product	Sponsoring agency, contract number, amount, documentation
AGRISECT CHEMICAL CORP. New York, N.Y.	Butyl Ester Herbicides***	DSA-400-C1634, \$653,500 (GCD)
ANCHOR PRECISION PRODUCTS Hackensack, N.J.	M5 Riot Control Agent Dispenser (helicopter or vehicle mounted)	DAAA15-67-C-0408, \$211,575 (GCD)
BUFFALO TURBINE AGRICULTURAL EQUIPMENT Gowanda, N.Y.	M106 Riot Control Agent Dispenser ("Mity-Mite")	DAAA15-67-C-0254, \$122,379 (GCD)
DOW CHEMICAL CO. Midland, Mich.	Tordon Herbicide	DSA-400-C1399, \$3,830,568 (GCD) DSA-400-67-C-7030, \$2,274,000 (GCD)
	Butyl Ester Herbicides***	DSA-400-67-C5534, \$1,217,625 (GCD) DSA-400-C1820, \$2,734,300 (GCD)

FEDERAL LABS, INC. (Subsidiary of The Breeze Corp.) Saltburg, Pa.	M7A3 CS Riot Hand Grenade CS-1 Riot Control Agent	DAAA15-67-0228, \$531,472 (GCD) DAAA15-69-C-0177, \$1,140,221 (CBD) DAAA15-69-C-0153, \$604,800 (CBD)
FISHER CHEMICAL CO. (Division of Ashland Oil & Refining Co.) Englewood Cliffs, N.J.	CS-1 Riot Control Agent CS Riot Control Agent	DAAA15-67-C-0622, \$824,019 (GCD) DAAA15-67-C-0246, \$360,691 (GCD) DAAA15-69-C-0555, \$87,472 (CBD)
HERCULES, INC. Wilmington, Del.	Butyl Ester Herbicides***	DSA-400-C1633, \$2,923,530 (GCD)
LIQUIDONICS, INC. Westbury, N.Y.	Components of M3 Riot Control Agent Dispenser	DAAA15-67-C-0513, \$136,250 (GCD)
MONSANTO CO. (Agricultural Division) St. Louis, Mo.	Butyl Ester Herbicides***	DSA-400-C1284, \$3,278,224 (GCD)
NORTHROP CAROLINA, INC. Asheville, N.C.	M25A2 CS-1 Riot Hand Grenade CS-1 Riot Control Agent	DAAA15-67-C-0250, \$2,440,971 (GCD) DAAA15-69-C-0456, \$45,389 (CBD)
SARGENT-FLETCHER El Monte, Cal.	Liquid Agent Spray Tank, TMU-28/B	DAAA15-67-C-0649, \$1,716,965 (GCD)
THIOKOL CHEMICAL CORP. Denville, N.J.	CS-1 Riot Control Agent	DAAA15-69-C-0150, \$38,340 (CBD)
U.S. RUBBER CO Nagatuck, Conn.	Butyl Ester Herbicides***	DSA-400-67-C-5959, \$284,000 (GCD)

*Abbreviations: CBD, Commerce Business Daily (published by U.S. Department of Commerce); GCD, Government Contracts Directory (published 1969 by Government Data Publications, Inc., Washington, D.C.)

Technical information on chemical agents and dispersers should be sought in the following: Army Technical Manual TM 750-5-15, Chemical Weapons & Defense Equipment; Army Technical Manual TM 3-215, Military Chemistry & Chemical Agents; and Army Training Circular TC 3-16, Employment of Riot Control Agents, Flame, Smoke and Herbicides in Counter guerrilla Operations.

**Contract numbers with the prefix DSA have been awarded by the Defense Supply Agency, Richmond, Va. The remaining contracts, preceded by the prefix DA, have been awarded by the Army Edgewood Arsenal, Md.

***Butyl esters herbicides are 2,4-D (2,4-dichlorophenoxyacetic acid) and 2,4,5-T (2,4,5-trichlorophenoxyacetic acid).

Because of world-wide public outrage, the Johnson administration temporarily suspended the use of gas for about six months in 1965. However, after an intensive publicity campaign designed to categorize these munitions as "humane" substitutes for conventional weapons, the U.S. Command resumed the widespread use of CW agents.⁹

The Army has procured 13,736,000 pounds of CS for use in Vietnam from 1964-1969. With a helicopter dispenser this is enough to cover 80,000 square miles. (South Vietnam has only 66,000 square miles.) Procurement jumped from 367,000 pounds in 1964 to 6,063,000 in 1969.¹⁰

⁹See Lt. Col. Stanley D. Fair, "Gas and a Just War," Ordnance, November-December 1966, pp. 272-6. For a complete chronology of the use of CW agents in Vietnam see Hersh, op. cit., pp. 123-60.

¹⁰Washington Post, 24 July 1969, and Congressman Richard McCarthy at Tufts University, Medford, Massachusetts, 15 September 1969.

While the Army's press releases reported that tear gas was used to rescue downed airmen or women and children who had been seized by the Viet Cong as "human shields," the truth was somewhat otherwise. Beginning on February 21, 1966, CW agents were used to empty bunkers of their human inhabitants in preparation for bombing attacks by the huge B-52 strategic bombers. The New York Times on that date reported that "the purpose of the gas attack was to force the Viet Cong troops to the surface where they would be vulnerable to the fragmentation effects of the bomb bursts." A year later, in August 1967, the Pentagon acknowledged that DM was regularly used in these operations.

The "non-lethal" gases being used in Vietnam are not the "humane" weapons of the Pentagon's public relations campaigns. They are not being used for "riot control" or to save civilian lives: they are being used as part of lethal systems for genocidal purposes. There is no reason to believe that the military will halt its escalation now that it has made the leap to the lethal use of chemical weapons. In October 1966 Brig. Gen. J.H. Rothschild, a former commander of the Army Chemical Corps, said that mustard gas (HD) should be used in Vietnam in clearing land and rendering bunkers useless. At the same time Maj. Gen. John Bruce Medaris, a former commander of the Army Ordnance Missile Command, advocated the use of nerve gas in Vietnam.¹¹

Use of BW Weapons

An example of how the U.S. intends to put biological munitions to use was given by Rep. Richard D. McCarthy (D-N.Y.). McCarthy said that "we came very close to using biological warfare against Cuba" during the 1962 missile crisis. According to McCarthy, "it was only a last minute reversal that prevented the U.S. from being the first to use this inhuman form of warfare in modern time." He later said that former and present government officials had confirmed the report that the U.S. had planned to use "a biological agent to attack the Cuban sugar crop."

McCarthy has also described a study conducted by U.S. Army Chemical Corps planners for a hypothetical invasion of Cuba with the assistance of a biological attack that would incapacitate the Cuban defenders with fevers of 102 degrees, diarrhea, vomiting and a generally sick feeling. It was estimated that up to 3 per cent of the Cuban population would be killed by the disease and that it would save the lives of 10,000 U.S. soldiers.¹²

Anti-Crop Warfare

The practice of anti-crop warfare represents one of the major scientific innovations of the shift to counterinsurgency studies. When the U.S. began researching anti-crop warfare in the 1950's, it concerned itself almost exclusively with biological agents which attacked

¹¹Hersh, op. cit., p. 33.

¹²McCarthy referred to the two Cuban instances in speeches at Tufts University, Medford, Massachusetts, 15 September 1969, and to the Medical Committee for Human Rights and Physicians for Social Responsibility at New England Life Hall, Boston, Massachusetts, 18 July 1969. Both are available from his office.

wheat, the staple food crop of the Soviet Union. Since 1961, however, the Pentagon has emphasized research on anti-crop agents aimed at the ecology of tropical areas.¹³

By 1963, the use of anti-crop CW agents in Vietnam had become a customary practice, and their use has been increasing ever since.

Anti-crop agents, either biological or chemical, are munitions which destroy plants or inhibit their growth. (See Chart 8.) This category of weapons actually includes two distinct military techniques: anti-food warfare, the destruction of an enemy's foodcrops; and anti-foliage warfare, the destruction of vegetation used for camouflage and ambush. Although in practice these two techniques often utilize identical or related munitions, they are intended to accomplish quite distinct military objectives:

● Anti-food warfare is the intentional poisoning of plants used for food. Since the purpose of such a tactic is to weaken the enemy through systematic starvation, it is only useful in a drawn-out conventional war. A nuclear war would be concluded long before anti-food attacks would begin to have any significant impact. Counterinsurgency, on the other hand, represents an ideal application for anti-food warfare since a major objective of the counter guerrilla forces is to make it materially impossible for the native population to sustain a guerrilla movement.

● Anti-foliage warfare is the destruction of vegetation used by the enemy to conceal his movement when attacking, and his sanctuaries when in retreat. Where it is deemed necessary to completely destroy the vegetation in a given area chemicals are used which permanently destroy the plants (such agents are called herbicides). In other cases, concerned only with stripping the plants of their leafy coverage, the effect is achieved by drying out the leaves (desiccation) or speeding up the natural processes which cause the leaves to fall (abscission). The chemicals which produce these results are known as defoliants or desiccants.

Use of Defoliants in Vietnam

The American defoliation program in Vietnam, known officially as "Operation Ranch Hand," was initiated in November 1961 when six C-123 transport planes, ordinarily used for carrying troops, were flown to South Vietnam and outfitted with special tanks and high-pressure nozzles. The crop-spraying missions were flown by a special air unit, the 12th Air Comman-

¹³Under its counterinsurgency research program, Project Agile, the Pentagon in 1961 contracted for the needed research. From August 1961 to June 1963 the Army Biological Laboratories, Ft. Detrick, reported that "1410 compounds were spray-tested in the greenhouse to evaluate them as effective defoliants, desiccants and herbicides." This information, and more, available from Technical Abstracts Bulletin, 15 July 1965. While this work was in progress, other agencies were cataloging the plant life of Vietnam and surrounding areas. The Agricultural Research Service of Washington, D. C. compiled a survey of forest types in Southeast Asia, and studied the physiographic and climatic features of the area which were relevant to anti-crop warfare. See U.S. House Committee on Appropriations, Department of Defense Subcommittee, Department of Defense Appropriations, 1968, Hearings, 90th Congress, first session, Pt. 3, p. 93.

do Squadron, based at Saigon's Tan Son Nhut airfield. The motto of this unit describes the operation's premise: "ONLY WE CAN PREVENT FORESTS."¹⁴

According to Air Force Chief of Staff John P. McConnell, from 1962 to the beginning of 1967, more than one million acres of Vietnam had been sprayed. In February, 1968, the Pentagon announced that 965,000 acres had been chemically treated in 1967, an amount roughly equal to the total for the program's first five years. The scope of this effort can be indicated by the fact that the entire U.S. production of 2,4-D and 2,4,5-T has been taken over by the Pentagon (except a small supply for homeowners).¹⁵

¹⁴For more information on this unit, see Frank Harvey, Air War—Vietnam (Bantam, 1967), pp. 39-43 and Hersh, op. cit., pp. 132-42.

¹⁵Business Week, 22 April 1967.

8. U.S. HERBICIDES & DEFOLIANTS

Chemicals most frequently used	Effects
2,4-D (2,4-dichlorophenoxyacetic acid)	Destroys broad-leaf plants. Effect on humans of heavy direct exposure: pulmonary constriction, digestive malfunction & bleeding from the mouth.
2,4,5-T (2,4,5-trichlorophenoxyacetic acid)	Same as above. In a press conference, 29 October 1969, Dr. Lee A. Dubridge, President Nixon's science advisor, announced that the federal government was taking action to restrict the use of 2,4,5-T in this country. He quoted a study conducted by Bionetics Research Laboratories, "which indicated that offspring of mice & rats given relatively large doses of the herbicide during early stages of pregnancy showed a higher than expected number of deformities."** It is still being used in Vietnam.
cacodylic acid	A dimethylarsenic acid, containing 54.29 per cent arsenic. It is extremely poisonous. Arthur W. Galston, a Yale biologist, says that "the lethal subcutaneous dose in dogs is 1 gram per kilogram body weight. If the same toxicity held for man, then about 70 grams, or slightly over 2 ounces, would kill the average 150 pound man if administered subcutaneously."***
picloram (Dow Chemical Company's trade name is Tordon)	This is considered the most dangerous of the 4 herbicides from an ecological point of view because it remains in the soil considerably longer. The DoD tested the chemical in a tropical rain forest in Puerto Rico, spraying the area with 9 to 27 pounds of picloram per acre. The forest remained bare of leaves for the entire 2 years of the study.***

*New York Times, 30 October 1969.

**See "Changing the Environment: Herbicides in Vietnam II," Scientist & Citizen, August-September, 1967, pp. 122-9.

***See Weed Science, 1968, p. 45 & George R. Harvey & Jay Mann, "Picloram in Vietnam," Scientist & Citizen, September, 1968, p. 166.

9. DEFOLIANTS USED IN VIETNAM

Agent Orange	50-50 mixture of 2,4-D & 2,4,5-T used against heavy jungle cover & broad-leaf crops.
Agent Blue	Solution of cacodylic acid used to destroy tall elephant grass & rice.
Agent White	Mixture of 2,4-D & picloram used to destroy non-gramineous crops.

The government's first admission that it was using chemical herbicides to poison rice fields in Vietnam was delivered in December, 1965. The New York Times reported that "crop destruction missions are aimed only at relatively small areas of major military importance where the guerrillas grow their own food or where the population is willingly committed to their cause." [emphases added.]¹⁶

CBW Weapons - Bibliography¹⁷

Brown, Maj. Frederic J., Chemical Warfare: A Study in Restraints (Princeton, 1968)

Bunn, George, "Banning Poison Gas and Germ Warfare: Should the U.S. Agree?" Wisconsin Law Review, Vol. 1969, No. 2, pp. 375-420. A history of U.S. opposition to international agreements on CBW by a former delegate to the disarmament talks and former general counsel for the Arms Control and Disarmament Agency.

Clarke, Robin, The Silent Weapons (McKay, 1968)

Hersh, Seymour M., Chemical and Biological Warfare: America's Hidden Arsenal (Bobbs-Merrill, 1968). This is the book to read as an overall exposé of CBW. Also available as an Anchor Paper Back (#A673).

McCarthy, Congressman Richard D., The Ultimate Folly: War by Pestilence, Asphyxiation, and Defoliation (Knopf, 1969). This will also be issued as a Vintage paperback.

Rose, Steven, editor, Chemical and Biological Warfare (Beacon, 1969). This is a collection of papers presented to a Bernal Peace Library conference on CBW, February 1968. It included interesting material on the British CBW program.

Rothschild, Brig. Gen. J.H. (USA, retired), Tomorrow's Weapons (McGraw, 1964). This is the classic work in favor of better gases and bigger germs, by a former head of the Army Chemical Corps.

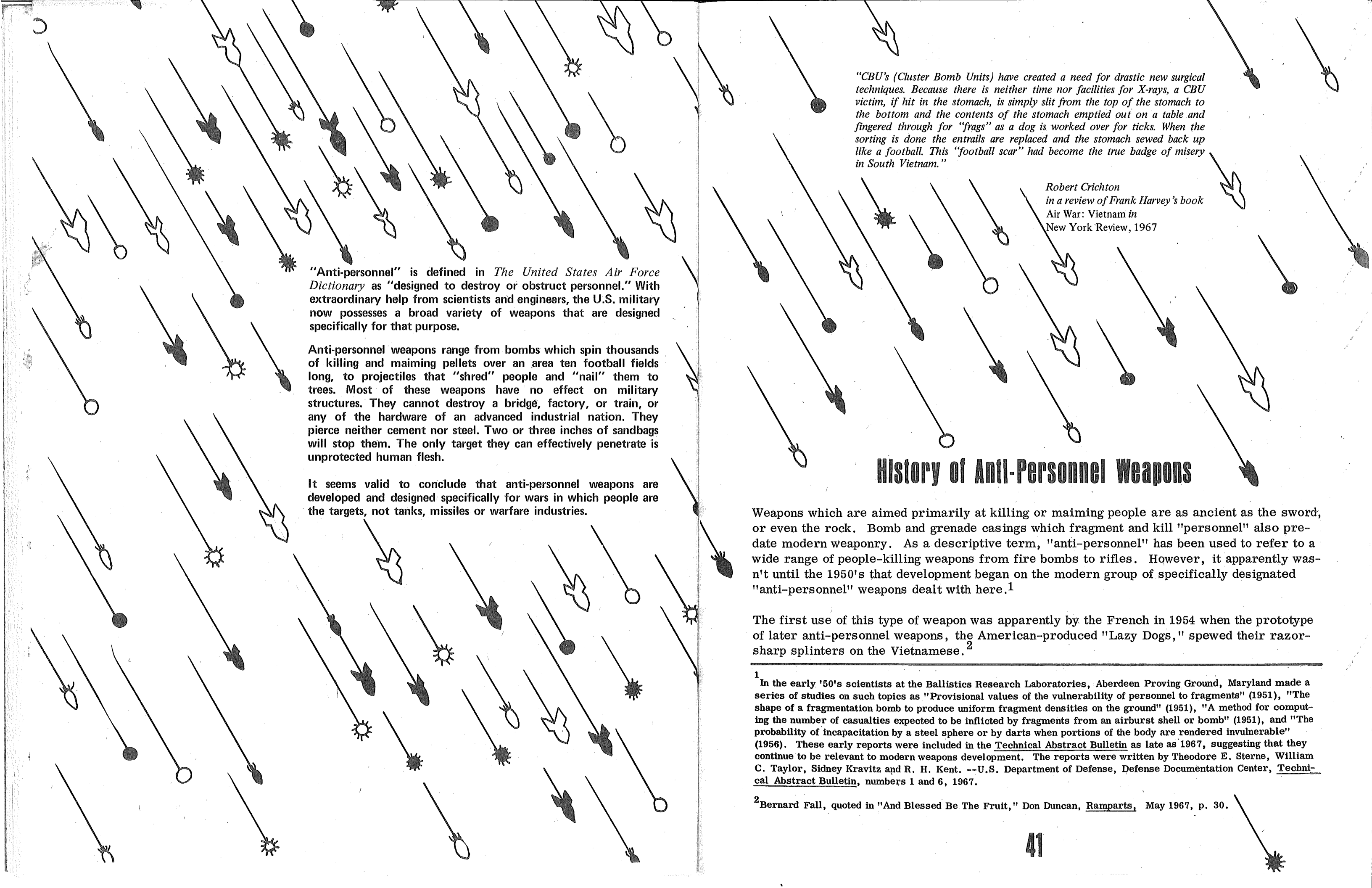
U.S. Senate Committee on Foreign Relations, Hearings, Chemical and Biological Warfare (Secret hearing held on April 30, 1969; sanitized and printed on June 23, 1969). Hearings are available free from the Committee office in Washington. This one covers the testimony of Dr. Matthew S. Meselson, Professor of Biology, Harvard University. He briefed the Senators on all aspects of U.S. CBW capability. It can be considered a primer.

¹⁶New York Times, 10 March 1966. Carol Brightman (Viet-Report, June-July 1966) reasoned that "the fact that food is everyone's basic commodity was turned into an asset in military calculations: by inducing famine in pro-NLF areas the Saigon government could drive entire districts into government refugee camps. . . . The idea was after all to swell the government side."

¹⁷For further information see Chapter 4.



ANTI-PERSONNEL



"Anti-personnel" is defined in *The United States Air Force Dictionary* as "designed to destroy or obstruct personnel." With extraordinary help from scientists and engineers, the U.S. military now possesses a broad variety of weapons that are designed specifically for that purpose.

Anti-personnel weapons range from bombs which spin thousands of killing and maiming pellets over an area ten football fields long, to projectiles that "shred" people and "nail" them to trees. Most of these weapons have no effect on military structures. They cannot destroy a bridge, factory, or train, or any of the hardware of an advanced industrial nation. They pierce neither cement nor steel. Two or three inches of sandbags will stop them. The only target they can effectively penetrate is unprotected human flesh.

It seems valid to conclude that anti-personnel weapons are developed and designed specifically for wars in which people are the targets, not tanks, missiles or warfare industries.

"CBU's (Cluster Bomb Units) have created a need for drastic new surgical techniques. Because there is neither time nor facilities for X-rays, a CBU victim, if hit in the stomach, is simply slit from the top of the stomach to the bottom and the contents of the stomach emptied out on a table and fingered through for "frags" as a dog is worked over for ticks. When the sorting is done the entrails are replaced and the stomach sewed back up like a football. This "football scar" had become the true badge of misery in South Vietnam."

Robert Crichton
in a review of Frank Harvey's book
Air War: Vietnam in
New York Review, 1967

History of Anti-Personnel Weapons

Weapons which are aimed primarily at killing or maiming people are as ancient as the sword, or even the rock. Bomb and grenade casings which fragment and kill "personnel" also pre-date modern weaponry. As a descriptive term, "anti-personnel" has been used to refer to a wide range of people-killing weapons from fire bombs to rifles. However, it apparently wasn't until the 1950's that development began on the modern group of specifically designated "anti-personnel" weapons dealt with here.¹

The first use of this type of weapon was apparently by the French in 1954 when the prototype of later anti-personnel weapons, the American-produced "Lazy Dogs," spewed their razor-sharp splinters on the Vietnamese.²

¹ In the early '50's scientists at the Ballistics Research Laboratories, Aberdeen Proving Ground, Maryland made a series of studies on such topics as "Provisional values of the vulnerability of personnel to fragments" (1951), "The shape of a fragmentation bomb to produce uniform fragment densities on the ground" (1951), "A method for computing the number of casualties expected to be inflicted by fragments from an airburst shell or bomb" (1951), and "The probability of incapacitation by a steel sphere or by darts when portions of the body are rendered invulnerable" (1956). These early reports were included in the *Technical Abstract Bulletin* as late as 1967, suggesting that they continue to be relevant to modern weapons development. The reports were written by Theodore E. Sterne, William C. Taylor, Sidney Kravitz and R. H. Kent. --U.S. Department of Defense, Defense Documentation Center, *Technical Abstract Bulletin*, numbers 1 and 6, 1967.

² Bernard Fall, quoted in "And Blessed Be The Fruit," Don Duncan, *Ramparts*, May 1967, p. 30.

More sophisticated anti-personnel weapons have, however, been developed since 1960³ during the Kennedy period when American military priorities were beginning to shift from nuclear deterrence to counterinsurgency. Thus we see that the development of these weapons has directly paralleled the depth of American involvement in the Vietnam struggle.

Rationale of Anti-Personnel Weapons

In evaluating the Pentagon's frequent assertion that it attacks only "military" targets in Vietnam, it is important to be aware of the following definition of a military target as stated in an Air Force manual:

A military target is any person, thing, idea, entity or location selected for destruction, inactivation, or rendering nonusable with weapons which will reduce or destroy the will or ability of the enemy to resist.⁴

Though the military's definition of a "military" target is very broad, the impression given to the public by the use of this term is probably closer to the military's definition of a "strategic" target:

A strategic target is any installation, network, group of buildings, or the like considered vital to a country's war-making capacity and singled out for air attacks.⁵

Within this framework the military's attacks (especially during the bombing of North Vietnam) on civilian villages, hospitals, schools, churches and irrigation systems⁶ emerge as deliberate strategy with an internal logic. Such targets are defined as "military" targets because in the opinion of the military their destruction fulfills the "psycho-social objective" of lowering enemy morale and reducing their will to resist. The Air Force manual cited above stated that such attacks were intended:

³The various cluster bombs (CBU's) are new since 1960. The first type of 40mm. grenade was introduced in 1960, with many new types developed since then. The 2.75 inch rocket was made into an anti-personnel weapon in 1963-4. Whirlpool Corporation appears to have begun its work on flechette projectiles in 1961. Whirlpool submitted its 39th monthly progress report for July 1964 under Army contract DA-33-008-ORD-2118 on "Design and development of new and improved flechettes and applicable weapon systems" according to the Technical Abstract Bulletin, number 1, 1965. This would place Whirlpool's first monthly report at May 1961, a few months after President Kennedy's inauguration.

⁴Fundamentals of Aerospace Weapons Systems, Manual of the U.S. Air Force ROTC, Air University, May 1961.

⁵Ibid.

⁶There is substantial verification of such attacks a considerable distance from any "strategic" target in both North Vietnam and Laos. See testimony by observation teams, doctors, journalists and others compiled in John Duffett, editor, Against the Crime of Silence: Proceedings of the Russell International War Crimes Tribunal, (O'Hare Books 1968) pp.137-234. See also Harrison Salisbury, Behind the Lines - Hanoi (Harper and Row, 1967). Clergy and Laymen Concerned about Vietnam, In the Name of America (Turnpike Press, 1968). Dana Adams Schmidt, New York Times, 23 February 1967. Jacques Decornoy, Le Monde hebdomadaire, 11-17 July 1968 (cited by MIT Professor Noam Chomsky, speech at Rutgers University, 15 October 1969).

... to dispel the people's belief in the invincibility of their forces, to create unrest, to reduce the output of the labor force, to cause strikes, sabotage, riots, fear, panic, hunger, and passive resistance to the government, and to create a general feeling that the war should be terminated...

Further ... a labor force preoccupied with civilian defense duties and the finding of food, shelter, and transportation could not operate at peak efficiency in the production of the materials of war.

Given these objectives we may also discover the rationale behind another seemingly sadistic peculiarity: most of the victims of anti-personnel bombs are not killed rather they are maimed. The pellets from anti-personnel bombs are designed to cause irregular and hard-to-cure wounds. This serves two functions. First, it means that instead of a single man dead and withdrawn from military production, six to ten people (as well as facilities and supplies) must care for him. Secondly, the sufferings of badly wounded victims tend to have greater demoralizing effect on the remaining population than the dead. Thus such weapons "build a deterrent capability into conventional ordnance." That is, they have a "separate and distinguishable psychological impact... apart from the actual destruction which they caused."⁷

A closer look at these weapons, their capabilities, and how they are being used should substantiate the thesis that civilian populations are in fact the "military" targets that the U.S. is attacking in Vietnam.

It will also be clear that the producers of these weapons, such as Honeywell, Aerojet-General, Avco, Whirlpool, General Time, and many others in towns and cities across the U.S. have been far from unenthusiastic in their attempts to improve, promote and profit from these "products."⁸

Descriptions of Anti-Personnel Weapons

The descriptions which follow are somewhat sketchy and incomplete, due both to secrecy and to the lack of a unified, comprehensive source. However, the descriptions should be a useful starting point for a local project designed to learn more about anti-personnel weapons and transform that information into actions.

⁷"Vietnam Spurs Navy Weapons Advances," Aviation Week, 21 March 1966.

⁸Large profits for the makers of anti-personnel bombs were particularly evident with the commencement of the bombing of North Vietnam in 1965. Newsweek stated in its August 2, 1965 issue, "New orders have been crackling out of the Pentagon, with requests sometimes going out by telephone and telegram—rather than mail—to speed up the process. American Machine & Foundry, for example, just got a \$17 million order for Mark 82 bomb assemblies. Some of the work is still classified, such as Honeywell's \$3.3 million order for BLU-3 cluster bombs. These are the high-explosive anti-personnel bomblets being dropped on North Vietnam." This profit jump is also evidenced in an examination of individual companies involved, for example, see p. 5 of Avco Annual Report, 1966.

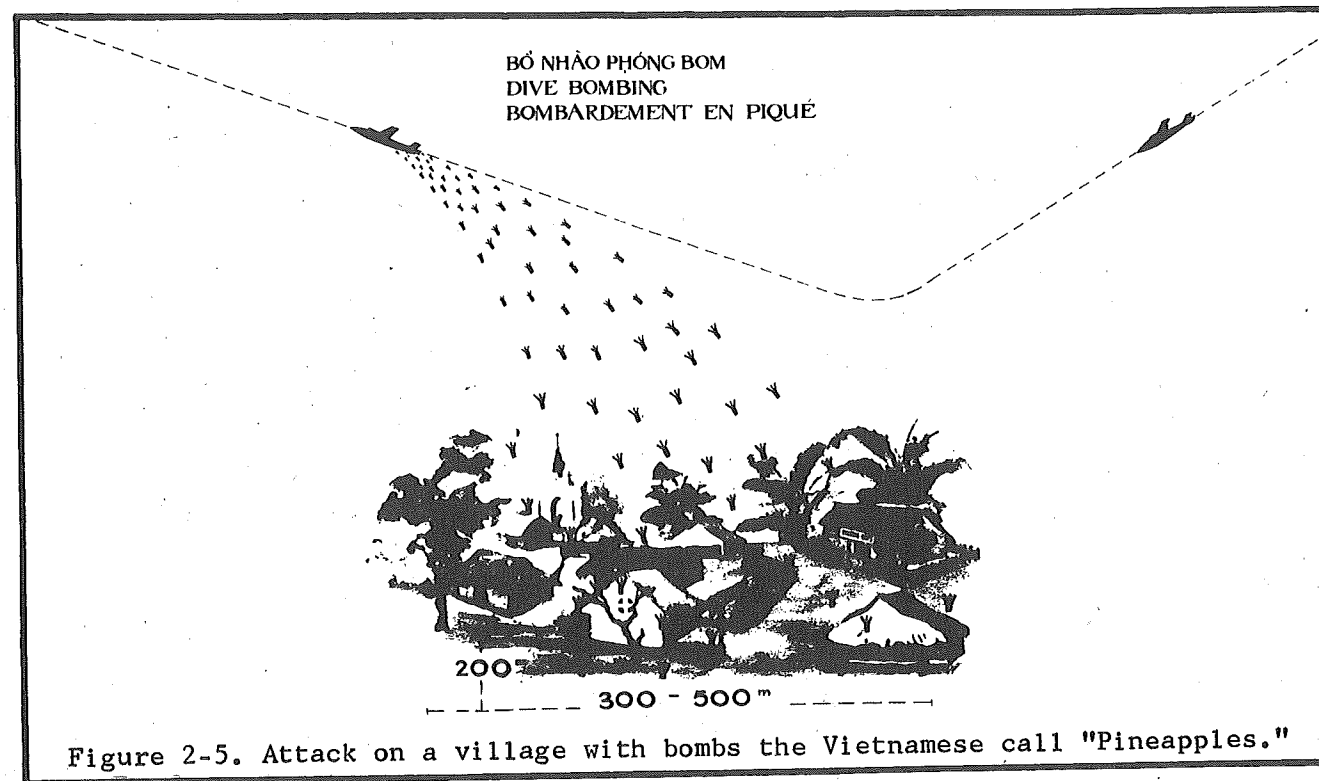


Figure 2-5. Attack on a village with bombs the Vietnamese call "Pineapples."

Pineapple Bomb

The Pineapple Bomb sprouts winglets which either stabilize its descent or increase its dispersion pattern. It explodes on contact, spewing hundreds of steel pellets ten meters in all directions. Its multi-tube dispensers, such as the SUU-14,⁹ and the more streamlined SUU-7, are slung under the airplane. Like a gigantic, two-dimensional machine gun, the compressed air dispensers eject a storm of deadly pellets on those below. "The discharge from one aircraft creates an elliptical killing zone five football fields long" and half as wide.¹⁰

This weapon was developed as a refinement of the previously mentioned Lazy Dog, which is still in limited use in Vietnam.¹¹ The tiny pellets have a devastating effect on humans, maiming more victims than they kill. As an ex-Green Beret reported, "Because of their shape and/or velocity, once they tear into the body they move in a complex path, doing great damage and complicating removal."¹²

⁹These initials are abbreviations used in contracts. The number indicates the more specific model.

¹⁰Duncan, *op. cit.*, p. 30.

¹¹Sources differ on the meaning of the term Lazy Dog. For example: "The so-called Lazy Dog... is a drum of steel pellets dropped from a plane that explodes at 6,000 feet. The pellets have a buckshot effect against men and equipment when they reach the ground."—Jack Raymond, *New York Times*, 3 May 1965. "A Lazy Dog is a grenade-like bomb containing 250 slivers of razor-sharp steel. There are 40 such bombs in a cylinder: 10,000 pieces of steel in a sudden storm of hail, lacerating anyone exposed or seeking shelter from the half-ton bombs."—John Duffett, *op. cit.*, p. 202. "Lazy Dogs, though the name is often applied to all kinds of anti-personnel bombs, are non-explosive missiles a couple of inches long, solid iron, and shaped like a tiny bomb... A CBU full of Lazy Dogs fills the air under it with a rain of projectiles that are both deadly and silent."—John S. Tompkins, *The Weapons of World War III* (Doubleday, 1966) p. 112.

¹²Duncan, *op. cit.*, p. 30.

CẤU TẠO VÀ MẬT ĐỘ SÁT THƯƠNG CỦA BOM BI HÌNH TRỤ STRUCTURE AND DESTRUCTION POWER OF CYLINDER-SHAPED STEEL-PELLET BOMBS

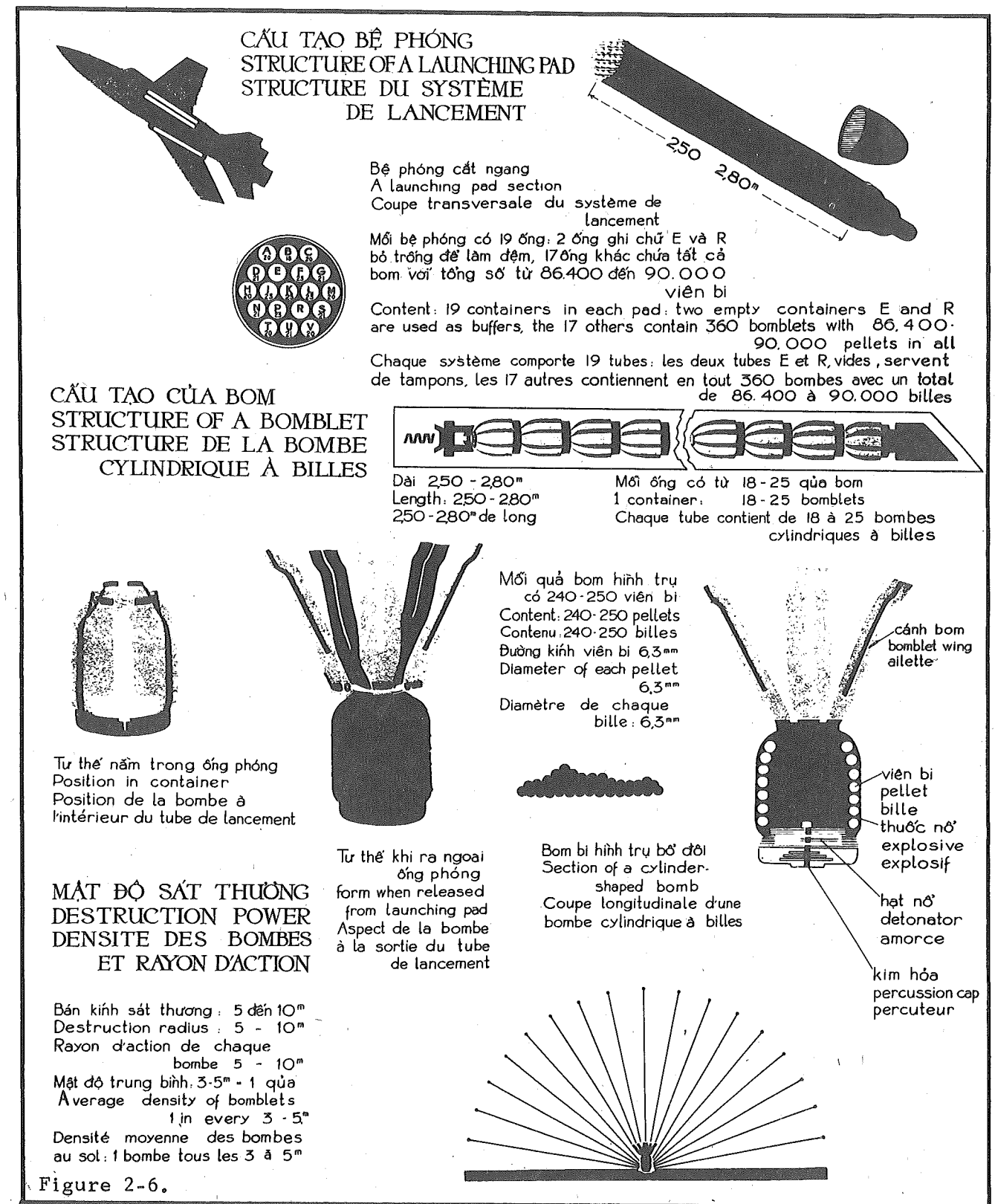


Figure 2-6.

BỔ NHÃO NÉM BOM
DIVE BOMBING
BOMBARDEMENT EN PIQUÉ

Ở độ cao khoảng 800-1000m
From 800-1000m altitude
À une altitude de 800-1000m



Figure 2-7.
Guava bomb attack on
a Vietnamese village.

While in many cases superseded by the Guava and other CBU's with an even wider killing range, the Pineapples have a particular terrorist (or deterrent) value in their machine-gun-like action¹³ when fired along a path from their tube dispensers.¹⁴

Guava Bomb

The Guava resembles a round conventional hand grenade. Hundreds of Guavas (BLU-26, 26/B, 24 etc.) are packed in the "mother" (SUU 30, etc.) which looks like an empty 750 pound bomb case.

Like the Pineapple, the Guava consists of a hollow envelope filled with 50 grams of Cyclotol A3. Into the casing are cast 260 to 300 steel balls. "Also cast into the casing in the meridional direction are four small fins or 'wings' which catch the wind and by friction set up a spinning motion along the polar axis. In the center of the explosive filling, a new type of detonator is located which operates by centrifugal force. This detonator consists of 3 small hammers which are cocked by the spinning of the bomblet and which are spring loaded. If the spinning stops for any reason, the hammers fall, exploding the bomblet, and firing the steel pellets into an isotropic distribution in a sunburst pattern for a distance of about 15 meters."¹⁵

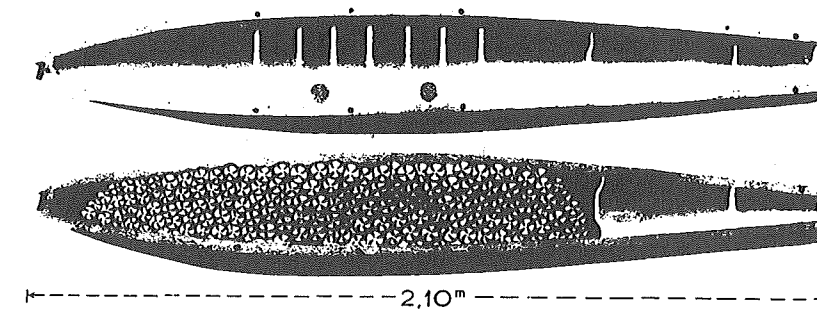
¹³This use of the Pineapple CBU is described in Frank Harvey, Air War-Vietnam (Bantam, 1967) p. 57.

¹⁴Improvements are constantly being made in dispensers. A new item, for example, is the Tactical Fighter Dispenser Munition, a downward-ejection tube system developed for more effective anti-personnel use by fast fighter planes. U.S. House Committee on Appropriations, Department of Defense Appropriations for 1967, Hearings, vol. 4, p. 244.

¹⁵Testimony of Jean Pierre Vigier, M.D., Research Director of National Center for Scientific Research, former Officer-in-charge of Armaments Inspection of the French Army, Duffett, op. cit., p. 250.

CẤU TẠO VÀ MẬT ĐỘ SÁT THƯƠNG CỦA BOM BI HÌNH CẦU STRUCTURE AND DESTRUCTION POWER OF ROUND-SHAPED STEEL-PELLET BOMBS

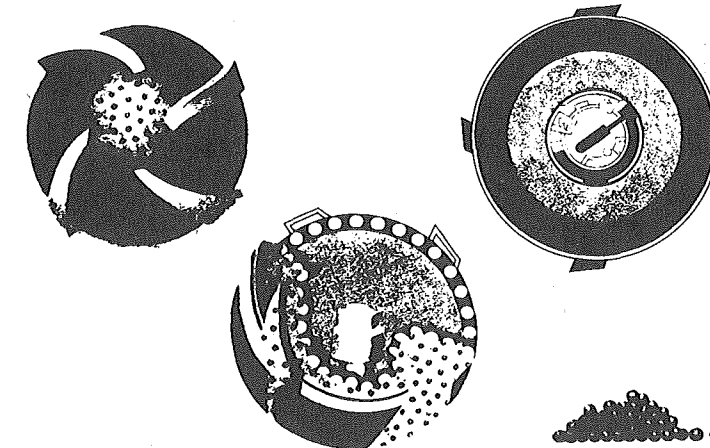
BOM MẸ - CLUSTER BOMB UNIT - CONTAINER DE BOMBES SPHÉRIQUES À BILLES



2,10m

Bom mẹ có 550 hoặc 640 quả bom con với tổng số từ 154.000 đến 192.000 viên bi.
Content: 550-640 bomblets with a total of 154.000-192.000 pellets.
Chaque container renferme 550 ou 640 bombes sphériques à billes avec un total de 154.000-192.000 billes

BOM CON
BOMBLET
BOMBE SPHÉRIQUE À BILLES



Một quả bom bi hình cầu
Round-shaped bomblet
Une bombe de type goyave

Nặng: 420g
Weight: 420g
Poids: 420g
Có: 100g thuốc nổ
Explosive: 100g
Charge: 100g d'explosif
Có: 280-300 viên bi
Steel-pellets: 280-300 units
Charge: 280-300 billes
Đường kính viên bi: 5,56mm
Diameter of a pellet: 5,56mm
Diamètre de chaque bille: 5,56mm

MẬT ĐỘ SÁT THƯƠNG
DESTRUCTION POWER
RAYON D'ACTION ET DENSITÉ

Bán kính sát thương: 5-10m
Destruction radius: 5-10m
Rayon d'action: 5-10m
Mật độ dày đặc: 4 quả / 1m²
Maximum density: 4 bomblets / 1m²
Densité maximum: 4 bombes sphériques à billes / 1m²
Mật độ trung bình: 1 quả / 2,5m²
Average density: 1 bomblet in every 2,5m²
Densité moyenne: 1 bombe sphérique à billes / 2,5m²

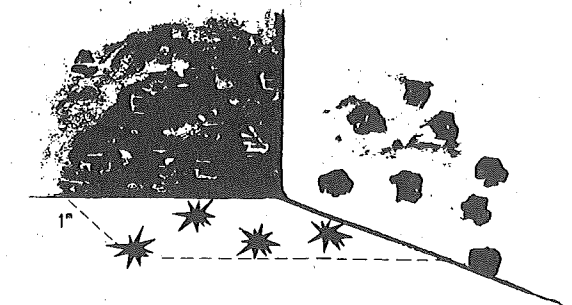


Figure 2-8. Drawings from the DRV of Guava bombs.

The Guava bomb was developed as an improvement over the Pineapple bomb in four ways:

1. It is smaller and more can be carried by each plane.
2. It can be dropped from a higher and safer altitude.
3. There are fewer duds since they do not have to strike the ground vertically to explode and if for some reason the hammers stick, and they do not explode immediately, they may do so if jarred. (Some are reported to have purposely delayed-action fuses to blow up rescuers.)¹⁶
4. They have a longer killing range, up to the length of ten football fields. As retired U.S. Air Force Colonel Robert L. Johnston expressed it:

Using B-52's, with their tremendous weight-carrying capacity and ability to bomb precisely regardless of the weather, it takes little imagination to envision the lethality of several wings of these aircraft flying a carefully spaced formation releasing SUU-30/B's (Guava bomb dispensers) at calculated intervals.

Large areas, such as "Zone C" or other such suspected concentration points, would be suddenly and without warning engulfed in a veritable hail of deadly missiles.¹⁷

Other Anti-Personnel Weapons

Rockeye. This is one of the Navy's new "Eye" series bombs.¹⁸ Some 247 bomblets are wrapped around a rocket motor. After the bomb has been dropped from the airplane, the motor starts spinning and the bomblets are dispersed in all directions.¹⁹ One obvious advantage of the Rockeye over the Guava bomb is its even wider dispersal area.

¹⁶Harvey, *loc. cit.*, contains descriptions of use of CBU's in Vietnam.

¹⁷Ordnance Magazine, January-February 1967. (War Zone C and large areas of South Vietnam have been designated "free bombing zones." Anything that moves is regarded as fair game.)

¹⁸Others in this series are Sadeye and Gladeye (CBU variations designed to dispense anti-personnel bomblets, grenades, or even propaganda leaflets); Walleeye (a thousand pound television-guided bomb—the pilot focuses the camera in the nose of the bomb on the target, and the Walleeye takes over and follows the picture on its own self-contained tv screen, correcting course with movable fins until it hits the target); Snakeye (a retarding device to slow the fall of conventional bombs); Weteeye (guided chemical bomb); Fireeye (incendiary hotter and longer burning than standard napalm); Deneeye (air-dropped land mine); Misteeye (the Navy's chemical warfare CBU for Sarin or VX nerve gas); Brighteye (pyrotechnic device); Padeeye (classified smoke generator); Bigeye and Fakeeye (classified); and Redeye (heat-seeking five foot missile developed from the sidewinder). Tompkins, *op. cit.*, p. 115.

¹⁹The Rockeye dispenser, shipping container, bomblet and bomblet fuse were developed for the Navy by Honeywell, Inc. The dispenser fuse was developed by Melpar, Inc. Honeywell is now producing Rockeye bombs for the Navy under a \$15 million contract. U.S. House Committee on Appropriations, Department of Defense Appropriations for 1967, *loc. cit.*

Explosive Fragmentation Bombs. In addition to the fragmenting CBU's, the casings of conventional or demolition-type bombs can be cast from malleable iron and other materials which give "more effective fragmentation."²⁰ According to one source:

All bombs and shells used by the Seventh Fleet and the U.S. Air Force against North Vietnam are, in fact, fragmentation bombs and anti-person bombs... (The) heavy bombs used for air bombardments and the shells from the Seventh Fleet artillery are made from a material which fragments into double-edged machete-like slivers. In the bombed or shelled hamlets there are thousands of these slivers left on the ground in and around the craters.²¹

An example of this Air Force program of building an anti-personnel side effect into conventional weapons was reported:

(Another) weapon is the 1,000 pound low-drag bomb equipped with a "daisy-cutter" fuse timed to detonate just before impact in order to produce a good spread of shrapnel. Effectiveness of such bombs is described as "excellent".²²

The Air Force has developed other fragmentation bombs designed specifically for anti-personnel use, such as the Mk. 81 carried by the F-48. In response to a pilot who complained that the ineffectiveness of this 250 pound bomb against bunkers, etc. was "demoralizing," the Air Force replied:

The Mk. 81 was designed as a fragmentation weapon. It was never intended that this bomb should be used against hard targets such as bunkers. Part of the military mission in South Vietnam is to harass the enemy, day and night, in order to prevent massing of large troop concentrations. The Mk. 81 has been extremely successful when employed for this purpose.²³

The 2.75 inch Rocket. Originally an anti-aircraft weapon, the 2.75 inch rocket was modified for anti-personnel use in 1963-4,²⁴ by addition of a high-fragmentation warhead (the M151 made of pearlitic malleable iron), an extremely sensitive fuse, and a modification of spin

²⁰This "revolutionary" new method of casting 81mm. shells was announced in Ordnance, November-December 1961.

²¹John Takeman, M.D. (Director of Stockholm Child Welfare Board) and Dr. Alex Hojer, M.D. (Sweden's delegate to the U.N. World Health Organization) in Duffett, *op. cit.*, p. 166.

²²Cecil Brownlow, "USAF Boosts North Viet ECM Jamming," Aviation Week, 6 February 1967.

²³Cecil Brownlow, "New Viet Shortage Inquiries Seen," Aviation Week, 24 October 1966.

²⁴It went into combat in early 1965 and became popular immediately: Pilots "would prefer 2.75 inch rockets and fragmentation bombs as a rule rather than general-purpose bombs. Most of the worthwhile targets are straw huts or targets in the open, one officer explained, and 'frag' bombs and 2.75's are ideal for these targets. The 5 inch Zuni rocket, designed to penetrate armor and concrete, is not particularly useful here, he added." C.M. Plattner, "Marine Control of Air Tested in Combat," Aviation Week, 14 February 1966.

This demand precipitated what one General called "an all-out national effort" to produce the rocket. According to the same General, "There is well over a billion dollars on this one ammunition item alone." U.S. Senate Committee on Armed Services, Hearings on Status of Ammunition and Air Munitions, 1966, p. 43.

characteristics to adapt it for launching from a slow speed platform such as the Army UH-1B helicopter. It is one of the principal munitions used in Vietnam.

In addition to warhead developments (which also include a flechette and a white phosphorous warhead) there have been several fuse "improvements" since 1964. The proximity fuse uses an electronic device that enables the warhead to explode just before hitting the ground, making it possible to kill more people than the conventional fuse which explodes on impact.

Even more effective is the "jungle canopy penetration fuse" for the 2.75 inch rocket. It has antennas or "fingers" to sense the top of the jungle canopy, and initiate a time-delay switch, allowing the explosion to occur after penetration of the dense foliage.²⁵ It is produced by Avco Ordnance Division.

Still another line of development has been in launching systems. The rocket was at first launched from tubes attached to the airplane, which had to be reloaded by hand. To speed things up, a multi-rocket pad was developed that could be detached and replaced in a matter of seconds. There are now several multi-rocket launchers; among them, the XM158 7-Rocket Launcher and the LAU-3A/A 19-Rocket Launcher.

40mm. Grenades. There have been many new developments in grenades in the 1960's from the pre-notched wire that breaks into tiny fragments in the M-26 Hand Grenade to the M-79 Rifle Grenade Launcher.

The M-79 launcher is used with the M-406 Grenade, which looks like an oversized bullet. Inside the bullet is a spherical grenade made of notched rectangular wire wrapped around a high explosive filler. When the grenade goes off, the wire (because of the notches) breaks into more than 300 fast flying (5,000 feet per second) fragments with an effective casualty radius roughly the size of a large bedroom.

The 40mm. grenade has been adapted for use in helicopters through the M-75 and XM-129 Helicopter Launchers. In addition to its helicopter application, the XM-129 is adaptable for ground vehicles, boats, and small fixed-wing aircraft. Mounted on a river patrol it can be used to cut a swath through an area, wounding or killing anyone in the way.

The Vietnam testing ground has also led to such developments as the following: "a grenade-launching attachment for the M-16 rifle (using the M-148 adapter); a 33 pound high-velocity automatic launcher, developed by Springfield Armory; and a 13 pound low velocity launcher."²⁶

Many new grenades have been developed including white phosphorous (incendiary), CS (riot-control gas), and white star (signal) grenades. Two of the principal developers of 40mm. anti-personnel grenades have been AAI Corporation and Avco. At its Ordnance Division in

²⁵Before the development of this new type fuse it was reported, "Use of the 2.75 inch rocket by strike aircraft in South Vietnam also is declining, although it is a prime weapon for armed Army UH-1B helicopters. The drawback to its use in the South is the tendency to detonate as it strikes the tops of trees when fired into a jungle area. When this occurs the shrapnel effect on the ground is negligible." Cecil Brownlow, "USAF Boosts North Viet ECM Jamming," op. cit.

²⁶Ordnance, September-October 1966. Also Mort Schultz, "VC Firepower - Can We Match It?", Popular Mechanics, June 1967.

Richmond, Indiana, Avco has developed a rocket-propelled 40mm. grenade called Avroc.²⁷ This line of rocket-boosted ammunition was described as a "shoulder-fired gun that shoots 40mm. rocket-powered shells."²⁸ It can be used with the M-79 Grenade Launcher and the M-75 Helicopter Grenade Launcher.

Flechette Projectiles. A flechette is a steel dart that looks like a small finishing nail, slightly more than an inch long, with four fins welded on the blunt end.

The XM 546 105mm. flechette projectile contains several thousand flechettes, enabling it to kill hundreds of men with one round. It is fired from a 105mm. Howitzer and explodes in the air, projecting thousands of shafts specially made to fly nose first. "I've seen reports of enemy soldiers actually being nailed to trees by these things," one officer reported.²⁹

The Beehive projectile, similar to, but smaller than, the flechette projectile, was used to "shred" 344 "Communists" during the New Years Truce of 1967-8. The U.S. military now has at least ten different flechette and Beehive projectiles ranging from 90mm. to 155mm.³⁰

A California research firm has developed a tiny, self-propelled flechette. Called a Microjet because it contains a tiny rocket, it can be used in bombs, shells or mines.³¹

Also in the experimental stage is SPIW (Special Purposes Individual Weapon). A pistol shoots flechettes surrounded by a 22-caliber plastic jacket or sabot that drops away outside the barrel. The small, high-velocity needle-shaped bullet tumbles when it hits, producing an improved and more lethal "dum-dum" effect.³²

Guided Missiles. At least two guided missiles, Bullpup and Shrike, have been used as anti-personnel weapons.³³ There is an anti-personnel version of the Shrike air-to-surface anti-

²⁷A mural in the lobby of Avco's Richmond, Indiana plant depicts a soldier in Vietnam using the weapon to blow up a distant convoy, a hut, a group of soldiers, and a group of unidentified people under the jungle foliage. In addition to anti-personnel grenades, Avroc can be used to fire anti-tank weapons, radio beacons, flares and pyrotechnics. The function of Avroc was explained in Ordnance, January-February 1968: "Present grenade weapons are handicapped when used in dense foliage similar to that found in the rain forests of Vietnam, because of the need to use a high trajectory. With the new ammunition the flat trajectory makes it possible for a man to fire under foliage of this type to reach the target."

²⁸Rockets from a Six Shooter, Business Week, 10 April 1965, p. 84.

²⁹Associated Press dispatch in the Palo Alto Times, 14 December 1967.

³⁰The principal developer of flechette projectiles has been Whirlpool Corporation. Several military agencies have contributed to the development; among them, the Ballistic Research Laboratory at Aberdeen Proving Ground, Maryland, and the Ammunition Engineering Directorate at Picatinny Arsenal, Dover, New Jersey. Flechette and Beehive projectiles are produced by Whirlpool, Northrop, and FMC Corporation. Fuses are produced by General Time.

³¹Tompkins, op. cit., p. 128.

³²Ibid.

³³Missiles and Rockets, 7 June 1965 reported that as a "bonus effect" the Bullpup air-to-surface missile "has turned out to be a good anti-personnel weapon because of high fragmentation, although cost would rule out its use solely for this purpose."

radar missile that contains jagged pellets, according to North Vietnamese sources; it was first used over Haiphong March 10, 1967.³⁴

The one pound Wasp anti-personnel rocket was developed by the Army for helicopter use. Army officers considered its development "an important potential breakthrough in helicopter armament."³⁵

Mines. The military has been working for a number of years to develop a wide-area anti-personnel mining system with a greater killing power than land mines of WW II and Korea. In South Vietnam the U.S. has used a portable land mine embedded with tiny steel pellets designed to explode instantly if touched.

The Gravel Mine, a recent development in this field, is "a small canvas-covered charge of lead azide which is laid from helicopters, airplanes, or can be spread from the ground by individuals or from a truck." The \$126 million requested for it in fiscal 1968 is evidence that it is planned as a major weapon.³⁶

The Claymore Mine is another new mine "designed specifically to kill the Chinese human-sea charge," or in the present situation, to mow down waves of attacking Vietnamese. "It is a curved green plastic box about the size of a large book, filled with explosives and thousands of BB-sized steel balls. Mounted on metal legs and pointed with the convex side facing the enemy (helpfully stenciled: 'Front Toward Enemy'), the Claymore explodes forward—sending out a hail of steel and plastic fragments that literally mow down the grass in a path six feet wide and a hundred feet straight ahead".³⁷

The United States has also dropped mines into rivers in North Vietnam designed to stop the movement of sampans and junks.³⁸

The M16 Rifle. Also called the (Colt) AR 15 or Armalite Rifle, this small, lightweight .223 caliber rifle is capable of firing, with great accuracy, 100 to 120 rounds per minute.³⁹ It is the weapon now being used by all our elite guerrilla warfare military units: the Army Special Forces, the Air Force Commandos, the Navy Seal Teams, and in Vietnam, by all Army and Marine Corps troops.⁴⁰

The AR15 rifle bullet is deadly because it imparts tremendous shock when it hits, and on striking flesh it yaws and tumbles end over end,

³⁴Liberation, May-June, 1967, p. 16.

³⁵Missiles and Rockets, 25 October 1965.

³⁶The procured canvas covers and Army-produced lead azide would be loaded at Cohasset Depot, Massachusetts, Iowa Army Ammunition Plant, and Kansas Army Ammunition Plant. U.S. House Committee on Appropriations, Department of Defense Appropriations for 1967, Hearings, op. cit., p. 391.

³⁷Tompkins, op. cit., p. 116.

³⁸R. W. Apple, Jr., New York Times, 27 February 1969.

³⁹Mort Schultz, op. cit.

⁴⁰Tompkins, op. cit., p. 125.

literally tearing its way out. This aspect of the AR15 lethality has not been publicly emphasized by the Army, perhaps because it has been suggested that it could be considered a technical violation of the Hague Convention against the use of expanding (or dum dum) bullets.⁴¹

If the Army is reluctant to discuss the M16's wounding power, medical journals are not:

Wounds from the M16 rifle (.223 caliber or 5.56 mm) are being seen frequently for the first time in Vietnam. It appears that this weapon has been very effective in the type of fighting being waged in Vietnam... The M16 has a high velocity of 3,250 feet per second, and the massive tissue destruction that we noted in the majority of our M16 wounds emphasizes the importance of velocity in the wounding power of a missile. Another factor to be considered in the wounding power is attributed to what is termed the "tumbling effect" of the M16 bullet.⁴²

Another medical journal reports:

The high velocity missile creates a cone of damage which is not immediately apparent. Though it causes only a small opening at the point of entry, a modern bullet can create an internal cone of damage three to four inches in diameter. You have to open the patient up enough to evaluate the muscle and other tissue around the wound.⁴³

Caltrops. These multi-pointed spikes similar to children's jacks are an example of even newer weapons under investigation. A report, which urged field tests, stated: (1) "Caltrops will penetrate footgear to inflict puncture injuries..."; (2) "Incapacitation, resulting from swelling and pain approximately 30 minutes after injury, makes Caltrops highly effective for impeding travel..." and (3) "Caltrops, distributed at low densities, will inflict serious injuries upon anyone who attempts to 'hit the dirt.'"⁴⁴

Puff, the Magic Dragon. Puff (AC47) is a pre-WW II C-47 outfitted with three Gatling-type Miniguns capable of delivering 18,000 rounds a minute of 7.62mm. bullets. Helicopters and DC3's have also been fitted with Miniguns.

Primarily an anti-personnel weapon, Puff circles a beleaguered outpost while the pilot lines up the target in a gunsight pointed out of the left window. Flying at 122 knots, he fires while he keeps the left wing low and the piper (illuminated sighting image) on the target...

⁴¹Ibid., p. 127.

⁴²Maj. Norman M. Rich, MC, USA, Maj. Egon V. Johnson, MC, USA, Lt. Col. Francis C. Dimond, Jr., MC, USA, "Wounding Power of Missiles Used in the Republic of Vietnam," Journal of the American Medical Association, 2 January 1967.

⁴³"Medicine Battles the Odds in Vietnam," Medical World News, 18 November 1969.

⁴⁴1966 report by Arthur T. Stanley, Army Engineer Research and Development Laboratories, Fort Belvoir, Virginia, Technical Abstract Bulletin, number 1, 1967.

Capable of circling long hours over a beleaguered fort or outpost, Puff can start the deadly circle quickly and in three seconds cover an area the size of a football field with at least one bullet to every square foot, says Lt. Col. Thomas E. Rickelman.⁴⁵

Each of the Miniguns has a firing rate of about 6,000 rounds/mm for a total of 18,000 rounds. Up to 54,000 rounds have been fired on a mission. The slow speed, large size and limited maneuverability of the AC47 make it more vulnerable to enemy ground fire than other attack aircraft so it is used principally at night or against daytime targets which are not heavily defended.⁴⁶

A Quaker worker, writing from Quang Ngai late in February 1969, describes this weapon as follows:

Several of us went to the roof about 3 a. m. The Americans unleashed the terrifying "Puff the Magic Dragon," a DC3 that spews forth 5000 machine gun bullets per minute. As I watched it circle overhead last night, silhouetted against the low clouds in the light of the flares, flinging indiscriminate bolts of death earthward, I could vividly visualize the scene below. Men, women, children and animals, caught like rats in a flood. No place to hide, no way to plead their case of innocence to the machine in the sky, no time to prepare for death. The beating the civilians are taking in this war is beyond adequate description...

The cold, mechanical, compassionless way that monster circled around and around and around, ruthlessly pursuing an unseen "enemy," stabbing viciously earthward again and again, probing, searching, killing and maiming all in its path....

We have survived, but a lot of Quang Ngai people didn't make it. And a lot more who are now clinging to life over at the hospital will not make it until morning. If only we could bring this horrifying scene of human devastation in its true dimensions home to the people who must know what it's like. The ones who are pulling the strings on this deadly puppet show. Man's inhumanity to man has reached its climax in Vietnam.⁴⁷

⁴⁵ John T. Weeler, dispatch from Saigon in St. Louis Post-Dispatch, 24 November 1965.

⁴⁶ C. M. Plattner, "Limited War Concepts Weighted in Battle," Aviation Week, 31 January 1966.

⁴⁷ American Friends Service Committee, "Vietnam 1969," 5 May 1969, p. 6.

10. ANTI-PERSONNEL WEAPONS*

Contractor:	Product:	Contract number/Amount:
AAI CORP. Cockeysville, Md.	Design and development of the XM617U antipersonnel mine fuze	DA36-034-ORD-3750A
ABG INSTRUMENT & ENGINEERING, INC., Santa Barbara, Cal.	Lockwires for 2.75-in. rocket motor	DAA21-68-C-0715/\$251,220
A.C. ELECTRONICS, INC. Huntsville, Ala.	M158E1 2.75-in. rocket launcher	DAAH01-69-C-0501/\$173,491
ACF INDUSTRIES, INC. St. Louis, Mo.	Metal parts for cluster bombs	\$4,087,241 (WSJ, 10-25-66)
ADVENTURE LINE MFG. CO., INC., Parsons, Kas.	BLU-26/B "guava" bomblet metal parts	F33657-68-C-0078/\$5,440,000
AEROJET-GENERAL CORP. Downey, Calif.	SUU-14/A cluster bomb dispensers	DAAA09-69-C-0025/\$1,250,000
	SUU-30B/B cluster bomb dispensers	F33657-68-C-0625/\$558,000
	M151 warhead metal parts for 2.75-in. rocket	DAAA09-69-C-0134/\$1,214,987
	Magazines for XM174 40mm. low velocity automatic grenade launcher	DA11-199-66-AMC-719W/\$57,197
	Engineering study of release of self-dispersing munitions from high speed airborne vehicles	DA18-064-AMC-170A
AERONCA, INC. Middletown, Ohio	metal parts for XM3 antipersonnel mine dispenser	DAAA09-68-C-0048/\$334,373
AIRPORT MACHINING CORP. Martin, Texas	M151 warhead metal parts for 2.75-in. rocket	DAAA09-68-C-0131/\$530,100
ALSCO, INC., Techfab Div., St. Louis, Mo.	XM159C 2.75-in. rocket launchers	DAAH01-69-C-0729/\$1,510,686
ALUMINUM CO. OF AMERICA Pittsburgh, Pa.	2.75-in. rocket motor tubes	DAAA21-69-C-0236/\$5,824,350
AMERICAN ELECTRIC, INC. La Mirada, Cal.	SUU-30B/B cluster bomb dispensers	F33657-68-C-0809/\$2,649,360
AMERICAN MFG. CO. OF TEXAS Fort Worth, Texas	M151 warhead for 2.75-in. rocket	\$1,000,000 (CBD, 6-21-67)
	Mk55 Mod 0 antipersonnel projectile	NO0104-68-C-5482/\$3,439,437
AMRON CORP. Waukesha, Wisc.	M118 cartridge case metal parts for the M406 40mm. grenade	DAAA09-69-C-0144/\$3,918,750
	metal parts for M384 40mm. grenade	DAAA09-68-C-0070/\$341,996
ATLANTIC RESEARCH CORP. Alexandria, Va.	Engineering study to adapt the XM27 mine to the SUU-13/A bomb dispenser	(TAB, July 1, 1967)
	Opener assemblies for the Tactical Fighter Dispenser Munition	(Army R&D, Feb. 1968)

ATLANTIC RESEARCH CORP. Flare Northern Div. (Subsidiary of Susquehanna Corp.) West Hanover, Mass.	Development of a carrying case for the XM27 Mod 2 gravel mine	DA28-017-AMC-2558A
AUTOMATIC SPRINKLER CORP. OF AMERICA; Dallas, Texas	SUU-7C/A cluster bomb dispensers	DAAA09-69-C-0204/\$1,990,674
AVCO CORP., Ordnance Div. Richmond, Ind.	Services and materials for an in- vestigation of improved antipersonnel kill mechanisms	DAA21-68-C-0655
	Development of Avroc rocket-propelled 40mm. grenade	(Ordnance, Jan.-Feb. 1968)
	M423 2.75-in. rocket fuze metal parts	DAAA09-69-C-0158/\$2,016,900
	M406 40mm. grenade metal parts	DAAA09-69-C-0131/\$1,324,965
BACHE TOOL & DIE CO. Westbury, N.Y.	Parts for BLU-26/B "guava" bomblet	F33657-68-C-0545/\$260,252
BATESVILLE MFG. CO. (Subsidiary of Aerojet-General Corp.) Batesville & Camden, Ark.	BLU-24/B bomblet metal parts	F33657-16687/\$9,350,000
	SUU-30A/B cluster bomb dispensers	F33657-68-C-1094/\$1,300,000
	M26 antipersonnel mine metal parts	DAAA09-68-C-0279/\$113,654
BEECH AIRCRAFT CORP. Wichita, Kans.	SUU-7C/A cluster bomb dispensers	DAAA09-68-C-0008/\$940,500
BIRMA PRODUCTS CORP. Sayresville, N.J.	Parts for 2.75-in. rocket	DAAA21-69-C-0267/\$159,807
BREED CORP. Fairfield, N.J.	Design and development of the XM43 antipersonnel mine and sub-pack system	DAAA21-69-C-0002/\$750,000
BULOVA WATCH CO. Jackson Heights, N.Y.	M423 fuze metal parts for 2.75-in. rocket	DAAA09-69-C-0175/\$1,410,231
CESSNA AIRCRAFT Wichita, Kans.	SUU-7C/A cluster bomb dispensers	DAAA09-69-C-0007/\$986,957
CHAMBERLAIN MFG. CO. Waterloo, Iowa	M151 2.75-in. rocket warhead	DAAA09-C-69-C-0176/\$992,250
COLUMBUS MILPAR MFG. CO. (Division of Whittaker Corp.) Columbus, Ohio.	parts for BLU-24/B and BLU-66/B bomblets	F0835-69-C-0016/\$19,089,911
	Nozzle assemblies for 2.75-in. rocket	DAAA21-68-C-0645/\$83,520
CULLMAN METALCRAFT, INC. Cullman, Ala.	SUU-30B/B cluster bomb dispensers	F33657-68-C-0810/\$2,649,360
DAY & ZIMMERMAN, INC. Phila., Pa.	Loading and packing of 2.75-in. rockets and other munitions	DA11-173-AMC-00114/\$99,219,021
E.L. DU PONT DE NEMOURS CO.	Facilities for production of lead azide for gravel mines at Kansas Army Ammunition Plant	DAAA09-67-C-0213/\$1,072,401
EASTERN TOOL & MFG. CO. Belleville, N.J.	M406 40mm. grenade metal parts	DAAG25-68-C-0755/\$668,064
EISEN BROS., Hoboken, N.J.	M406 40mm. grenade metal parts	DAAG25-68-C-0723/\$895,438
EMERSON ELECTRIC CO. St. Louis, Mo.	Design and development of 40mm. gun drive system	DAAF03-68-C-0044/\$162,000

EMERSON ELECTRIC CO. (Con'd.).	XM28 helicopter armament subsystems (employs 40mm. grenade launchers)	DAAF03-68-C-0025/\$4,465,500
FMC CORP. Santa Clara and San Jose, Calif.	Design and development of XM4 anti- personnel mine dispenser	DA28-017-AMC-02893A/\$772,791
	XM594E1 assemblies for XM580E1 90mm. Beehive	DAAA21-68-C-0793/\$650,124
FTS CORP Denver, Colo.	2.75-in. rocket fin, nozzle assemblies	\$1,736,870 (Army R&D, Jul-Aug 1968)
FAIRCHILD CAMERA & INSTRUMENT CORP., Syosset, L.I., N.Y.	M429 proximity fuze for 2.75-in. rocket	DAAA09-69-C-0032/\$3,092,800
FALCON RESEARCH AND DEVELOP- MENT CORP., Denver, Colo.	Mathematical study of the effectiveness of 20mm., 30mm., and 40mm. ammunition fired from aircraft against personnel and light vehicles	AF08-635-4081
FILTERS, INC., San Jose, Cal.	Parts for 2.75-in. rocket	DAAA21-69-C-0268/\$163,395
FRANKLIN INSTITUTE Phila., Pa.	Supporting studies for button bomblet	\$75,708 (CBD, 2-24-67)
FUSION RUBBERMAID CORP.	Plastic canisters for Tactical Fighter Dispenser Munition	\$1,389,640 (Army R&D, Feb. 1968)
GENERAL TIME CORP. Acronetics Div. Skokie, Ill.	M423 fuze parts for 2.75-in. rocket	DAAA09-69-C-0105/\$1,697,115
	XM571E1 fuzes for XM580E1 90mm. Beehive projectile	DA36-038-AMC-4036A/\$3,220,000
	XM592E1 fuzes for antipersonnel projectiles	DAAA25-68-C-0458A/\$250,000
GIBBS MFG. & RESEARCH CORP. Jonesville, Wisc.	M427 2.75-in. rocket fuze metal parts	DAAA09-69-C-0104/\$1,992,600
HAMILTON WATCH CO. Military Products Div. Lancaster, Pa.	M423 2.75-in. rocket fuze metal parts	DA11-173-AMC-677A/\$1,241,813
	XM592E1 fuzes for antipersonnel projectiles	DAAA25-68-C-0431A/\$1,050,709
HARVEY ALUMINUM, INC. Torrance, Calif.	M118 40mm. grenade cartridge case	DAAA09-69-C-0143/\$3,113,415
HAYES INTERNATIONAL CORP. Birmingham, Ala.	M151 2.75-in. rocket warhead	DAAA09-69-C-0135/\$1,290,900
HAYES-ALBION CORP. Albion, Mich.	M151 2.75-in. rocket warhead	DAAA09-69-C-0128/\$1,597,320
HERCULES, INC. Wilmington, Del.	Loading, assembly and packing of XM41E1 mine into CDU-4/B canister (Tactical Fighter Dispenser Munition)	DAAA09-68-C-0370/\$9,360,000
HONEYWELL, INC. Ordnance Div. Hopkins and Minneapolis, Minn.	System concept studies and engineering investigations of air-to-surface area denial weapons	AF08-635-3070
	Development and production of Rockeye II bombs	N00019-69-C-0163/\$15,473,235
	BLU-26/B "guava" bomblet metal parts	F33657-68-C-0776/\$8,104,800*
	7/32" steel balls for bomblets	F33657-68-C-0667/\$588,000
	SUU-13/A cluster bomb dispensers	DAAA09-68-C-0257/\$40,600

HONEYWELL, INC. (Con'd.)	XM429E1 proximity fuze safety and arming devices for 2.75-in. rocket	DAAG39-68-C-0037/\$190,000
	Production of 40mm. grenade fuzes at Twin Cities Army Ammunition Plant	\$1,293,545 (DIB, June 1965)
HOOVER BALL & BEARING CO. Erwin Tenn.	7/32" steel balls for bomblets	F33657-68-C-0669/\$825,600
HUGHES TOOL CO. Culver City, Calif.	Engineer, develop, design, and test the XM8 helicopter armament subsystem based on the XM129 40mm. grenade launcher	DAAF01-67-C-0811/\$639,608
INSTITUTE FOR DEFENSE ANALYSES, Jason Div., Arlington, Va.	Study of explosively-produced flechettes	(TAB, May 1, 1967)
KDI PRECISION PRODUCTS, INC. Norwood and Cincinnati, Ohio	M427 2.75-in. rocket fuze metal parts	DAAA09-69-C-0196/\$1,518,075
	Safety and arming devices for XM429 2.75-in. rocket fuzes	DAAG39-67-C-0059/\$26,774
KANARR CORP., Kingston, Pa.	M79 grenade launchers	DA11-199-AMC-715W/\$3,252,506
KELSEY HAYES CO., Heintz Div., Phila., Pa.	Mk1 Mod 1 2.75-in. rocket warhead, fibre gasket	N104-9323A/\$957,258
KISCO CO., INC., St. Louis, Mo.	M14B4 cartridge cases for 105mm. flechette and smoke projectiles	DAAA09-69-C-0043/\$13,400,000
KOEHLER & SONS, Hatboro, Pa.	7/32" steel balls for bomblets	F33657-68-C-0807/\$899,000
KOLLSMAN INSTRUMENT CORP. Elmhurst, N.Y.	M18A1 antipersonnel mine metal parts	DAAA21-69-C-0257/\$543,000
L.T. INDUSTRIES, INC. Dallas, Texas	SUU-30B/B cluster bomb dispensers	F33657-68-C-0840/\$2,916,000
LANSLOWNE STEEL & IRON CO. Morton, Pa.	Mk56 Mod 0 antipersonnel projectiles	N00104-68-C-5481/\$8,183,565
MARQUARDT CORP.	Fin and nozzle assemblies for 2.75-in. rockets	\$3,038,945 (Army R&D, July-Aug. 1968)
MARTIN-MARIETTA CORP. Orlando, Fla.	Development of an antipersonnel version of the Bullpup B air-to-surface missile for fragmentation use against ground troops	\$900,000 (Ordnance, Sept.-Oct. 1966)
	Canisters for the aerial mine system	\$2,389,258 (Army R&D, Jan. '68)
MARTIN-MARIETTA CORP. Baltimore Div., Baltimore Md.	Grenade launchers, downward firing weapon system aircraft modification kits	N00019-68-C-0430/\$104,165
MASON & HANGER, Silas Mason Co., Inc.	Operation of Iowa Army Ammunition Plant for production of mines and medium and large caliber ammunition (gravel mines)	DA11-173-AMC-85A/\$13,695,852
MAXSON ELECTRONICS CORP., Maxson-Macon Div., Macon, Ga.	XM429 2.75-in. rocket fuze testers	DAAG39-69-C-0002/\$216,433
MAXSON ELECTRONICS CORP. Great River, L.I., N.Y.	T25E5 57mm. slug-filled projectile metal parts	DAAA21-68-C-1032/\$250,040
MEDICO INDUSTRIES, INC. Wilkes-Barre, Pa.	M151 2.75-in. rocket warhead metal parts	DAAA09-69-C-00888/\$3,090,600

MELPAR, INC., Fairfax, Va.	Development of Rockeye dispenser fuze	(DoD App. 1967, v. 4, p. 244)
MICROCOM CORP. Horsham, Pa.	Development of telemetry systems for XM429 2.75-in. rocket proximity fuze	DAAG39-68-C-0065/\$92,818
MILLER RESEARCH CORP. Baltimore, Md.	Development of a counter-ambush barrage weapon system	DA-OAD05-68-C-0345X/\$288,308
MOTOROLA, INC., Semi-conductor Products Div., Phoenix, Ariz.	Integrated circuit for XM429 2.75-in. rocket fuze	DAAA09-68-C-0371/\$242,880
MUNCIE GEAR WORKS, INC. Muncie, Ind.	Fin and nozzle assemblies for 2.75-in. rocket	DAAA21-68-C-0782/\$3,351,500
NASH-HAMMOND, INC.	Plastic cannisters for Tactical Fighter Dispenser Munition	\$1,205,085 (Army R&D, Feb. '68)
NATIONAL LEAD CO., Doehler-Jarvis Div., Toledo, Ohio	BLU-26/B "guava" bomblet metal parts	F33657-68-C-0775/\$3,086,930
NATIONAL UNION ELECTRIC CO.	Fuze parts for bomblet dispensers	\$3,318,900 (Army R&D, Jan. '68)
NORRIS INDUSTRIES, INC. Los Angeles, Calif.	2.75-in. rocket motor tubes	DAAA21-69-C-0243/\$11,020,680
	M108B1 cartridge cases for M377 90mm. flechette projectile	\$1,000,000 (CBD, 6-22-67)
NORTHROP CORP., Nortronics Div., Anaheim, Calif.	Design, development and testing of a flechette area neutralization gun	AF08(635)-4977/\$429,600
	WDU-4/A flechette warhead for 2.75-in. rocket	AF33657-16110/\$11,377,000
	XM380E5 and XM603E1 105mm. Beehive projectiles	DAAA21-69-C-0099/\$2,530,836 and DAAA21-69-C-0093/\$1,141,178
PHILCO-FORD CORP. Newport Beach, Calif.	M75 40mm. grenade launchers	DA11-199-AMC-00687W/\$1,400,757
	XM129 40mm. grenade launchers	DAAG07-68-C-710W/\$2,457,743
REPUBLIC CORP., Consolidated Molded Products Div., Scranton, Pa.	M18A1 antipersonnel mine metal parts	DAAA21-69-C-0258/\$804,000
REYNOLDS METAL CO. Phoenix, Ariz.	2.75-in. rocket component	\$1,054,930 (DIB, July 1965)
SCOVILL MFG. CO. Waterbury, Conn.	Metal parts for cluster bombs	\$4,171,813 (WSJ, 10-25-66)
SKAGIT CORP. Sedro-Wooley, Wash.	M94B1 cartridge for 106mm. flechette projectile	DAAG05-67-C-0578A/\$265,825
SPERRY RAND CORP. New York, N.Y.	Loading and packing of CBU-25A/A anti-personnel bombs, M151 2.75-in. rocket warheads, and other ammunition for use in Southeast Asia	DA11-173-51-AMC-0080/\$43,977,106
STANFORD RESEARCH INSTITUTE Menlo Park, Calif.	Fragmentation warhead study	AF08(635)-2915/\$87,950
SUPERIOR STEEL BALL CO. New Britain, Conn.	7/32" steel balls for bomblets	F33657-68-C-0668/\$2,925,000
THIOLKOL CHEMICAL CORP. Bristol, Pa.	Investigations of low-density area denial mine systems	DA36-034-AMC-0166A
	Development of chemical fuze for antipersonnel mines	DAAA21-68-C-0755/\$537,730

UNITED AEROTEST LABS, INC. Deer Park, N.Y.	Development of XM617U antipersonnel mine fuze (with AAI Corp.)	DA36-034-ORD-3750A
VICTOR COMPTOMETER CORP. Daisy-Heddon Div., Rogers, Ark.	7/32" steel balls for bomblets	F33657-68-C-0723/\$990,450
WESTINGHOUSE ELECTRIC CORP. Molecular Electronics Div., Elkridge, Md.	Integrated circuits for 2.75-in. rocket	DAAG39-67-C-0049/\$50,000
WHIRLPOOL CORP., Evansville Ordnance Div., Evansville, Ind.	Design and development of new and improved flechettes and applicable weapons systems	DA33-008-ORD-2118 and other contracts
	XM380E5 and XM603E1 105mm. Beehive projectiles	DAAA21-69-C-0098/\$3,487,806 and DAAA21-69-C-0092/\$1,643,009
WHITTAKER CORP., Bermite Div. Saugus, Calif.	Igniters for 2.75-in rocket motor	DAAA21-68-C-0674/\$999,552
WURLITZER CO. North Tonawanda, N.J.	PS113A power supply for XM429 2.75-in. rocket fuzes	DAAA09-68-C-0337/\$546,556
ZENITH RADIO CORP. Chicago, Ill.	M429 2.75-in. rocket fuzes	DAAA09-69-C-0033/\$2,977,849

*This chart represents a sampling of contracts awarded in the anti-personnel weapons field. To determine more thoroughly the specific contracts held by a particular industry, see Chapter 4.

Sources for contract data: unless otherwise noted, all contracts are taken from the Commerce Department's publication, Commerce Business Daily (CBD) during the period March-November 1968. Other sources are Ordnance, published by the American Ordnance Association; Army Research & Development Newsmagazine (Army R&D); Technical Abstract Bulletin (TAB), published by the Defense Documentation Center; the Defense Industry Bulletin (DIB); Wall Street Journal (WSJ); and the House Committee on Appropriations Hearings on the Department of Defense Appropriations for 1967 (DoD App.). Contracts preceded by the letters DA are Army contracts; by AF or F, Air Force contracts; and by N, Navy contracts. Contracts marked 69-C were first awarded in fiscal 1969 (1 July 1968 to 30 June 1969).

11. DEMOLITION BOMBS*

Contractor:	Product:	Contract no./amount:
A.O. SMITH CORP. Chicago, Ill.	M117A1 750-lb. bomb metal parts	DAAA09-68-C-0078/\$11,984,315
ACTION MFG. CO., Phila., Pa.	M905 tail fuze metal parts	DAAA09-68-C-0085/\$545,000
AMERICAN MACHINE & FOUNDRY CO. Brooklyn, N.Y.	M117A1 750-lb. bomb metal parts	DAAA09-69-C-0035/\$30,253,380
AMERICAN MFG. CO. OF TEXAS Fort Worth, Texas	Mk82 Mod 1 500-lb. bomb bodies	N00104-69-C-0098/\$36,627,838
	Mk83 Mod 3 1000-lb. bomb bodies	N00104-68-C-3481/\$9,887,140
AUTOMATIC SPRINKLER CORP. OF AMERICA, Bailfield Div., Dallas, Texas	Mk15 Mod 1 fin assemblies	N00104-68-C-0780/\$14,402,230
BATESVILLE MFG. CO. (Subsidiary of Aérojet-General Corp.) Batesville, Ark.	M904E2 nose fuze metal parts	DAAA09-68-C-0053/\$2,395,800
BAYFIELD INDUSTRIES Carrollton, Texas	"Snakeye" fins for demolition bombs	\$1,600,000 (DIB, July 1965)

BENDIX CORP., Environmental Science Div., Balto., Md.	M905 tail fuze metal parts	DAAA09-69-C-0139/\$828,000
BORG-WARNER CORP., Ingersoll Products Div., Chicago, Ill.	Mk82 Mod 1 500-lb. bomb bodies	N00104-69-C-0003/\$15,914,464
BUXMONT ORDNANCE, Berwick, Pa.	250-lb. bomb bodies	\$6,509,065 (DIB, May 1965)
COLUMBUS MILPAR MFG. CO. (Division of Whittaker Corp.) Columbus, Ohio	Mk14 bomb fins	\$3,372,880 (DIB, May 1965)
CRESCENT PRECISION PRODUCTS, INC., Garland, Texas	M131A1 fin assemblies	DAAA09-69-C-0059/\$3,619,980
EUREKA WILLIAMS CO. (Division of National Union Electric Corp.) Bloomington, Ill.	M904E2 nose fuze metal parts	DAAA09-68-C-0256, and DAAA09-68-C-0386/\$3,666,300
GENERAL INSTRUMENT CORP. Sickles Div., Chicopee, Mass.	M904E2 nose fuze metal parts	DAAA09-68-C-0246/\$3,386,618
	M905 tail fuze metal parts	DAAA09-69-C-0076/\$836,000
HONEYWELL, INC. Hopkins, Minn.	M904E2 nose fuze metal parts	DAAA09-69-C-0100/\$48,493
INTERCONTINENTAL MFG. CO. Garland, Texas	Mk82 Mod 1 500-lb. bomb bodies	N00104-69-C-0129
	Mk84 Mod 2 2000-lb. bomb bodies	N00104-69-C-0119/\$6,226,155
LASKO METAL PRODUCTS, INC. West Chester, Pa.	Mk14 Mod 2 fin assemblies	N00104-68-C-0816/\$7,321,018
LE TOURNEAU, R.G., INC. Longview, Texas	M117A1 750-lb. bomb metal parts	DAAA09-69-C-0044/\$24,039,720
	M131A1 fin assemblies	DAAA09-C-0058/\$4,836,600
METALS ENGINEERING CORP. Greenville, Tenn.	Fin assemblies for Mk83 Mod 0 bombs	N00104-68-C-3482/\$1,752,120
POLORAN PRODUCTS, INC. New Rochelle, N.Y.	M131A1 fin assemblies	DAAA09-68-C-0486/\$1,491,000
RAYTHEON CO. Lexington, Mass.	M904E2 nose fuze metal parts	DAAA09-68-C-0243/\$2,322,000
	M905 tail fuze metal parts	DAAA09-68-C-0027/\$3,070,200
STA-RITE GINNIE LOU, INC. Shelbyville, Ill.	Arming wires for demolition bombs	F42600-69-C-0176/\$121,000
STEWART-WARNER CORP., South Wind Div., Indianapolis, Ind.	M904E2 nose fuze	DAAA09-68-C-0105/\$915,173
SUPREME PRODUCTS CORP. Chicago, Ill.	M904E2 nose fuze metal parts	DAAA09-C-68-C-0083/\$271,472
	M905 tail fuze metal parts	DAAA09-C-69-C-0049/\$277,500
UNITED STATES STEEL CORP. Pittsburgh, Pa.	Mk81 Mod 1 250-lb. bomb bodies	N00104-68-C-0826/\$6,739,920
	Mk82 Mod 1 500-lb. bomb bodies	N00104-68-C-3599/\$13,210,740
JOHN WOOD CO. St. Paul, Minn.	M131A1 fin assemblies	DAAA09-69-C-0208/\$1,454,412

*This chart includes DoD contracts for the production of demolition bombs, bomb fins & bomb fuses. Demolition bombs consist of a metal bomb case with a high explosive filler. Thousands of them are used daily in South Vietnam. Source, unless otherwise noted, is Commerce Business Daily. Other sources: Wall Street Journal (WSJ) and Defense Industry Bulletin (DIB).

INCENDIARY



Napalm

The first incendiary weapon of modern warfare was an inefficient flame-thrower used by both the German and Allied Forces during WW I. The weapon was hazardous and technically unsuccessful, but it proved the applicability of such munitions.

With the advent of airpower and the outbreak of WW II, the U.S. became interested in developing an improved incendiary mixture and hired Dr. Louis F. Fieser from the Gibbs Laboratory, Harvard University, to work in cooperation with the Army Chemical Warfare Service, Edgewood Arsenal, Maryland. Fieser has presented a history of his research program in his book, The Scientific Method.¹ The result of this program was napalm, an incendiary substance made by the gelation of gasoline and named for naphthenate and palmitate, two constituents of the gelling agent.

The first successful napalm detonations were carried out on a Harvard University games field and behind the football stadium, providing an excellent example of applied weapons research in the university.

Napalm was the principal agent of the incendiary raids on Japanese cities and caused far more deaths than the atomic attacks on Hiroshima and Nagasaki. Napalm has two effects: asphyxiation (caused by incomplete combustion, which produces carbon monoxide) and burns which are likely to be deep and extensive. Napalm was characterized by Maj. Gen. Alden H. Waitt, chief of the Chemical Warfare Services, as "one of the most effective and spectacular munitions of World War II." According to Waitt, "Sixty-six of Nippon's war centers with . . . 20 million population received more than 100,000 tons of incendiaries in 15,000 sorties. More than 100 square miles were burned out in five major cities, while incendiary destruction amounted to about 40% in the urban areas involved."²

Dr. Fieser and his associates in 1946 concluded a description of the development of napalm on this optimistic note:

According to an officer who inspected some of the Japanese areas devastated by the B-29 raids with M69 bombs, a few of the more enterprising civilians salvaged a dud or two and made good use of the recovered napalm for cooking and heating. Certain other uses of a more novel and scientific character are being investigated with promising results. It is too early as yet to know whether napalm will find significant application in times of peace.³

If napalm ever did "find significant application in times of peace," it is certainly not a matter of general knowledge. Four years later, in the Korean War, napalm was described as the mainstay of American forces. At the height of the war, its use exceeded 250,000 pounds a day.⁴ The American attack on Namchonjon, a town of some 10,000 was described by a British journalist:

¹Louis B. Fieser, The Scientific Method: A Personal Account of Unusual Projects in War and Peace (Reinhold, N. Y. 1964).

²For the figures on napalm in Japan see F. J. Sanborn, "Fire Protection Lessons of the Japanese Attacks," Fire and the Air War, ed. H. Bond (National Fire Protection Association, Boston, 1946), pp. 169-74.

³Industrial & Engineering Chemistry, 19 August 1946, p. 773.

⁴Peter Reich, M. D. and Victor W. Sidel, M. D., "Current Concepts-Napalm," New England Journal of Medicine, 13 July 1967, pp. 86-8.

. . .it was the usual slow business. They knew no other way. The odd bursts of fire. The halt. The air strike. The artillery. Tanks forward. . . There were twelve air strikes in all that morning, the hills blazing, torrents of black smoke spewing up to the sky from the napalm; torrents of white smoke from the phosphorous bombs; spouts of earth and rice and produce, shacks and a few people, from both. . .

By noon the town was taken.

Namchonjon was an appalling ruin, a scene of almost absolute desolation. There was nothing left of it.⁵

In 1965 the military was again using napalm. . . in Vietnam. This time, however, newspaper reports have made the horrible effects of napalm clear. One such report described in the New York Times of June 6, 1965:

As the communists withdrew from Quang Ngai last Monday, U.S. jet bombers pounded the hills into which they were headed. Many Vietnamese - one estimate was as high as 500 - were killed by the strikes. The American contention is that they were Viet Cong soldiers. But three out of four patients seeking treatments in a Vietnamese hospital afterwards for burns from napalm were village women.

Dr. Fieser has felt no guilt over his part in the original development of napalm. In 1967 he told the New York Times;

You don't know what's coming. That wasn't my business. That is for other people. I was working on a technical problem that was considered pressing.

I distinguish between developing a munition of some kind and using it. . . .

I don't know enough about the situation in Vietnam. It's not my business to deal with the political or moral questions.⁶

In 1966 an Air Force witness told the House Committee on Appropriations that a new type of napalm was being developed. He said that it "hugs the ground" and has a higher temperature, burns longer, and covers a greater area than the previous type of napalm.⁷ This may be the "super-napalm" referred to by Dr. Gilbert Dreyfus, Professor of Biochemistry at the University of Paris Medical School, at the International War Crimes Tribunal at Ruskilde, Denmark in 1967. Dr. Dreyfus said this new kind of napalm is "enriched with sodium, magnesium or phosphorus with which the temperature reaches 1500° to 2000°C., 2732° to 3632° F."⁸

⁵Reginald Thompson, Cry Korea (London, Macdonald, 1951). Not published in the U.S.

⁶New York Times, 27 December 1967. A brief description of napalm and Fieser's role in its development can be found in "Napalm" by Victor W. Sidel, CBW: Chemical and Biological Warfare, ed. Steven Rose (Beacon, 1968).

⁷U.S. House, Committee on Appropriations, Hearings on Department of Defense Appropriations for 1967, vol. 5, pp. 390-1. It is possible that the Air Force witness was describing napalm-B.

⁸Liberation, December 1967-January 1968, p. 64.

Napalm-B (presently used in Vietnam), consisting of one-fourth gasoline, one-fourth benzene and one-half polystyrene, was produced by Dow Chemical Company. Recent contracts have been awarded to American Electric Company of La Mirada, California, which produces the napalm at its Long Beach, California plant.

Other prime contractors for napalm and associated chemicals include:

U.S. and W.R. Eakins Co., Brooklyn, N.Y.
McGeon Chemical Co., Cuyahoga Heights, Ohio
W. R. Grace & Co., Hatco Chemical Division, Fords, N.J.
Martin-Marietta Corp., Charlotte, N.C.

Alternate suppliers of napalm include:

Witco Chemical Co., Chicago
Nopco Chemical Co., Metsap Division, Cedartown, Ga.
Hayden Newport Chemical Co., Nuodex Products Division, Newark, N.J.

In 1966 napalm was also produced by United Technology Center, a division of the United Aircraft Corp., Redwood City, Cal., but the plant was closed in early 1967 after demonstrations and protests by local residents.

Magnesium

According to U.S. Army Technical Manual TM 9-1325-200, Bomb and Bomb Components, "Magnesium is a soft metal which, when heated sufficiently in the presence of air, ignites and burns vigorously. Magnesium melts and flows as it burns, igniting all combustible material in its path." In a magnesium bomb, the bomb body itself is made of magnesium and the filler is an incendiary thermate which is used to ignite it.

Thermite & Thermate

The same technical manual states:

Thermite is a mixture of powdered aluminum and powdered iron oxide which, when ignited by an igniter, burns at a temperature of about 4,000° F. White-hot molten iron is released when the thermite burns and acts as a heat reservoir to prolong and spread the incendiary effect. When used as a filling for munitions, thermite is called TH1.

Thermate is a mixture of TH1, barium nitrate and sulfur in an oil binder. Thermate, TH3, is the standard metallic filling used in incendiary bombs.⁹

⁹Army Technical Manual TM 9-1325-200 Bomb and Bomb Components (April 1966). This and other unclassified Army documents are available for study at government depository libraries, which are located at large universities and public libraries.

Thermate is also used as a filler in the AN-M 14 hand grenade. According to another Army manual, the AN-M14 grenade burns 30 to 45 seconds at 3,700° F. and can burn through 1.5 cm. (about five-eighths of an inch) of homogenous steel.¹⁰

White Phosphorous

White phosphorous (WP) and plasticized white phosphorous (PWP) ignite spontaneously on contact with air, producing a white smoke. Weapons filled with WP and PWP are called "smoke" weapons, but they are also incendiary weapons as shown in this description from the Army manual cited above:

Smoke bombs have a three-fold purpose. They are used for screening the movement of troops and ships in combat areas; for anti-personnel effect on troops in the open or in dug-out positions; and for marking targets. They also have an incendiary effect in that they will set fire to materials which are easily ignited such as clothing, dry brush, canvas, etc.

Frank Harvey reports in Air War-Vietnam that "this stuff is even more vicious than napalm. In the civilian hospital in Can Tho, I saw a man who had a piece of white phosphorous in his flesh. It was still burning."¹¹

WP is used in the M34 hand grenade, which has an effective casualty radius of 25 meters (about 80 feet).¹² It is also used in the M-156 warhead for the 2.75-inch rocket, and in WP projectiles of almost all calibers between 40 mm and 175 mm.

New Incendiary Weapons

Several new munitions have been developed since 1960. One of them is the Fireeye firebomb which uses a new burning agent. A film of the Fireeye was shown to the House Committee on Appropriations in 1967. "Notice the unique cohesive texture of the burning mixture," a Navy witness told the Congressmen.¹³

Another new incendiary weapon is the Firecracker artillery shell. According to the French Press Agency, it was used for the first time in Vietnam February 7, 1968. "The shell hits the ground and bounces up while splitting up into eight smaller shells, which then explode in a hail of fiery fragments." This is essentially a cluster bomb unit (CBU) (see below) combined with an incendiary bomb.¹⁴

¹⁰U.S. Army ROTC Manual ROTC-145-30 (September 1966) Individual Weapons and Marksmanship.

¹¹Frank Harvey, Air War-Vietnam (Bantam 1967), pp. 56-7.

¹²U.S. Army ROTC Manual ROTC-145-30. "Effective casualty radius" is defined as "the radius of a circle about the point of detonation in which it may normally be expected that 50 per cent of the exposed personnel will become casualties."

¹³House of Representatives, Committee on Appropriations, Hearings on Department of Defense Appropriations for 1967, vol. 5, p. 272 and Hearings for 1968, vol. 3, p. 451.

¹⁴Agence France Presse dispatch in the London Times, 16 February 1968.

12. INCENDIARY WEAPONS*

Contractor:	Product:	Contract number/amount:
A.J. INDUSTRIES, INC., Sargent-Fletcher Div. El Monte, Calif.	BLU-1C/B 750-lb. firebomb	F42600-68-C-3087/\$625,003
ACF INDUSTRIES, INC., Carter Carburetor Div., St. Louis, Mo.	M52 fuze assembly for M302A1 60mm. white phosphorus projectile and M49A2E1 60mm. high explosive projectile.	DAAA09-69-C-0145/\$1,386,930
AEROJET-GENERAL CORP. Downey, Calif.	Development of supersonic firebomb	AF08-635-5996/\$352,830
ALCAN ALUMINUM CORP. Riverside, Calif.	Mk67 white phosphorus warhead for 2.75-in. rocket	DAAA09-69-C-0236/\$178,425
AMERICAN ELECTRIC La Mirada, Calif.	BLU-27/B 750-lb. firebomb	F42600-69-C-2205/\$25,854,760.
	CBU-54/B incendiary cluster munition	F33657-68-C-1198/\$1,761,263
	BLU 32 A/B firebomb filled with napalm B	F4 2600-70-C-0728/\$9,234,164
AMERICAN OIL CO. Whiting, Ind.	Study of combustion optimization of hydrocarbon flame thrower fuels	DA18-035-AMC-264A
AMERICAN TECHNICAL MACHINERY CORP., Mt. Vernon, N.Y.	M5 casing burster assembly parts for M60 105mm. white phosphorus projectile	DAAA09-69-C-0228/\$449,484
ATLANTIC RESEARCH CORP. Flare-Northern Div. Saugus, Calif.	Development of incendiary fuels	N609-21-7209/\$91,000 (R&DD '67)
	Establishment of feasibility and development of vertical flame projector	DA04-495-AMC-828/\$75,022 (R&DD, 1967)
BULOVA WATCH CO., American Standard Div. Providence, R.I.	Head assembly for M525 and M527 fuzes for M302A1 60mm. white phosphorus pro- jectile	DAAA09-68-C-0077/\$1,609,789
CHAMBERLAIN MFG. CORP. Waterloo, Iowa	M156 white phosphorus warhead for 2.75-in. rocket	DAAA09-69-C-0234/\$3,667,144
CHAMBERLAIN MFG. CORP. Elmhurst, Ill.	M60 105mm. white phosphorus projectile metal parts	DAAA09-68-C-0489/\$3,666,915
CHAMBERLAIN MFG. CORP. New Bedford, Mass.	M110 155mm. white phosphorus projec- tile metal parts	DAAA09-68-C-0321/\$4,910,415
CINCINATTI UNIVERSITY, Kettering Laboratory Cincinnati, Ohio	Investigation of the effectiveness of two incendiary mixes, Napalm B and Westcogel	DA18-001-AMC-991X
CLARKE CAN CO., INC. Philadelphia, Pa.	Container assembly for M14 thermate hand grenade and M34 white phosphorus hand grenade	DAAA15-69-C-0020/\$45,530

COLUMBUS MILPAR MFG. CO. Columbus, Ohio	M524A5 point detonating fuze for M375 81mm. white phosphorus projectile and M374 81mm. high explosive projectile	DAAA09-68-C-0300/\$3,720,000
CONCO, INC., Mendota, Ill.	Mk77 Mod 2 firebombs	N00104-69-C-0127/\$1,768,068
CORNELL AERONAUTICAL LAB Buffalo, N.Y.	Assessment of flame and incendiary munition effects (Project Heatwave)	DA-18-035-AMC-719A (TAB, 11-15-66)
DAY & ZIMMERMAN, INC. Philadelphia, Pa.	Loading and packing of M48A3 fuze parts for 90mm. and 120mm. white phosphorus projectiles	DA-11-173-AMC-0010/\$99,219,021
DOW CHEMICAL COMPANY Midland, Mich.	28,614,240 lbs. of napalm B for the BLU-32/B firebomb	F42600-69-C-0191/\$1,502,248
EISEN BROTHERS Lodi, N.J.	M8 casing burster for M302 60mm. white phosphorus projectile	DAAA09-69-C-0042/\$87,116
ENGINEERING RESEARCH, INC. Indianapolis, Ind.	M5 casing burster assembly for M60 105mm. white phosphorus projectile	DAAA09-69-C-0162/\$465,835
FMC CORP., Defense Technology Laboratories, Santa Clara, Calif.	Development of supersonic firebomb	AF08-635-5997/\$345,076
	CBU-53/B incendiary dispenser munition	F33657-68-C-1199/\$1,371,193
G.I.E. Corp. Buffalo, N.Y.	Casing burster for M156 white phos- phorus warhead for 2.75-in. rocket	DAAA09-69-C-0221/\$192,060
GALION AMCO, INC. Galion, Ohio	M505A3 point detonating fuze for 20mm. high explosive-incendiary projectiles	DAAA25-69-C-0165/\$2,159,700
HARVEY ALUMINUM, INC. Torrance, Calif.	M56A3 20mm. high explosive- incendiary projectiles	DAAA25-69-C-0183/\$2,490,024
INDEPENDENT LOCK CO., Defense Products Div., Fitchburg, Mass.	M52 point detonating fuze for M302A1 60mm. white phosphorus projectile and M49A2 60mm. high explosive projectile	DAAA09-68-C-0272/\$889,950
KENNEDY VAN SAUN CORP. Danville, Pa.	M302 60mm. white phosphorus projectile metal parts	DAAA09-68-C-0351/\$670,440
KEYSTONE MFG. CO. Boston, Mass.	M48A3 point detonating fuze for 90mm. and 120mm. white phosphorus projectile	DAAA09-69-C-0154/\$4,468,600
WALTER KIDDE & CO., INC. Belleville, N.J.	M48A3 point detonating fuze for 90mm. and 120mm. white phosphorus projectile	DAAA09-69-C-0163/\$4,707,415
LEAR SIEGLER, INC. Anaheim, Calif.	M48A3 point detonating fuze for 90mm. and 120mm. white phosphorus projectile	DAAA09-69-C-0169/\$8,287,625
MATTATUCK MFG. CO. Waterbury, Conn.	M52 fuze for M302A1 60mm. white phos- phorus projectile and M49A2 60mm. high explosive projectile	DAAA09-68-C-0369/\$162,060
MAXSON ELECTRONICS CORP. Maxson-Macon Div., Macon, Ga.	Mk77 Mod 2 firebomb	N00104-69-C-0127/\$1,768,068
NORTHROP CORP, Nortronics Div., Anaheim, Calif.	Design, test and develop a multi- shot portable flame weapon	DAAA15-67-C-0343/\$353,300 (R&DD, 1968)
NORTHROP CAROLINA Asheville, N.C.	A study of potential pyrotechnic fuel mixture	DA-18-035-AMC-958A/\$59,250 (R&DD, 1968)
OKLAHOMA UNIVERSITY RESEARCH INSTITUTE, Norman, Okla.	Susceptibility of potential target components to defeat by thermal action	DAAA15-67-C-0074/\$134,500 (R&DD, 1968)

ORDNANCE PRODUCTS North East, Md.	M206A2 time fuze for M34 white phosphorus hand grenade and M26A1 fragmentation hand grenade	DAAA09-69-C-0063/\$888,785
REMINGTON ARMS CO., INC. Bridgeport, Conn.	Parts for M526 fuze for M375 81mm. white phosphorus projectile	DAAA21-69-C-0240/\$120,936
REVLON, INC., N.Y., N.Y.	Arming device for BLU-7A/B firebomb	DA11-173-AMC-652A
RULON CO., Chicago, Ill.	M48A3 point detonating fuze for 90mm. and 120mm. white phosphorus projectiles	DAAA09-67-C-0296/\$4,353,501
SECURITY SIGNALS, INC. Cordova, Tenn.	M66E1 ignition cartridge for M375 81mm. white phosphorus projectile and M374 81mm. high explosive projectile	DAAA09-69-C-0192/\$610,955
SHOCK HYDRODYNAMICS, INC. Sherman, Oaks, Calif.	Evaluation techniques for flame and incendiary agents	DAAA15-67-C-0172/\$79,880 (R&DD, 1968)
SOUTHWEST RESEARCH INSTITUTE San Antonio, Texas	Development of a rapid liquid gelation system for hydrocarbon flame thrower fuels	DA18-035-AMC-708A/\$49,100 (R&DD, 1967)
SUPREME PRODUCTS CORP. Chicago, Ill.	M505A3 point detonating fuze for 20mm. high explosive-incendiary projectiles	DAAA25-69-C-0164A/\$1,877,720
TALLEY INDUSTRIES, INC. Mest, Ariz.	AN-M14 thermate hand grenade	DAAA15-69-C-0183/\$698,522
TECHNIDYNE, INC. West Chester, Pa.	Chemical fireball munition concept	AF08-635-3554 (R&DD, 1967)
TECHNIDYNE, INC. Bellmore, N.Y.	M5 casing burster assembly for M60 105mm. white phosphorus projectile	DAAA09-69-C-0019/\$451,095
TEPPER & SONS, INC. Deer Park, N.Y.	body and cap assembly for M34 white phosphorus hand grenades	DAAA15-69-C-0065/\$254,737
	M30 cluster and M14 fin assembly for M36 incendiary bomb	DAAA15-69-C-0160/\$1,815,643
	M15 assembly for M36 incendiary bomb	DAAA15-69-C-0172/\$2,241,674
TRO MFG. CO. Franklin Park, Ill.	M48A3 fuze for 90mm. and 120mm. white phosphorus projectiles	N00419-69-C-0001/\$352,800
WHITTAKER CORP., Bernite Div., Saugus, Calif.	Loading and packing of M505A3 fuze for 20mm. high explosive-incendiary projectiles	DAAA25-69-C-0177A/\$2,376,000
Z D PRODUCTS El Segundo, Calif.	M48 fuze for 90mm. and 120mm. white phosphorus projectiles	\$1,065,000 (Army R&D, Sep. '68)
ZELLER CORP. Fort Wayne, Ind.	M56A3 20mm. high explosive-incendiary projectiles	DAAA25-69-C-0184A/\$2,516,603

*This chart represents a sampling of contracts awarded for incendiary weapons. To determine more thoroughly the specific contracts held by a particular industry, see Chapter 4.

Sources for contract data: Unless otherwise noted, all contracts are taken from the Commerce Department's publication, Commerce Business Daily (CBD), during the period March-November 1968. Other sources are Ordnance, published by the American Ordnance Association; Army Research & Development Newsmagazine (Army R&D); Technical Abstract Bulletin (TAB), published by the Defense Documentation Center; Research & Development Directory (R&DD), published by Government Data Publications, Inc.; the Defense Industry Bulletin (DIB); Wall Street Journal (WSJ); & the House Committee on Appropriations Hearings on the Department of Defense Appropriations for 1967 (DoD App.). Contracts preceded by the letters DA are Army contracts; by AF or F, Air Force contracts; and by N, Navy contracts. Contracts marked 69-C were first awarded in fiscal 1969 (1 July 1968 to 30 June 1969), etc.

3. AN EXAMPLE OF ACTION RESEARCH ON THE MILITARY INDUSTRIAL COMPLEX: THE HONEYWELL PROJECT



Minneapolis Tribune Photo by Kent Kobersteen

DEMONSTRATORS MARCHED FROM ART INSTITUTE TO MAIN HONEYWELL OFFICE
'Honeywell Project' members protested company's production of war materials

NARMIC hopes to report on various existing models of action/research on the military/industrial complex in local communities.

One well-developed model is the Honeywell Project of Minneapolis, centered on the production of counterinsurgency weapons. It has focused attention on both domestic and international aspects of corporate domination.

We particularly call your attention to the techniques used in data-gathering, organizing and public education through confrontation and other methods. To the extent that the military/industrial complex forms a national pattern, these techniques can be used effectively; to the extent that local situations and long-range goals differ, the application of action/research will vary.

In order to assist NARMIC in fulfilling the role of clearing house for these projects, which, by their nature, will be locally oriented and therefore varied and unique, we encourage you to share your experiences with us, so that others can learn how to effectively apply action/research to their own communities.

"A North Vietnamese delegate to an East Berlin conference told a Macalester College chaplain, 'This is an anti-personnel fragmentation bomb dropped upon men, women and children in North Vietnam. It was made by Honeywell in Minneapolis. Ask the people of your city why they have done this to us. We have done nothing to them.'"

*Marv Davidov
Honeywell Project Coordinator
529 Cedar Avenue South
Minneapolis, Minnesota 55404
(612) 336-1581*

The Research

The following questions were prepared by NARMIC staff and answered by Marv Davidov, Honeywell Project Coordinator.

WHY DID YOU CHOOSE HONEYWELL AS THE FOCUS OF YOUR PROJECT?

Davidov: Honeywell presents an image of corporate liberalism to the area. Its directors hire more than a token number of blacks and American Indians. The company directors go out of their way to hire ex-convicts. Honeywell has built a country club complex for its employees. Stephen Keating, President and former FBI man who came up the hierarchy through ordnance, was Chairman of the Minneapolis Urban Coalition last year.

Honeywell is known as the heating control company, the company which produced guidance controls for Apollo, and as the "other" computer company. But few Minnesotans are aware that Honeywell is a major producer of CBU's and other hideous weapons.

It's interesting that when we met with James Binger, Board Chairman of Honeywell, in his office on April 22, he asked the same question, "Why Honeywell?"

The major reason for initiating the Honeywell Project was that anti-personnel fragmentation bombs are being produced in Minneapolis. A movement against the corporation grew out of this horrifying realization.

Honeywell, whose main offices are located in Minneapolis, is the number one war producer in the State of Minnesota and is number 20 nationally (about \$500 million that we know of in war production in 1969).

Honeywell is the largest private employer in Minnesota and consequently exercises immense economic and political effect on the people of Minnesota.

Figure 3-1.
Material prepared by the Honeywell Project

Board Members of Honeywell, Inc., and Their Affiliations

Harold W. Sweatt, Honorary Chairman, Honeywell, Inc. (B 1891, Mpls. Ed. U of M, 1913) V.P. and general mgr., President, Mpls. Honeywell Regulator Co., 1934-53; Chairman of Bd., 1953; Chmn, Finance Committee, 1961
Board memberships: U. of Minn. Foundation Trustee; Northwestern National Bank & Trust; Northwest Bancorporation; General Mills; Minn. & Ontario Paper Co.; Canadian American Comm Clubs: Woodhill (Wayzata); Links (NYC); Minnekahda (Chicago); Gulfstream Golf (Delray Beach, Fla.) Home: 1665 N. Ocean Way, Palm Beach, Fla. Office: Roanoke Bldg., Mpls.

James H. Binger, Chairman, Honeywell Inc. (B. 1916 Mpls, Ed. Yale 1938, LLB U of M 1941) Admitted Minn. Bar, 1941; Associated Fletcher, Dorsey, Barker, Colman & Barber (Mpls.) 1941-43. Joined Honeywell 1943; asst. sec. 1945-46, asst. V.P., 1946-50, V.P., gen. mgr. value div. Phila. 1950-55, Comp. V.P. 1952-61, Pres. 1961-65, Chrm. Bd. 1965-- Chief Exec. Officer 1964--
Board memberships: U of Minn. Foundation Trustee; Northwest Airlines, Inc.; Northwest Bell Telephone Co.; Northwest Bancorporation; Order of Coif; Phi Delta Phi Clubs: Woodhill Country (Wayzata) Home: 2511 Crosby Rd., Wayzata, Minn.

Stephen F. Keating, President, Honeywell, Inc. (B. 1918 Graceville, Minn.; ed. U of M 1940, LLB U of M) Admitted to the Bar, 1942; Special Agent, FBI, Norfolk, Va. 1942-43; Air Combat Intelligence Officer, USNR, 1943-46; Associated Otis, Farley & Burger, 1946-48; mgr. military contracts, aero div., Mpls. Honeywell Regulator Co., 1948-54; Div. V.P., 1954-56; V.P., 1956-61; Exec. V.P. 1961-65; Pres. 1965
Board Memberships: First Bank Stock Corp.; General Mills, Inc.; Toro Mfg. Corp.; Member, Order of Coif.; Dayton's Company Clubs: Woodhill (Wayzata) Home: Route 5, Box 692, Wayzata, Minn. 55391 Office: 2701 4th Ave. So. Mpls. 55408

Charles L. Davis, V.P., Military Products Group, Honeywell, Inc. (B. Lakeland, Fla. ed. Auburn U. 1942) Home: 5308 Dundee Rd. Edina, Minn. Office: 2701 4th Ave. S Mpls. 55408

Edson W. Spencer, V.P. and Head of International Operations, Honeywell, Inc. (B. C 1926, ed. Princeton, Northwestern U., U. of Mich.; B.A. Williams Coll., 1946, M.A. Oxford, 1950) With Sears Roebuck, 1951-54; Honeywell Inc. 1954 -- Div. exports, 1964-65; V.P. Foreign Relations 1965; Honeywell Dir. 1969.
Board Memberships: Mpls. Soc. of Fine Arts; Carleton College; St. Paul Committee Foreign Relations; Mpls. Citizens League. Home: Route 1, Long Lake, Minn. 55356 Office: 2701 4th Ave. S., Mpls. 55408

Paul B. Wishart, Chairman Finance Committee, Honeywell Inc. (B. 1898, Kirkwood, ed. U.S. Naval Acad. 1920) Served USN 1917-23; Pres. Honeywell Inc. 1953-61, Ch & Chief Exec. Officer 1961-64, Chmn. 1964-65; Chmn. Finance Comm. 1965
Board Memberships: International Milling Co. (Mpls.); Honeywell Controls Ltd. Honeywell S.A. (Mexico); First National Bank (Mpls.); American Motors (Detroit) Bd. of Trustees, Dunwoody Inst., Mpls.
Clubs: Minikahda (Mpls.) Woodhill Country (Wayzata) Home: 3100 Forest Cove, Minn. 55343. Office: Roanoke Bldg., Mpls. 55402

Dayton Corp. (B. 1918, Mpls. ed. Yale 1940) With Dayton
Pres. 1965
Bank (Mpls); First Bank System Corp.; Toro Mfg

HOW MUCH DID YOU KNOW ABOUT HONEYWELL
WHEN YOU BEGAN THE PROJECT
AND WHAT DO YOU KNOW NOW?

Davidov: We knew very little about Honeywell when we began the project. We know much more now, but there is a great deal of research still to be done.

We discovered that Honeywell is a corporation with diverse activities around the world, with an integrated global network of manufacturing, sales, service and training facilities in some 160 cities in 64 nations. These facilities are manned by an international organization of more than 16,000 persons. Sales and service offices are in all principal cities of the world, including South Africa and Vietnam.

Figure 3-2.
Material prepared by the
Honeywell Project

HONEYWELL'S INTERNATIONAL OPERATIONS

Honeywell's overseas operations are continually expanding and appear to be characterized by a tendency to bring these operations under Honeywell's exclusive control either through buying out former partners in the various ventures or through establishing wholly-owned subsidiaries.

At the April, 1969, meeting of stockholders, Edson Spencer, head of Honeywell's international operations, told stockholders that international sales had reached \$234 million during 1968, representing approximately 20% of total sales for the year; that just over 25% of Honeywell's employees are overseas, and that the company has subsidiaries and affiliates in 25 nations and distributors in 31 more.

During 1968:

a majority interest was acquired in Fritz Dienes, K.G., a company in Muhlheim, West Germany.

Honeywell formed a wholly-owned subsidiary, Honeywell Europe, Inc., in Brussels, Belgium, to manage operations in central and southern Europe, the Mediterranean area and the Middle East.

a new factory was being built near Frankfurt, West Germany for the manufacture of computers for the Common Market.

During 1967:

Honeywell acquired full ownership of their former Spanish subsidiary, Omnium Iberico Industrial.

in Finland, Honeywell Ab was formed when all the shares of the long-time Finnish distributor, Ob Control Ab were purchased.

minority interests were bought in Yamatake-Honeywell Company Ltd., Taiwan, which was a joint venture between Honeywell and a Japanese firm in which Honeywell has a 50% interest.

minority interest was purchased in Mechanical and Combustion Engineering Co. Ltd.,

Honeywell's operations in other countries around the world include:

Honeywell S.A. in Mexico (direct subsidiary, 1954)
 Honeywell Controles Ltda. in Brazil (wholly owned by Honeywell, 1958)
 Honeywell S.A.R.I. in France (wholly owned, 1951)
 Honeywell GmbH in West Germany (wholly-owned, 1954)
 Oskoseoglu in Turkey (1963)
 Ingenieria Comercial, S.A. in Peru (1955)
 K. Karayannis in Greece (1953)
 R. H. Harriss (Pty.) Ltd. in South Africa (1928)
 Honeywell C.A. in Venezuela (1957)
 American Engineering Corporation (1921) and Honeywell Lmted. (1963) in Hong Kong
 Blue Star Engineering Company (1943) and Honeywell Limited (combined since 1954) in India
 Vidhayakom Co. Ltd. in Thailand (1946)
 Unitech Engineering Corporation in the Philippines

A few other countries which also have Honeywell subsidiaries are: Australia (1962); Austria (1956); Italy (1965); New Zealand (1945); Norway (1937); Sweden (1938) and Switzerland (1947)

Figure 3-3.
 Material prepared by the Honeywell Project

We are researching the international aspects of Honeywell operations and contacting peace groups in France, Germany, Great Britain, Japan, the Netherlands, Brazil, Argentina and Canada.

We are doing local power structure research to determine who controls the political economy of Minneapolis and how the University of Minnesota serves Honeywell. We know already that the Board Chairman of Honeywell is Chairman of the University Foundation, which controls university endowment funds. Consequently, the university has \$600,000 invested in Honeywell; \$700,000 in Dow Chemical, and investments in other firms engaged in genocide or Third World exploitation.

We are researching Honeywell's effect on city and state politics, welfare, tax structure, the media and its connections with party politics. We will be interested in information concerning which DFL (Democrat-Farm-Labor) and Republican political figures got the war contracts and what their connections are with Honeywell.

WHERE AND HOW DID YOU GET MOST OF YOUR INFORMATION?
 WAS THE CLASSIFIED NATURE
 OF HONEYWELL'S OPERATIONS A PROBLEM?

Davidov: Honeywell provides a wealth of information concerning every aspect of its operations. For example, we have a map which Honeywell produced showing locations of its sales offices and plants around the world. This information and the annual report are available to the public at Honeywell's main offices.

We used Department of Defense manuals, ordnance trade journals and other reference materials found in the public library.¹

¹See Chapter 4.

"WAR CORPORATIONS AND RECRUITMENT POLICY"

Monday October 13th 11 am

Steps of Northrop

WAR CORPORATIONS RECRUITING ON CAMPUS WEEK OF OCT. 13

Position of War contractor <u>Nationally</u>	<u>Name</u>	Millions in War production <u>1968</u>
No. 1	General Dynamics	2,239
3	General Electric	1,489
20	Honeywell Inc. (fragmentation bomb)	352
25	Standard Oil	274
33	FMC Corporation	185
39	Texas Instruments	169
46	Texaco Inc.	138
--	Dow Chemical (napalm)	--

UNIVERSITY OF MINNESOTA INVESTMENTS IN WAR CORPORATIONS 1968 *

Position of War contractor <u>Nationally</u>	<u>Name</u>	Bonds and other <u>Securities</u>	Shares of <u>Common Stock</u>
No. 3	General Electric	\$100,000	1,700
6	AT&T	2,125,000	16,852
19	Ford Motor	632,000	3,640
20	Honeywell Inc.	600,000	1,600
25	Standard Oil	645,000	3,775
26	RCA	-----	5,300
30	IBM	-----	1,024
38	duPont	-----	1,320
39	Texas Instruments	-----	1,100
41	General Tele. & Elect.	-----	3,700
46	Texaco Inc.	200,000	6,141
--	Dow Chemical	700,000	-----

*University of Minnesota Endowment Fund Securities Report June 30, 1968.

Honeywell Project 529 Cedar Ave. So. Mpls. --- 336-1581

(Labor donated)

Figure 3-4. A Honeywell Project leaflet

“Industrial preparedness for defense...”



Honeywell salutes the American Ordnance Association on a half century of dedication to the nation's security. And supports the AOA in its efforts to maintain industrial preparedness for defense.

We've been building for America's defense for over 25 years... from all WWII allied tank periscopes to today's small caliber ammunition fuzing, seaborne firepower, and air-

borne munition dispensing systems.

Our common goal with AOA... to maintain a constant state of readiness through the best equipment possible.

We stand ready to build weapons that work, to build them fast, and to build them in quantity. And always with one goal uppermost in mind: a more effective military man now... and in the future.

Honeywell

AEROSPACE AND DEFENSE GROUP
Minneapolis, Minn. 55408

Figure 3-5.
Honeywell ad in Ordnance, September-October 1969

We used back files of the Minneapolis Tribune, checking Honeywell releases over the past six years and stories written about past strikes at Honeywell.

Since our first demonstrations, scientists and engineers have given information about the inner workings of the corporation.

Peace movement people and independent research groups have written with valuable information.

Sympathetic Honeywell union members have counseled us on what to say in leaflets addressed to workers.²

The classified nature of Honeywell operations has not been a problem in getting information or establishing our credibility. Abundant evidence in the establishment press documents our charges that Honeywell decision-makers are involved with genocide. We are getting some classified information from within. For example, we discovered that Honeywell produces a domestic counterinsurgency weapon, a tear gas shell which can fit most police rifles.

WHAT GROUPS OF PEOPLE DID YOU SEE AS YOUR CONSTITUENCY?

WHAT WERE YOUR AIMS?

HAVE YOUR ORIGINAL AIMS AND OBJECTIVES CHANGED?

Davidov: We saw Honeywell workers, stockholders, civic and church groups, peace groups, students, blacks, scientists and engineers as our constituency.

Our plans have not changed about whom the project is aimed at, but our analysis, aims and objectives have broadened. We had planned initially to build a political power base which could force Honeywell directors to cease all war production and convert to production of creative products.

As the project developed we began to feel that the workers and the community did not possess the kind of power which actually could stop production of CBU's, and that they did not have the knowledge which would allow them to direct that power into positive ends. For workers or the community to attain control involves long-range organizing and much education.

The project has also taught us that we have much to learn as our perspectives are continually expanded. As we work in the community, through researching and experience and action, we are beginning to comprehend the nature of the American empire and its manifestations in terms of banking, finance and political economy.

But we must further educate ourselves, the workers and the community. We must learn how, in a variety of day-to-day ways, the U.S. corporate structure oppresses its domestic employees through diversion of human resources into war production for profit. We must learn what "workers' and/or community control" means in terms of the U.S. experience, and also more about workers' councils in other societies. We hope to familiarize Minneapolis movement people, Honeywell workers and the broader community with these concepts in an effort to find our own workable models.

²See Honeywell Project labor leaflets, pp. 87, 88.

We shall do careful research to acquire this knowledge and would welcome ideas from individuals and groups who are working on similar possibilities.

HOW DOES THE HONEYWELL PROJECT KNOW THAT WORKERS WOULD NOT BE AS WEAPONS-ORIENTED AS THE PRESENT HONEYWELL DECISION-MAKERS?

Davidov: You can't offer guarantees, but it still remain the best hope. If we look back on the growth of industrial unions in the U.S., we see that in the '30's there was an extremely anti-militarist, anti-war dynamic in the CIO. This dynamic was lost in WW II, partly because of the impact on the whole society of the technology that grew out of the war, but also because the unions themselves shifted from a reliance on worker organization and education to collaborative deals with management from the top down under the aegis of the War Production Board.

Thus workers, instead of being the dynamic and decisive elements in the growth of unions, became the objects of arrangements made by others—the union leadership and corporate management.

With an intensive educational program, we think rank-and-file union people will come to see that it is not in their interest to make weapons which are used against workers, peasants and intellectuals in other countries.

HOW MANY PEOPLE ARE WORKING ON THE PROJECT?
HOW DO YOU FUND IT?

Davidov: The 25 people who responded to the project initially represented the peace movement in Minneapolis, CRV, YSA, MSU (Minneapolis High School Union organizers), SDS, AFSC, Catholic radicals, radicals working in Minneapolis, federal poverty program, Women's Liberation, students, non-students, representatives of progressive labor groups. The project was endorsed by radical blacks.

Although project members have come and gone, a core of about 15 people have seriously worked and attended the weekly meetings. We have had as many as 50 people at general planning meetings, though we deliberately keep the numbers at planning sessions low in order to ensure communication at this stage of development. There are only two full-time workers, though we soon will need more.

We began financing the program from contributions of members. The project has run thus far on \$30 per week. We do not accept money with strings attached. (Please send stringless money!)

HOW DO YOU PLAN TO CONTINUE YOUR WORK IN THE FUTURE?

Davidov: We have used demonstrations carefully, four in ten months. Our relationship with the press is good. Because of the nature of CBU's, many reporters and tv cameramen have expressed sympathy. We cooperate more closely with those reporters who show sympathy and we feed them information.

Since September we have begun University of Minnesota Honeywell Project, which picketed Honeywell recruiters during October 15 Moratorium Week.

Since June our organizing committee for professionals has had two meetings with a very few Honeywell scientists and engineers, perhaps the beginning of a professional union.

Charles Pillsbury, member of an upper-class family who is working on the project and whose family owns stock in Honeywell, has initiated a legal suit to open the Honeywell shareholder's list to him and the project.

We are presently seeking speaking engagements in every voluntary association in the Twin Cities. We have been on two talk shows. We have spoken at every area college and have created Honeywell Project campus groups. We have spoken at every Mobilization rally.

We distribute our general leaflet, now being rewritten, to middle-class groups and have leafleted four local Honeywell plants thus far.

We plan to continue contacting union people, although we have stopped distributing leaflets during Teamsters' contract negotiations with Honeywell.

We shall hold a conference on organizing against corporate power sometime this winter.

INSIDE PROTEST: Conversations around Minneapolis these days are spiced with the news that Charles A. Pillsbury, 22-year-old Yale student and a member of one of the city's most prominent families (of the Pillsbury company for flour and other foods) has filed suit against another top local firm, Honeywell, Inc.: Young Pillsbury opposes Honeywell's munitions business, such as the "anti-personnel bomb."

Unlike most young activists, however, he fights from a unique position. He's a Honeywell shareholder (about \$45,000 in stock) and his dividends may help pay legal fees in the case. He wants access to company records to see who was responsible for the decisions to produce such weapons. Then he may move into a proxy fight to elect directors who will change the munitions policy.

* * *
DIM VIEW: The Greater New York Safety Council calls the maxi "graceless, unsanitary—and hazardous." And, says its director of home safety, Mrs. Marjorie B. May, you should settle for ankle length instead of length, because the floor length come a real dr ar its
ees with

Figure 3-6. Clipping from "Eye" column in Women's Wear Daily, 26 November 1969

The Action

The following report on action projects were drawn from Honeywell Project progress reports and materials.

MEETING WITH CORPORATION EXECUTIVES

On April 22, 1969, a University of Minnesota Professor of Mechanical Engineering, who had worked at Honeywell on development of war material and had quit in disgust over the hideous weapons manufactured there, telephoned James Binger, Chairman of the Honeywell Board of Directors. He asked Binger to meet with ten project members. Binger refused, but when he was told the project was planning a demonstration at the annual shareholders' meeting, Binger said he would meet that afternoon with three of the project members.

A professor of physics, the ex-Honeywell worker and Marv Davidov met with Binger and Gerry Morse, Vice President in charge of personnel and labor negotiator for Honeywell, in an hour-long meeting in Binger's office.

Marv outlined the nature of the project: development of political pressure upon decision-makers until they stop production of fragmentation bombs and all war material. Demands were non-negotiable, but the project would work cooperatively by bringing economists, scientists and engineers to Honeywell, free of charge, to develop plans for conversion to peaceful and creative products. It was suggested that Honeywell, with all its prestige, should take the lead in conversion so other companies could follow.

Morse said Honeywell employs 20,000 people in its "defense group" and is an equal opportunity employer, wishing to provide self-sufficiency for blacks. Marv asked if that meant that poor blacks, white and Indians would one day control Honeywell. "No," came the answer, "but they could work their way up through channels."

The two moments when the Honeywell executives exhibited a gut reaction occurred when Marv said the project was planning civil disobedience at the homes, country clubs, businesses and churches of decision-makers and that the project planned to connect with the Japanese, French, German, English, Italian and Australian peace movements to focus on Honeywell's overseas operations.

DEMONSTRATION AT HONEYWELL'S MAIN OFFICES DURING STOCKHOLDERS' MEETING

Davidov called Binger at his home the following Sunday and requested permission to have four people in at the stockholders' meeting to speak for no longer than ten minutes with no disruption. The project had bought two shares of stock one week before. Binger had said only "stockholders of record" (those who had purchased stock at least two months prior to the stockholders' meeting) were qualified to speak. However, he agreed that one person could speak for ten minutes at the forthcoming meeting.

Honeywell made its first public statement concerning war production in a press release on Monday, April 28.

HONEYWELL PROJECT STATEMENT TO STOCKHOLDERS' MEETING, HONEYWELL, INC.

Presented by Evan Stark, April 29, 1969

Opening Statement for the People Against Honeywell

Mr. Binger, Mr. Keating and gentlemen:

I am here today to present some opening remarks in the case of the People vs. the Honeywell Corporation of America.

The case for the prosecution is straightforward. Our argument is that it is illegal, immoral and inhuman for Honeywell to manufacture armaments for the mass destruction of civilian poor.

In addition, we argue that Honeywell's mass production of weaponry constitutes a direct attack on poor and working people in this country and throughout the world.

First, the legal argument.

Article 6(b) of the Nuremberg Agreements defines war crimes as "including (but not limited to)...attacks on and murder of civilians during wartime." Article 6(c) clearly states that "...accomplices participating in the formulation or execution"...of attacks on or murder to civilians are..."responsible for all acts performed by any persons in execution of such crimes."

Gentlemen, it is undisputed that "anti-personnel," guava or fragmentation bombs are produced by Honeywell Inc. It is undisputed that such weapons, among others produced by Honeywell, are used most frequently and consistently against civilian poor.

Clearly the men responsible for this production are accomplices to war crimes against civilian poor. In its opening statement for the defense, Honeywell claims that it is entirely appropriate and correct" to produce such weapons "as a matter of good citizenship."

The Nuremberg Charter clearly responds to this defense.

"The Charter recognizes that one who has committed criminal acts may not take refuge in superior orders nor in the doctrine that his crimes were citizenly acts of state."

.....

It is not necessary to show that the war in Vietnam is itself an illegal, immoral and inhuman war against the Vietnamese people -- there are already more than one million civilian dead in Vietnam -- to prove Honeywell's complicity in acts defined as war crimes by virtually every civil, military and international code.

The legal argument is least important.

The people put Justice before law. The Nuremberg laws were enforced by victor against vanquished and it is as unlikely that American courts will move against Honeywell as it was that German courts would move against Krupp.

The moral arguments cannot be separated from the humane. The People agree that what is inhumane is also immoral.

Increasingly the world is divided between haves and have nots, between those who seek Freedom and Justice by every means at their disposal and those who oppose such moves, between those who are life-affirming and peace-affirming and justice and freedom affirming and those who, in the public's eye, stand for death, injustice and unfreedom.

The people of the world turn to men who claim to be of good will and ask: "Which side are you on?"

In its opening statement for the defense, Honeywell claims that as a "technology based company we have the capability to provide a variety of equipment in support of the Defense Department."

The People recognize the capability of technology. They recognize its potential to close the gap between the haves and have nots. They recognize its capability to decently house, clothe, feed, pay and supply with useful products all of America's citizens.

The People also know technology can broaden the gap between the haves and have nots.

By putting over one-third of its production into Defense, Honeywell broadens the gap.

By the mass production of armaments:

Honeywell enforces the will of the few over the many.

Honeywell makes America's economy increasingly dependent on war and useless production.

Honeywell contributes to the rapid rise of the cost of living. Government spending on arms causes inflation; inflation causes taxes and prices to rise. Wages do not rise accordingly. Honeywell produces armaments because it is profitable and for no other reason.

.....
There are many men of good will who work at Honeywell and who run Honeywell. Honeywell has taken an active part in trying to solve the urban problems.

But this good will and effort are meaningless so long as Honeywell produces armaments on a massive scale. . . . What does it matter how many blacks and Indians and poor whites Honeywell employs if it contributes to the death of many more?

What does it matter how much money Honeywell pours into rebuilding our cities when it pours so much more into destroying their social fabric?

.....
The war in Vietnam is coming to an end. Already, the United States is preparing for new wars in Asia and in South America. Already it is preparing new contracts.

But the American People will no longer stand for this. The crisis in the cities has gone too far. Racism has gone too far. Too many of our sons and brothers have been killed.

.....
There are millions of hard working men of all colors, races and nationalities in America. They are sick of supporting the cities with their wage and property tax -- they are sick of paying the money they need for food and security for guns and missiles.

And there are those in the professional classes, doctors, lawyers, scientists, engineers, and social planners, who will refuse to put their services at your disposal if that means contributing to America's shame at home and abroad.

I come before you today because there is a dream in America which you must keep alive and feed. Your profits, great as they may be, are only as great as this dream and will only survive so long as this dream is fulfilled.

The dream of the people -- and once the dream of Honeywell -- is that America's companies and technologies can provide a better life, better cities and a better world for us all. And there is profit in that dream.

Gentlemen, the People are prepared to support Honeywell in a great adventure. Say No to the production of terror and war and the People will build you into a mighty monument. They will use your computers to redistribute Freedom and Justice; they will explore space with your help; they will live and prosper with your help. With your help, today's dream will be tomorrow's America.

Gentlemen, the People will be heard. The question is: How will Honeywell respond?

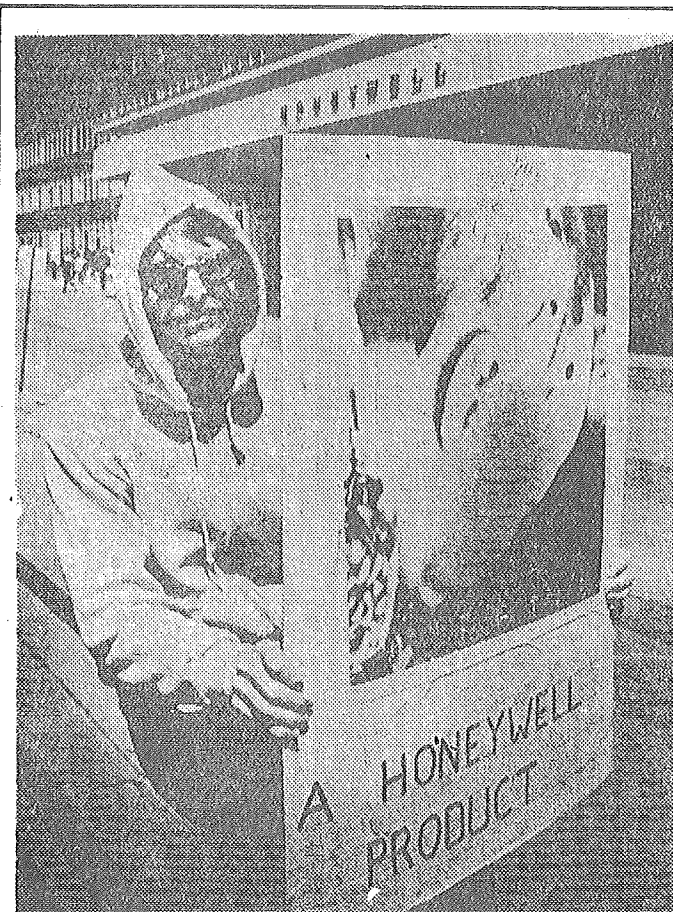
Thank you.

HONEYWELL'S STATEMENT TO THE PRESS - April 28, 1969

"Honeywell management shares the feelings of those who would like to see the Vietnam War ended. We vigorously support the efforts the government is making to find a solution to the complex problems that surround this conflict. Until such solutions are found we believe the government has an obligation to provide our armed forces engaged in the conflict with the equipment they need to maintain a strong military posture. As a technologically-based company we have the capability to provide a variety of equipment as a supplier to the defense department. We believe it is entirely appropriate and correct to do so as a matter of good citizenship. For those who do not share our views about what a company should do in the support of its democratically chosen government we endorse their right to legal and peaceful protest."

The project then arranged an interview with a reporter of the business section of the Minneapolis Star, who included in the news article excerpts of the Honeywell project statement to the stockholders' meeting.

On Tuesday, April 29, '69, 35 project members demonstrated on company property directly in front of Honeywell's main offices. (Binger stated in a press release that Honeywell would not keep the demonstrators off the street in front of the plant if the demonstrators were peaceful, since "the street is Honeywell property.") The demonstration displayed blown-up photos of atrocities with excerpts from a Honeywell statement such as, "It is entirely appro-



Minneapolis Tribune Photo by Earl Seubert

PROTESTERS greeted Honeywell stockholders when they gathered for their annual meeting at the firm's headquarters. John Crocker, 19, one of about 35 pickets, held a poster showing the head of a child, alleged to be a Vietnamese wounded by a fragmentation bomb.

Honeywell's Arms Business Protested

By JIM FULLER

Minneapolis Tribune Staff Writer

Officers, stockholders and company's armaments manufacturing operations met in and protesters against the what turned out to be a gen-

erally cordial confrontation Tuesday.

About 35 members of a new organization called "Project Honeywell" appeared at company headquarters, 2701 4th Av. S., to distribute leaflets and talk to stockholders arriving for the firm's annual meeting.

Their protest was, as promised, entirely peaceful.

Honeywell officers, in turn, kept their pledge to refrain from interfering with the demonstration.

FOLLOWING an agreement worked out between the two sides last week, a Project Honeywell speaker was given 10 minutes immediately after the formal stockholders' meeting to present his case.

The stockholders listened in silence, and it appeared that few, if any, minds were changed by the presentation.

Speaking for the anti-Vietnam war group was Evan Stark, director of the East Side Citizens Community Center.

Stark drew friendly chuckles and a smattering of applause from his audience when he admitted that Honeywell has "done well by me" as a stockholder.

He owns two shares of Honeywell stock, purchased for the purpose of gaining entrance to the meeting.

THE SMILES faded when the speaker began what he called an "opening statement for the people against Honeywell."

"Our argument is that it is illegal, immoral and inhuman for Honeywell to manufacture armaments for the mass destruction of civilian poor," Stark said.

"It is undisputed that such weapons (antipersonnel fragmentation bombs) among others produced by Honeywell, are used most frequently and consistently against the civilian poor," Stark continued. "Clearly the men responsible for this production are accomplices to war crimes..."

"The people recognize the capability of technology," Stark said. "They recognize its potential to close the gap between the haves and have nots. They recognize its capability to decently house, clothe, feed, pay and supply with useful products all of America's citizens."

HOWEVER, he charged, technology improperly used can "broaden the gap between the haves and have-nots."

James H. Binger, Honeywell chairman, said after Stark's talk that the speaker "has covered matters of great concern" to Honeywell's management and stockholders. "That does not mean we have reached the same conclusion," he added.

Outside, demonstrators continued to hand out leaflets aimed mainly at Honeywell's production of fragmentation bombs. Some of the men and women entering and leaving the building refused to take the leaflets, and there were some mumblings about a need for haircuts.

Most people took the material and thanked the protesters, however.

Figure 3-7
Clipping from
Minneapolis Tribune
30 April 1969

appropriate, correct, and a matter of good citizenship..." printed below a dead child with fragments in its head. The project handed out 600-700 leaflets.

All tv stations and both newspapers were there. Binger said for tv news: "Honeywell will continue to supply the needs of the Defense Department."

CONTACTING THE WORKERS: LEAFLETING AT HONEYWELL'S MINNEAPOLIS PLANTS

A few days after the stockholders' demonstration, the project received a call from two very sympathetic union people who agreed to advise the project on leaflet content, though neither of them would publicly identify with the project.

Two weeks after the initial demonstration, eight "straight-looking" project people leafleted the St. Louis bomb plant, distributing about 500.

Figure 3-8.
A Honeywell Project labor leaflet

TIRED OF BEING PUSHED AROUND?

Why all the pressure on employees to make the quotas set by Honeywell bosses? Who benefits from the speed-up in production - the men and women making the products or the big executives? Binger gets a raise from \$147,000 to \$213,000 and an \$83,000 bonus. What big raise and fat bonus did you get? When assembly workers and a shop steward speak out, what happens? Who gets pushed around? Who gets pushed around with property taxes, sales taxes, and income taxes? Honeywell executives and stockholders hide behind loopholes and tax shelters. A Minnesota legislator reported that companies like Dayton's, 3M, Hanna Mining, and Honeywell get enormous tax breaks. And who pays through the nose for these taxes? Who gets pushed around by inflation? Wage-earners pay the bulk of the surtax. Why is it that Honeywell's profits soar while the real wages of its employees sink into higher costs? What caused inflation in the first place - overpriced spending of under-paid wage-earners or the squandering of money by undertaxed corporations like Honeywell? Who gets pushed around in an endless war not of their own making? Former Commandant of the U. S. Marine Corps, David Shoup, put it this way: "I believe that if we had and would keep our dirty, bloody, dollar-crooked fingers out of the business of these nations so full of oppressed, exploited people. ... arrive at a solution of their own, that ... and work for ..."

A decision was made to leaflet the St. Louis Park plant again the next week and Binger was notified three days before. He requested the project meet with Honeywell security official Fred Cary to ascertain ground rules, since the project was barred from plant property. No police protection was asked for but Cary said he would be there in case "hotheads in the plant pull any funny stuff." For traffic safety the project was permitted on Honeywell property.

The project received 14 calls from union people at the plant in the next two days. Most callers expressed no hostility but asked who was behind the project and said they were in accord with many of the things stated in the leaflet. Callers were told of a meeting planned at a local church the following Sunday night to discuss common solutions to problems.

Figure 3-9.
More Honeywell Project labor leaflets

Who Gives A Damn?

Recently, at the New Brighton Ordnance Plant, a young woman's hands were severely mutilated by the accidental explosion of a bomb. Honeywell production bosses marked it off on their neat little clipboards as a loss of labor time. attempt was made to adjust the speeded-up rates in order employees. No hazardous pay rates were attached to promote better working conditions workers were given the pro against these up

Who Empties Your Pockets (and Fills Theirs)?

Over the last decade the average wage earner has been plagued by high-rising costs. For example, costs of home ownership went up 31%, and medical services zoomed up 60%. Wages, for the most part, have not kept pace with rising costs. Moreover, the rise in the consumer price index (our daily bread costs) resulted in a 5-10% increase in 1968. And wages, particularly those without a cost-of-living clause, were eaten up by these costs.

However, the biggest burden on wage earners is the inequality in the tax structure. The working family that makes between 7,000 and 15,000 dollars a year gets hit the hardest by local and national taxes. On a local level the tax structure is weighted against the home-owner. Property taxes extract nothing close to a fair share from business. One of the reasons is that many state lobbyists for business interests. The influence of big corporate tax, the 1967 corporate

The projects' union friends tipped them off that Teamsters would send observers to the meeting, and when three project members arrived at the church they saw about 50 Teamsters standing on the steps, including union president Tyler.

Questions were raised at the meeting about whether the Honeywell Project was an SDS project. The chairman said it was not but that he agreed with some of the goals of SDS, though he sometimes disagreed on tactics. He reminded union people that most college students now support the goals of the radicals; that when the Teamsters battled police and the Minneapolis power structure in the '30's, they were painted in the press as wild radicals and Communists.

When an ex-Marine spoke from the platform against the Vietnam war, the Teamsters shouted, "They only want to talk with themselves," and all left in unison. On the steps outside, the Teamsters milled around as the union president chastised a sympathetic union woman because she was talking with project members. One drunken union man took a tire iron from his car but was restrained by the others; he bashed at a street sign instead.

The project's analysis is that union leadership is uptight, attempting to brand the project an SDS Work-in Project. Union leaders apparently take their cues from local Teamster leadership. The union invited a "red-baiting, SDS-baiting" Hennepin County attorney to speak to the June union meeting about SDS. The union contract expires in February and there will be an attempt made to create rapport with individual members.

The Project Labor Committee has leafleted four local plants, the bomb plant twice. They do not notify press of plant leafleting.

DEMONSTRATION AT BOARD CHAIRMAN BINGER'S CHURCH

The project stated it would bring public pressure to bear on the private and public lives of the corporate leaders of Honeywell, thus in late August a demonstration was held at St. Martin's Episcopal Church By-The-Lake, which James Binger, Board Chairman of Honeywell belongs to but does not attend.

Charlie Pillsbury, who attended St. Martin's, met with the minister and did the advance project work. The minister was informed that about 55 people would demonstrate at the church against CBU production. He was assured that the demonstration would be peaceful and non-disruptive. A request was made to introduce the project during the service and hold a dialogue with parishioners, which was granted.

The project notified the press, and called Binger and informed him of the demonstration before it occurred. He said, "You have every right to express your point of view and you are certainly doing that."

Sunday morning, 55 men, women and children demonstrated at St. Martin's. Among them were representatives of CRV, New Democratic Coalition, AFSC and project members.

The demonstrators stood on either side of the church entrance, holding CBU and atrocity photos, singing a peace round and leafleting as people entered.

The minister said in his sermon that he used to be a pacifist, but could no longer accept absolute truths. In an attempt to insulate church people from the project members, he urged his people not to bear slogans like those outside. He also urged everyone to attend the coffee-hour dialogue afterwards, which lasted for one and a half hours. The church people generally doubted CBU's were used against people and expressed impotence about the situation.

All three tv stations and the Minneapolis Tribune plus suburban papers briefly covered the story.

Figure 3-10.
Honeywell Project leaflet

CBUs violate international law. The Hague Convention of 1907 forbids employing arms, projectiles or material calculated to cause unnecessary suffering. Aerial bombings designed to terrorize the population were forbidden at the 1907 Hague Convention.

James Binger justifies Honeywell's manufacture of CBUs by pleading his obedience as a citizen to the U.S. Government. But this argument did not work for German war criminals indicted during the Nuremberg Trials. The Nuremberg Principles, ratified by the international community, state that no person acted in fact in violation of international law if he followed the orders of his superiors. The Nuremberg Tribunal held that the Nuremberg Principles apply to all persons, and that no person acted in violation of international law if he followed the orders of his superiors.

A CHALLENGE TO ST. MARTIN'S

Here at St. Martin's-by-the-Lake you are participating this morning in the familiar ritual during which, each Sunday, many of us take time to put our daily lives in perspective. The rich and orderly service helps us to celebrate life and its blessings and to remind ourselves once again of our obligations as Christians.

In Vietnam many churches as well as schools and hospitals stand in ruins. The shadow of these ruins falls far. Some of you may have noticed it dulling the Sunday morning atmosphere here at St. Martin's, casting its pall over the bright flowers and altar hangings, lending an ominous note to the sacred music.

James Binger, Chairman of the Board at Honeywell, belongs to St. Martin's and helps support it. Since 1965, Honeywell has contracted to manufacture an illegal and barbaric weapon used extensively against the civilian populations both in North and South Vietnam. The "cluster bomblet unit" or CBU is an anti-personnel weapon consisting of whirling spheres which break near ground level to release thousands of b-b sized pellets in all directions. Frank Harvey, in a non-commissioned book Our Air War In Vietnam, describes the way CBUs are used in the open or inside a

COMMITTEE OF RETURNED VOLUNTEERS (CRV)/ HONEYWELL PROJECT JOINT DEMONSTRATION

In September, CRV held its first annual meeting in Minneapolis, in part because of the Honeywell Project, and suggested a joint demonstration at its close.

The security officer from Honeywell called the project, stating that he knew of the demonstrations. The President of Honeywell said the project would not be permitted to demonstrate on Honeywell property in front of the main office as the project had previously done with permission.

Project leaders spoke with Minneapolis police authorities, who said they had met that morning with Charles Stenvig, Mayor and ex-policeman. The project stated that they would begin the demonstration at the First National Bank since three Honeywell board members are directors of the bank (which has corresponding banking in Central and Latin America and Asia). The police said: the project would not be permitted to leaflet in the main shopping area; they would not initiate any arrests if the demonstration proceeded onto Honeywell property unless Honeywell asked them (the police) to come; even then they would probably ticket rather than arrest the demonstrators, so as not to clog the jails.

Only three people from the project were willing to risk arrest by stepping on Honeywell property. CRV felt as a body that their national leadership could not be involved in a protracted court battle.

Davidov informed the press and called Binger and said they felt it was stupid from his point of view to initiate arrest since the project was not seeking a disruptive situation at that time. Binger said the project would constitute a mass demonstration involving elements that could not be controlled. Davidov replied that a "mass demonstration" implies 500 or above, and that working closely with CRV the project could assert with some certainty that the demonstration would be nonviolent. Binger said he would look out the window and assess the situation as it happened.

Tuesday morning, 65 people met at the First National Bank. The Honeywell head security officer was there. He offered a compromise: Honeywell would permit 10 demonstrators on the property if the rest of the group would demonstrate off the property. Davidov said he couldn't decide for the group but that the decision would be made collectively.

The police did not stop the leafleting. The group walked to Honeywell single file and obeyed all traffic regulations. At Honeywell the demonstrators presented a demand to Keating: meet with three CRV members and two project members either in his office or down on the streets in the presence of the press. The security man took the demands to Binger and Keating who refused to meet. The result was that 14 CRV and 15 project people were ready to march onto Honeywell property, up 26 people from the original three who contemplated civil disobedience.

HONEYWELL INVOLVED IN GENOCIDE



Child killed by Honeywell fragmentation bomb

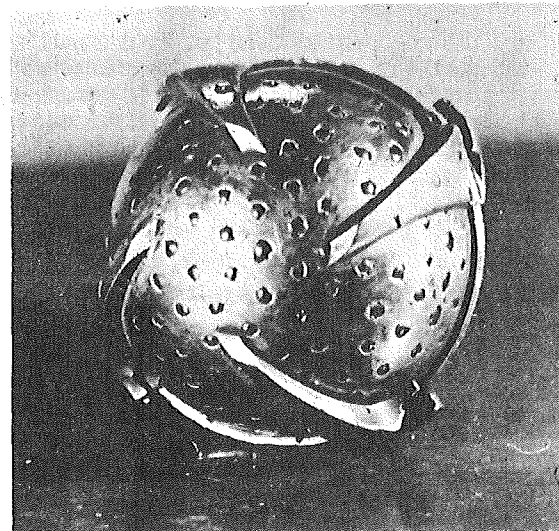
Honeywell Inc., one of the top 20 U.S. prime defense contractors, with defense sales of 478 million dollars annually, is producer of the deadly anti-personnel fragmentation bombs which have been responsible for much of the civilian casualties in the Viet Nam War.

Reports from both North and South Viet Nam indicate that villagers, mostly women and children, (see pictures) are being exterminated by the use of this immoral weapon. Recently, George

Grim reported in the Minneapolis Tribune about the genocide being carried out against the Biafrans by the Nigerian State. He mentions the use of these same anti-personnel fragmentation bombs. What makes the use of these bombs by U.S. forces in Viet Nam any different than their use by the Nigerian State? Nothing! Genocide is the same wherever it occurs. Honeywell is directly involved in the genocide in Viet Nam because it produces these inhuman weapons.

ANTI-PERSONNEL FRAGMENTATION BOMBS

Anti-personnel fragmentation bombs are about the size of a baseball and contain about 250 ballbearing-like steel pellets imbedded in a metal casting. A tripping mechanism and explosive are placed inside the casting. Many of these small bomblets are placed inside a much larger casing which is opened in mid-air to scatter the small bomblets over a large area. The bomblets are armed in descent and explode on impact sending a shower of deadly pellets in all directions. The pellets tear the flesh and smash the bones of all humans in the area, while leaving buildings intact. This weapon was specifically designed by Honeywell to be used against civilian populations.

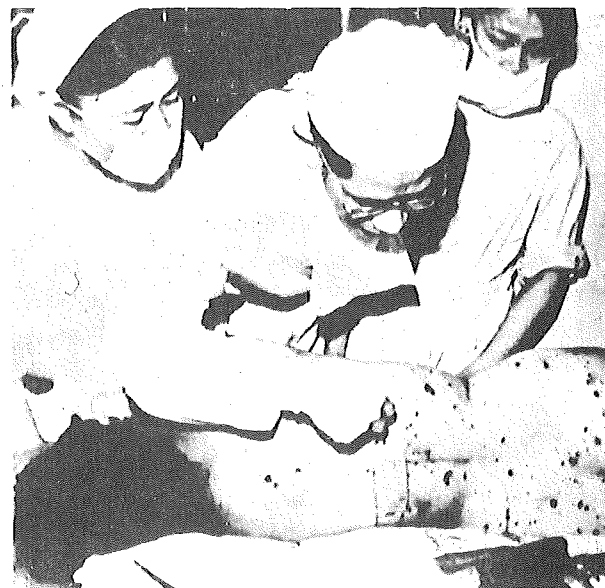


Honeywell fragmentation bomb

PRIME DEFENSE CONTRACTOR

Honeywell is Minnesota's largest defense contractor, ranking 20th nationally, up from 43rd in 1965. Honeywell's Aero-Space and Defense sales for fiscal 1968 were \$478 million, 37% of total sales. This was an increase of 45% over the previous year and 150% since 1965 when defense sales were smaller, yet still an unreasonable 25% of total sales. This substantial increase is primarily due to a large increase in ordnance operations. (Only 8% of the defense sales in fiscal 1967, about 2% of total sales, were to the National Aeronautic and Space Administration.) Honeywell has over 4 million sq. ft. of factory space and over 20,000 employees working in its defense group, (4,000 employees at the St. Louis Park plant alone.) Honeywell has four ordnance plants in the Minneapolis and St. Paul area.*

*Honeywell Annual Reports.



Victims flood hospitals

STOP THE MILITARY - INDUSTRIAL COMPLEX

Many individuals have warned the American people of the Military-Industrial Complex, not least of these former President Eisenhower. When 73 cents of every tax dollar goes to the Defense Department, it is time to take action and stop the monstrous complicity before it engulfs us. When Job Corps, a domestic program of importance to many poor and disadvantaged Blacks, Whites and Indians is cut 30% (100 million) and President Nixon proposes a \$7 billion beginning for the Anti-Ballistic missile program, something is radically wrong with our priorities as a nation. When the working man is paying more taxes than many of

the people in the upper income brackets because of unjust tax laws that favor the rich, something is wrong with this democracy. While the working man pays for the Viet Nam War and excessive and unreasonable military spending, the rich make substantial profits from the inflationary war economy. The rich make more money while inflation eats up what increases in salary the working man gets. It is unjust that the working man who is earning less has to pay more taxes than the rich. It is likewise unjust to make Black men fight a war, supposedly for freedom, in Viet Nam when they don't even have freedom and equality back home.

THE GRATE SOCIETY

The Pentagon's anti-personnel bombs are made in equal-opportunity factories.

Fragments for the war on poverty.

- George Bowering

THE HONEYWELL PROJECT

We, a group of concerned people, workers, students, and professionals, representing various political views are united in the belief that this country is in grave danger, and is putting the whole world in that situation as well. There is a need in this country for a more equitable, peaceful, and freer society. We have begun to act towards these goals by beginning the Honeywell Project. The goal of this project is to bring world-wide public pressure to bear on Honeywell to stop not only the immoral production of anti-personnel fragmentation bombs, being used in a campaign of genocide in Viet Nam, but to persuade Honeywell to cease all aspects of defense production.

WE DEMAND A WORLD OF PEACE

We of the Honeywell Project demand that tax monies now spent for inhuman weapons, for an unjust war, for the continuation of the suicidal arms race, and for the perpetuation of the Military-Industrial Complex, be spent instead for creative domestic projects that are desperately needed in order to make this country truly free for all, Blacks, Whites and Indians. We demand that the corporate directors of Honeywell cease production of anti-personnel fragmentation bombs and put an end to their

involvement in the Military-Industrial Complex. We demand that the directors re-allocate the resources and energies of Honeywell that are now devoted to destructive purposes. These resources and energies could be used for the creation of goods valuable to humanity. We demand that workers, Black, White and Indian be given substantial voice in the decision of what should be produced. These demands must be met if this nation and the whole world are to carry on. We intend to persist until these demands are met.

JOIN WITH US

If you are interested in joining with the concerned individuals of the Honeywell Project, want to donate to the project, or would like a speaker to speak to your group, or just want further

information, call 336-1581 or write Honeywell Project, 529 Cedar Avenue South, Minneapolis, Minnesota 55404.

*Photos of North Vietnamese victims thanks to Bob Eaton, Skipper of the Phoenix.

HONEYWELL

PRODUCTS

KILL

PEOPLE

Figure 3-11. The basic Honeywell Project leaflet

The security officer declared very loudly, "This is private property. You are not permitted to demonstrate here. We do not even permit the union to demonstrate on Honeywell property." An incredible blunder in the presence of the press! The project had leafleted the day before at the main plant, stating to union people that their right to demonstrate could be blocked if Honeywell decision-makers stopped the project from demonstrating.

Thirty-two people walked onto Honeywell property. The project picketed and leafleted for 45 minutes, fully expecting to be arrested, while 33 people demonstrated off the property. The directors did not arrest.

The corporation leaders backed down publicly on their stated posture, a situation which they no doubt will try to avoid in the future. The demonstration united project members, juiced up CRV in its first coordinated national action and paved the way for future project action.

Figure 3-12.

Arms Protest Staged at Honeywell

About 70 persons ignored trespass warnings from Honeywell Inc. security officials Friday and staged a lively demonstration particularly against production of an anti-personnel fragmentation bomb made by the company. The day was planned by the Honeywell Project, an organization of workers, students, teachers and professionals, is planning to demonstrate Tuesday, ~~Sept~~ ^{Sept} 16, at the General Offices of Honeywell, Inc., on 4th Avenue South. The Honeywell Project has been denied the right to picket on 4th Avenue South between 27th & 28th Streets East, by the corporate leaders of Honeywell. They have denied access to 4th Avenue South for us to demonstrate non-violently our beliefs and demands.

Clash Averted at Honeywell

Minnesota YMCA
well Project leader, said that between 4,000 and 5,000 leaflets were distributed to Honeywell employees between 6 a.m. and 8 a.m. yesterday.

PROTECT YOUR RIGHT TO PICKET

The Honeywell Project, a group of workers, students, teachers and professionals, is planning to demonstrate Tuesday, ~~Sept~~ ^{Sept} 16, at the General Offices of Honeywell, Inc., on 4th Avenue South. The Honeywell Project has been denied the right to picket on 4th Avenue South between 27th & 28th Streets East, by the corporate leaders of Honeywell. They have denied access to 4th Avenue South for us to demonstrate non-violently our beliefs and demands.

This is important to the employees of Honeywell, Inc., because if we are denied the right to picket there on Tuesday, Honeywell employees may be denied the right to picket there next February if Teamsters Local 1145 should strike.

Even if the employees of Honeywell in Local 1145 do not agree with our beliefs and demands, we do have one thing on which we agree — that being the right to picket to make our demands made known to the public and Honeywell corporate leaders.

We of the Honeywell Project call upon the employees of Honeywell to protect your right to picket on 4th Avenue South next February by protecting our right to picket there tomorrow.

Writer
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"We hope to inspire semi-autonomous community groups which will closely coordinate their activity and take public measures of resistance to the defense-oriented corporate leaders.

"We realize fully the experimental, nonviolent nature of the project and that in a sense we are pioneering for the movement. We wish to stimulate other groups—internationally and around the country—to begin resistance projects aimed at defense-oriented corporate power holders."

Marv Davidov

Honeywell Project's Bibliography on Corporate Power

- Peter M. Blau, Exchange and Power in Social Life (John Wiley, 1967). Analysis of possible reactions of the powerless to the powerful in a variety of situations.
- David Braybrooke and Charles E. Lindblom, A Strategy of Decision (Free Press, 1963). Decision-making processes involved in situations of varying degrees of complexity—from simple administrative matters to wars and revolutions.
- William G. Domhoff, Who Rules America? (Prentice-Hall, 1967). Though influenced a great deal by Mills' The Power Elite, Domhoff feels that Mills overplayed the power of the military.
- Leo Fenster, "Mexican Auto Swindle," Nation, 2 June 1969, pp. 693-7. A brief insight into how corporations take advantage of the plight of Third World nations to grow richer and more powerful.
- John Kenneth Galbraith, "How to Control the Military" (Doubleday, 1969). A moderate's view of how the military-industrial complex came into being and suggestions as to how it may be controlled.
- David Horowitz and Reese Erlich, "Big Brother as Holding Company," Ramparts, 30 November 1968, pp. 44-52, and "Litton Industries: Proving Poverty Pays," Ramparts, 14-28 December 1968, pp. 40-49. A two-part case history of the expanding power and influence of one of America's corporate giants, Litton Industries.

David Horowitz and David Kolodney, "The Foundations: Charity Begins at Home," Ramparts, April 1969, pp. 38-48. A report on the power and prestige of the Rockefeller, Ford, Carnegie and other foundations.

David Horowitz, "Billion-Dollar Brains: How Wealth Puts Knowledge in its Pocket," Ramparts, May 1969, pp. 36-44. Explains how the great foundations shape the American system of higher education through gifts, endowments and the financing of special areas of study.

Ferdinand Lundberg, The Rich and the Super-Rich (Bantam, 1968). (\$1.98 in paperback at almost any bookstore.) How the rich achieve and perpetuate their wealth and influence through control of corporations, foundations, trust funds, Congress, foreign policy, etc., and manage the country to benefit themselves.

C. Wright Mills, The Power Elite (Oxford, 1956). Systematically examines the power and influence of the wealthy and the military.

----, "The Bureaucratic Ethos" in Maurice Stein and Arthur Vidich, Sociology on Trial (Prentice-Hall, 1963) pp. 12-25. Reprinted from C. Wright Mills, The Sociological Imagination (Oxford, 1959) pp. 100-118. Explains how it is possible for money to shape the theoretical orientations and research interests of entire disciplines in the social sciences.

Carl Oglesby and Richard Shaull, Containment and Change (Macmillan, 1967). Shows that the Cold War and especially the Vietnam war are not mistakes by our State Department but rather natural, logical consequences of the imperialistic framework within which we operate.

Also: Corporation Procedures in Weapons Industries—A report from the Honeywell Project written by a former Honeywell employee who is familiar with corporation procedures. Available from Honeywell Project.

Available from the New England Free Press, 791 Tremont St., Boston, Massachusetts, 02118 (add 15% for postage):

Jill Hamberg, "Where It's At: A Research Guide for Community Organizing" (\$1)

William Domhoff, "Researching the Governing Class of America: A Guide to Sources" (10¢)

NACLA "Research and Methodology Guide" (Researching the empire and campus reconnaissance) (25¢)

Mike Klare (NACLA) "The University-Military Complex: A Directory and Related Documents" (\$1)

4. INFORMATION SOURCES FOR RESEARCH ON MILITARY CONTRACTING

A local industry may be engaged in counterinsurgency war production even if it isn't listed in the charts included in this booklet. Those involved may also be engaged in other war production not listed or may have concluded work on the contract shown. The amount of money shown is, in most cases, only a fraction of the total awarded to the company for the weapon in question. While these lists do represent substantial research, they cannot be complete for several reasons:

1. The contract may have been awarded before or after the period during which these contracts were compiled.
2. The contract may be classified for "national security" reasons.
3. The contract may not be awarded directly by the Department of Defense, but rather awarded through a contracting agency to a sub-contractor, or even a sub-sub-contractor.
4. Local researchers should be aware that controversial research projects and the production of deadly weapons or their components are sometimes disguised in innocuous-sounding technical language.
5. Rarely will one find contracts for an entire weapons system. Rather, contracts are usually for components which are later assembled at an Army ammunition plant or under a separate contract. While we have in general included such components, minor items such as a switch may have eluded classification with a particular weapons system.

These direct information sources will help local research-actionists uncover further the involvement of their local industries in defense production. If you are unable to locate any of the materials listed, contact NARMIC.

Categories of Information*

CONTRACT AWARDS

DAILY SOURCES

DoD contracts are listed daily in press releases issued by the Office of the Assistant Secretary of Defense for Public Affairs (OASD/PA) in the Pentagon, Washington, D.C. 20301. (Telephone numbers: for information, (202) OX 7-5131; for copies (202) OX 7-3189.) These

*Numbers in parentheses refer to bibliographic entries which follow at the end of this chapter. Abbreviations used in this section include: DoD, Department of Defense; R&D, Research and Development; GPO, Government Printing Office.

lists are usually reprinted by the Wall Street Journal and indexed by company name in the annual Wall Street Journal Index. DoD contracts over \$25,000 (except for those whose existence is classified) are also included in the list of government contract awards which appears in the Commerce Business Dailey (9).

MONTHLY SOURCES

The Defense Industry Bulletin (10) publishes a cumulative list of all DoD contracts over \$1 million each month. Army Research and Development Newsmagazine (5) provides a monthly accumulation of all Army contracts over \$1 million. A monthly accumulation of all DoD contracts for R&D Contracts Monthly (23).

YEARLY SOURCES

An annual cumulative list of DoD production contacts appears in the Government Contracts Directory (16). An annual cumulative list of DoD Contracts for R&D appears in the R&D Directory (24). Contract awards for specific weapons systems and those awarded by specific DoD agencies are listed in the DMS Market Intelligence Report (15).

TOP CONTRACTORS

The total value of all contracts awarded to the 100 largest DoD contractors is reported annually in the Pentagon's computation of 100 Companies and Their Subsidiaries Listed According to Net Value of Military Prime Contract Awards; the value of DoD contracts awarded to the 500 leading R&D contractors is provided in 500 Contractors Listed According to Net Value of Military Prime Contract Awards for Research, Development, Test and Evaluation Work. These two documents are available upon request from the OASD/PA at the address above.

CONTRACTS BY COMMUNITY AND STATE

The Pentagon has recently begun publishing for each state a Listing of Contractors Receiving a Prime Contract of \$10,000 or More in Fiscal Year 1968 (exact title not determined at this writing). The listings show, for each city within the state, the name and the dollar amount (in thousands) for each contractor. To obtain your state listing (price ranging from \$1 to \$5 depending on the state), write to: Records Management Branch, Correspondence and Directives Division, OASD (A), Pentagon, Washington, D.C. 20301.

Another source is Department of Defense, Prime and Subcontractors, With Product Listing, directory of DoD contractors, their addresses and products or services. It is compiled by regions and available free from the Small Business Office of Defense Contract Administration Services in:

- Atlanta, Ga. 30305, 3100 Maple Dr. N.E.
- Boston, Mass 02210, 666 Summer St.
- Chicago, Illinois 60666, O'Hare International Airport, P.O. Box 66475
- Cleveland, Ohio 44199, 1240 East 9th St, Federal Office Bldg., rm. 1855
- Dallas, Texas 75201, 500 South Ervay St.
- Detroit, Michigan 48211, 1580 East Grand Blvd.
- Los Angeles, Calif. 90045, 11099 S. La Cienega Blvd.

New York, N. Y. 10013, 60 Hudson St.
Philadelphia, Pa. 19101, P.O. Box 7478
St. Louis, Mo. 63101, 1136 Washington Ave.
San Francisco, Calif. 94010, 866 Malcolm Rd., Burlingame

Writing to your Senators and Representatives for information on DoD contracts awarded in your local region is a possible way to bypass the Pentagon bureaucracy and at the same time inform your Congressman that local citizens are opposed to corporate involvement in war production.

Some State Development Commissions can also make information available on defense contracts by community and state.

STATISTICAL SUMMARIES INCLUDING COMMUNITY AND STATE BREAKDOWNS

The following sources do not name contractors but might provide material useful for leaflets, articles and background information: Statistical Abstracts of the United States, 1969 (27) contains numerous charts on business and the military, including defense contract awards and payrolls by states, defense-generated employment by state, defense-oriented industries and world-wide military expenditures.

The Pentagon published on October 27, 1969 a summary of military procurement and R&D contracts by state and category, entitled Military Prime Contract Awards by Region and State, Fiscal Years 1967-69. (17)

The same office produces a national breakdown of contracts by numerous categories including method of procurement, entitled Military Prime Contract Awards and Subcontract Payments or Commitments, July 1968-June 1969.

HEARINGS

A primary source of information on U.S. military policies and weapons development is the annual series of Congressional hearings on the DoD budget. Four basic sets of Congressional hearings are held on the military budget each year: hearings before the Senate and House Armed Services Committees on military authorizations and hearings before the Senate and House Appropriations Committees on military appropriations. These documents are available from the Congressional committees involved, the GPO or from local Representatives and Senators. The exact titles are Department of Defense Appropriations for Fiscal Year 19**, Hearings Before the DoD Subcommittee of the House (Senate) Committee on Appropriations and Military Procurement Authorizations for Fiscal Year 19**, Hearings Before the Senate (House) Armed Services Committee. The most informative of these, the House Appropriations Committee Hearings, contains among its six volumes one on procurement and one on R&D. Special hearings on various military matters are sometimes called by Congressional committees; for a list of transcripts of such hearings, consult the Monthly Catalog of United States Government Publications (18).

Debate on the DoD budget in the House of Representatives and the Senate is reported daily in the Congressional Record; many Congressmen insert valuable documentary information on the military in the Record to supplement their remarks.

WEAPONS SYSTEMS DEVELOPMENT

New weapons are described, and progress on their development reported, in many professional and trade magazines and in the journals of military associations. Some of these publications are Air Force and Space Digest (1), Armed Forces Journal (3), Army (4), Army Research and Development Newsmagazine (5), Aviation Week and Space Technology (7), Defense Industry Bulletin (10) and Ordnance (21). These publications also announce contract awards for major projects, and publish general news concerning the various military research organizations.

DoD RESEARCH PROJECTS

DoD-financed research projects are described in the Technical Abstract Bulletin (28) and U.S. Government Research and Development Reports (29); these semi-monthly publications include an abstract (capsule summary) of completed research reports. Abstracts of research projects sponsored by the Air Force are published annually in Air Force Research Resumes (2).

In 1961, the Army Research Office published a seven-volume compendium of research projects underway at that time, the Fiscal Year 1961 Army Research Task Summary (6). Included in the series were volumes on Life Sciences, Chemistry, Physics, Engineering, Materials, Electronics, and an Index. This document is worth consulting as background information because of its completeness.

Most military magazines regularly include features on current military research activities. In particular, one should consult Army Research and Development Newsmagazine (5), Aviation Week and Space Technology (7), Defense Industry Bulletin (10), Naval Research Reviews (19), OAR Research Reviews (20), Ordnance (21) and U.S./R&D (30).

A number of scientific magazines also publish articles on Pentagon-financed research projects, including Science (25), Scientific Research (26) and Chemical and Engineering News (8).

MILITARY PUBLICATIONS AND TECHNICAL REPORTS

Specialized reports and publications issued by the DoD and the four services are listed, by subject, in the Price Lists of Government Publications, available free from the Superintendent of Documents, Government Printing Office, Washington, D. C. 20402. The price lists should be requested by number; of interest are Army, #19; Navy, #63 (including Marine Corps publications); Air Force, #79; Defense, #85. Military periodicals not listed above are identified in Government Printing Office price list #36, Government Periodicals and Subscription Services.

Technical information on specific weapons systems, military tactics and military regulations is contained in Army, Navy, Air Force and Marine Corps field manuals, training circulars, and technical manuals, which are indexed in the Monthly Catalog of U.S. Government Publications (18). These manuals, if not classified, are available from the GPO or the public information office of the respective services. For Army manuals, write the Magazine and

Book Branch, Public Information Division, Office of the Chief of Information, Department of the Army, Washington, D.C. 20310. These manuals are also stored in the "regional depository libraries" or "regional technical report centers" established by government agencies (these are usually the leading university and/or municipal library in each state). One document to which all of these reports refer is the Dictionary of United States Military Terms for Joint Usage (14), available from the GPO. Among the Army field and technical manuals of particular interest are: TM 3-400, Chemical Bombs and Clusters; TM 750-5-15, Chemical Weapons and Defense Equipment; TM 9-1910, Military Explosives; TM 9-1950, Rockets; TM 9-1980, Bombs for Aircraft; and TM 9-1325-200, Bombs and Bomb Components; Army ROTC manual ROTCM-145-30, Individual Weapons and Marksmanship (September 1966); and Army Materiel Command pamphlet 700-3-3, Logistics: Complete Round Charts Artillery Ammunition (December 1967). Aviation Week and Space Technology (7) publishes an annual "Forecast Issue" which includes a directory, with specifications, of all U.S. aircraft, missiles and helicopters. This issue is usually published in early spring.

RESEARCH GUIDES

The North American Congress on Latin America (NACLA) publishes a Research Methodology Guide (22) which lists procedures and sources of information for investigations of particular corporations, institutes and universities. NACLA has also published a compendium of university-performed military research projects as The University-Military Complex (31).

Sources of Information Listed in the Text

1. Air Force and Space Digest. Monthly magazine of the Air Force Association (1750 Pennsylvania Ave. N.W., Washington, D.C. 20006). Subscription included with annual membership dues of \$7.00.
2. Air Force Resumes. Published annually by the Air Force Office of Aerospace Research, Washington, D.C. Available from Clearinghouse for Federal Scientific and Technical Information, U.S. Dept. of Commerce, Springfield, Va. 22151.
3. Armed Forces Journal. Published weekly by Army & Navy Journal, Inc. (1710 Connecticut Ave. N.W., Washington, D.C. 20009). Subscription rate: \$10.00 per year.
4. Army. Monthly publication of the Association of the United States Army (1529 18th St. N.W., Washington, D.C. 20006). Subscription included with annual membership of \$6.00.
5. Army Research and Development Newsmagazine. Published monthly by the Army Research Office, Washington, D.C. Available from GPO.*
6. Army Research Task Summary. Fiscal Year 1961. Published in 1962 by the Office of the Chief of Research and Development, Department of the Army, in seven volumes: Vol. 1, Life Sciences, Psychological & Social Sciences; Vol. 2, Chemistry; Vol. 3, Physics; Vol. 4, Engineering Sciences and Earth Sciences; Vol. 5, Materials; Vol. 6, Electronics, Mathemat-

*U.S. Government Printing Office orders should be sent to Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

ics, Operations Research, etc.; Vol. 7, Index. At one time, these reports were available from the GPO; present distribution route unknown.

7. Aviation Week and Space Technology. Published weekly by McGraw-Hill. Subscriptions must be requested on company or organization letterhead. Subscription rate: \$10.00 per year. Address for subscriptions: Aviation Week, P.O. Box 430, Hightstown, N.J. 08520.
8. Chemical and Engineering News. Published weekly by the American Chemical Society. Subscription rate: \$6.00 per year (address for subscriptions: Subscription Service Dept., American Chemical Society, 1155 16th Street, N.W., Washington, D.C. 20036).
9. Commerce Business Daily. Published by U.S. Dept. of Commerce, Washington, D.C. Available from GPO. Rate: \$15.00 per year.
10. Defense Industry Bulletin. Published monthly by the Office of the Assistant Secretary of Defense (Public Affairs). Subscription is free if requested on company or organization letterhead. Address for subscriptions: Editor, Defense Industry Bulletin, OASD (PA), The Pentagon, Washington, D.C. 20301.
11. Department of Defense Annual Report. Published annually by the DoD. Available from GPO. Price varies; most recent issue available, 1966, priced at \$1.75.
12. The 1970 Defense Budget and Defense Program for Fiscal Years 1970-74. Statement by Secretary of Defense Clark M. Clifford, 15 January 1969. Available for \$1.75 from the GPO.
13. Department of Defense Telephone Directory. Published quarterly. Available from the GPO. One-year subscription: \$4.50; single copies: \$1.25.
14. Dictionary of United States Military Terms for Joint Usage. Published by the Joint Chiefs of Staff. Available for \$2.00 from the GPO.
15. DMS Market Intelligence Report. "An information service of McGraw-Hill Publications." (DMS Building, 100 Northfield, Greenwich Conn. 06830. (203) 661-7800). DMS subscribers receive basic directories on defense weapons and contractors, monthly supplements with updated information, and free consultation services. Cost for total package is over \$1,000. The DMS reports are divided by program and agency; they include Rockets—Missiles—Spacecraft, Military and Civil Aircraft, Ships—Vehicles—Ordnance, Electronics and General Support.
16. Government Contracts Directory. Published by Government Data Publications, Inc. (422 Washington Building, Washington, D.C. 20005). Includes 3 volumes: an Awardee Directory (list of contracts by contractor), Agency Directory (contracts listed by government agency) and Product Directory (contracts listed by type of product). All three volumes cost \$99.50; each volume is also available singly.
17. Military Prime Contract Awards by Region and State, Fiscal Years 1967-69. Published by The Office of the Secretary of Defense, Directorate for Statistical Services OASD (C), Pentagon, Washington, D.C. 20301. Free.

18. Monthly Catalog of United States Government Publications. Published and distributed by the GPO. Subscription rate: \$4.50 per year.
19. Naval Research Reviews. Published monthly by the Office of Naval Research. Available from the GPO. Subscription rate: \$1.50 per year.
20. OAR Research Review. Published monthly by the Office of Aerospace Research of the U.S. Air Force. Available from the GPO. Subscription rate: \$2.75 per year.
21. Ordnance. Bi-monthly publication of the American Ordnance Association (616 Transportation Building, Washington, D. C. 20006). Subscription included with annual membership dues of \$7.00.
22. NACLA Research Methodology Guide. Published by the North American Congress on Latin America (P.O. Box 57, Cathedral Station, New York, N. Y. 10025). Price: 35¢.
23. R&D Contracts Monthly. Published by Government Data Publications, Inc. (422 Washington Building, Washington, D. C. 20005). Subscription rate: \$24 per year.
24. R&D Directory. Published annually by Government Data Publications, Inc. (422 Washington Building, Washington, D. C. 20005). Price \$15.00.
25. Science. Published weekly by the American Association for the Advancement of Science (1515 Massachusetts Ave., N.W., Washington, D.C. 20005). Subscription included in annual dues of \$12.00.
26. Scientific Research. Published biweekly by McGraw-Hill, Inc. Subscription applications must include organizational affiliation and position (limited to scientific fields); subscription rate: \$20.00 per year.
27. Statistical Abstracts of the United States, 19**. Published annually by the U.S. Bureau of Census of the Dept. of Commerce. Available from GPO. Price: \$5.75.
28. Technical Abstract Bulletin. Published semi-monthly by the Defense Documentation Center of the DoD, Alexandria, Va. This publication was given a "confidential" classification in September 1967 and is available only to persons with the appropriate security clearance (i. e., employees of defense contractors). Earlier issues are available in some university libraries.
29. U.S. Government Research and Development Reports. Published semi-monthly by the Clearinghouse for Federal Scientific and Technical Information, U.S. Dept. of Commerce, Springfield, Va. 22151. Available by subscription and at most university and municipal libraries.
30. U.S./R&D. Published monthly by Government Data Publications, Inc. (422 Washington Building, Washington, D. C. 20005). Subscription rate: \$48.00 per year.
31. The University-Military Complex. Published by the North American Congress on Latin America (P.O. Box 57, Cathedral Station, New York, N. Y. 10025). Price: \$1.25.