

Imagining a Nuclear World War Two in Europe

Preparing US Troops for the Battlefield Use of Nuclear Weapons

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During the Cold War, it was widely acknowledged that the advent of nuclear weaponry had fundamentally altered the nature of war between nuclear armed nations. However, while strategic nuclear war planning was being carried out and implemented in deployed weaponry and personnel by the United States, parallel to this was the continued embrace of military strategies that had been elemental to the conduct and victory in Europe during World War Two. This article argues that at the same time while nuclear weapons dramatically altered the war planning of the United States during the Cold War, for Army battlefield commanders there was little departure from pre-existing doctrines regarding the defence of Central Europe. For these battlefield commanders, the manufacture of tactical nuclear weapons was largely overlaid upon existing strategies to repel an imagined Soviet incursion. Focusing on discussions of battlefield nuclear tactics by Army strategists, the paper demonstrates that such planning persisted and was even embedded into training throughout the first half of the Cold War, and far beyond the entry of thermonuclear weaponry into the U.S. arsenal. The paper specifically looks at the training and participation of ground forces in nuclear weapon testing to acclimate them to the “atomic battlefield.” Through an examination of the indoctrination that these forces received about nuclear weapon effects, and specifically around the dangers posed by radiation, it becomes clear that the realities of nuclear weaponry had little effect on the preparation, training and strategies of American military leaders tasked with the military defence of Central Europe against Soviet incursion.

Immediately after the surrender of Japan in World War Two, the United States military conducted extensive studies of the impact of the two nuclear attacks on Japan that were carried out in the final weeks of the war. “[A]tomic weapons will not have eliminated the need for ground troops, for surface vessels, for air weapons, or for the full coordination among them, the supporting services and the civilian effort, but will have changed the context in which they are employed to such a degree that radically changed equipment, training and tactics will be required,” declared the report.¹ But did it? To what degree, and how quickly did the advent of nuclear weapons alter the war planning and preparations of the United States from their military posture during World War Two?

In August of 1945 most Americans, including many political and military leaders, believed that nuclear weapons compelled the Japanese to surrender and ended World War Two. The initial discourse around nuclear weaponry presented to the American public stressed the revolutionary nature of the new weapon. President Harry Truman, in announcing the nuclear attack on Hiroshima and introducing the world to the atomic bomb described it in quasi-religious language, saying that it harnessed the “basic power of the universe” and was given to America by God, while banner headlines across the United States heralded the use of these atomic weapons as dealing a “knockout blow” to Japan, or of being a “super weapon” capable of undreamed of destruction, compelling an entrenched Japan to surrender.²

¹ United States Strategic Bombing Survey, *Summary Report (The Pacific War)* (Washington DC: U.S. Government Printing Office, 1946): 30.

² “Text of Statements by Truman, Stimson on Development of Atomic Bombs,” *New York Times*, 7 August 1945, 4. There is copious literature around the use of nuclear weapons in Japan, and on the subsequent development and deployment of nuclear weapons by the United States throughout the Cold War. Classic works on the use of the bomb in Japan include, Gar Alperovitz, *Atomic Diplomacy: Hiroshima and Potsdam* (New York: Simon and Schuster, 1965); Martin J. Sherwin, *A World Destroyed: The atomic bomb and the grand alliance* (New York: Random House, 1973); and more recently, Tsuyoshi Hasegawa, *Racing the Enemy: Stalin, Truman and the surrender of Japan* (Cambridge: Harvard University Press, 2005). On nuclear weapons as cultural signifiers in the United States see, Paul Boyer, *By the Bomb's Early Light: American thought and culture at the dawn of the atomic age* (New York: Pantheon Books, 1985); Ira Chernus, *Dr. Strangegod: On the symbolic meaning of nuclear weapons* (Columbia, SC: University of South Carolina Press, 1986); Robert Jacobs, *The Dragon's Tail: Americans face the*

Nuclear weapons were imagined to be a civilization altering technology. Renowned CBS war correspondent William L. Shirer was among those on the air reporting on the use of the bomb after the official announcement about Hiroshima on 6 August 1945. Shaken by the description of the power of the new weapon, and cognizant of the devastations of warfare, Shirer asked his nationwide radio audience, in a world with nuclear weapons: “Is there any hope for mankind?”³ Military analyst Major George Fielding Eliot claimed in the *New York Herald Tribune* that “Mankind stands at the crossroads of destiny... The decisions which now confront the mind of man are the most important in his history. Upon these decisions hangs his continued existence on this planet.”⁴

However, while this apocalyptic and transformational rhetoric typified representations of nuclear weapons in the American press, the integration of the new weapons into military doctrine lagged behind popular discourse. This trajectory was explicitly outlined in one of the first books to consider the impact of nuclear weapons on international relations and military strategy, *The Absolute Weapon* published in 1946. Writing in *The Absolute Weapon*, editor Bernard Brodie outlined the then common wisdom, “It is already known to us all that a war with atomic bombs would be immeasurably more destructive and horrible than any the world has yet known. That fact is portentous, and to many it is overwhelming. But as a datum for the formulation of policy it is in itself of strictly limited utility.”⁵ This statement would prove more prescient than Brodie himself intended. Even as the destructive capacity of nuclear weaponry and

atomic age (Amherst, MA: University of Massachusetts Press, 2010). As for the primacy of nuclear weapons in the Cold War see, Gregg Herken, *The Winning Weapon: The atomic bomb in the Cold War, 1945–1950* (New York: Random House, 1981); Campbell Craig and Fredrik Logevall, *America's Cold War: The politics of insecurity* (Cambridge, MA: Harvard University Press, 2012). Essential work is also being conducted by the National Security Archive at George Washington University.

³ William L. Shirer on CBS Radio, 6 Aug. 1945, quoted in Wilber M. Smith, *The Atomic Bomb and the Word of God* (Chicago: Moody Press, 1945), 8.

⁴ George Fielding Eliot, “Atomic Bomb Said to Overthrow Basic Tenets of Military Science,” *New York Herald Tribune*, quoted in Donald Porter Geddes, ed., *The Atomic Age Opens* (New York: Pocket Books, 1945), 166.

⁵ Bernard Brodie (ed.), *The Absolute Weapon: Atomic power and world order* (New York: Harcourt, Brace and Company, 1946), 21.

the complexity of nuclear delivery systems progressed far beyond anything imagined in 1945, aspects of American military planning remained trapped in efforts to insert the new weapons into existing war fighting doctrines fixated on the battles of World War Two.

Brodie argued in 1946 that World War Two and the atomic bomb in particular had shown the primacy of strategic bombing. He argued against understanding nuclear weapons as inherently transformative, asserting that they could accomplish essentially the same goals as previously existing strategic bombing simply in a more condensed timeline. Nonetheless, military planners began in the late 1940s to prepare for a possible Soviet invasion of Western Europe, and a long drawn out land war in Germany. This imagined war mirrored the European theatre of World War Two, with nuclear weapons added, not as a radical or transformative component, but as simply a new weapon in the arsenal. A top secret memo prepared by the staff of the Net Evaluation Subcommittee of the National Security Council entitled "A Study of the Management and Termination of War with the Soviet Union," prepared in 1963, included a scenario titled "War in Europe." In this scenario, a communist move to take over the government of Italy results in a military confrontation between the Soviet Union and NATO. As the situation escalates the United States decides to use tactical nuclear weapons against Soviet forces in Eastern Europe. "The Presidential decision to authorize the use of tactical nuclear weapons resulted from the belief that not only would this action reverse the local military situation but would put serious pressure on the Soviets to close out the war."⁶ The scenario did eventuate in the further use of limited numbers of nuclear weapons in the Soviet Union itself, this limited use ultimately compelled the Soviet Union to withdraw entirely from Eastern Europe and from operating in any manner in Western Europe.

Even as thermonuclear weapons and missiles came to dominate American nuclear strategizing, it took decades for the US to loosen its grip on the idea of Germany as a nuclear battlefield in a World War Three ground war. In 1956, the Chief of Staff of the Army Maxwell Taylor approved the

⁶ Net Evaluation Subcommittee, "A Study of the Management and Termination of War with the Soviet Union," (November 15, 1963): 23–24.

PENTANA concept as discussed in the 1955 report titled, "Doctrinal and Organizational Concepts for Atomic-Nonatomic Army During the Period 1960–1970". Taylor was seeking a means of organizationally formalizing the capacity to integrate tactical nuclear weapons into combat groups. Completed in December 1955, the Army War College study called for a completely air transportable 8,600-man division to replace infantry, airborne, and armoured divisions. The new division was to be built around five small, self-sufficient battle groups that would include their own artillery. The battle groups were to meet the tactical requirements for dispersion of forces, operations in depth, and increased flexibility and mobility on the atomic battlefield. Organic division artillery, although meagre, included the Honest John, a surface-to-surface rocket with a nuclear warhead.⁷

The "Flexible Response" doctrine adopted during the Kennedy administration moved the United States towards planning for a range of possible scenarios for the use of nuclear weapons beyond the Eisenhower administrations emphasis on massive retaliation. Speaking at the Tactical Nuclear Weapons Symposium convened by the United States' Atomic Energy Commission and Department of Defense at Los Alamos National Laboratory in 1969, Colonel Stanley D. Fair of the US Army Combat Developments Command told attendees, "The need for the tactical nuclear option was most obvious in those situations that portrayed such numerically superior enemy strength that US and Allied Forces were inadequate to achieve a favourable outcome. In addition, the scenarios suggest that a tactical nuclear capability is needed to terminate conventional aggression before the conflict can expand to involve other areas or other combatants and to avoid a prolonged nonnuclear war."⁸

After the initial use of nuclear weapons during World War Two, the United States not only put the model of nuclear weapon used in Nagasaki into mass production (the Hiroshima and Nagasaki weapons were of completely different design and used different nuclear material to generate the

⁷ John B. Wilson, *Maneuver and Firepower: The evolution of divisions and separate brigades* (Washington DC: United States Army Center of Military History, 1998), 271.

⁸ Stanley D. Fair, "Tactical Concepts in Theater Operations," *Proceedings of the Tactical Nuclear Weapons Symposium* (Los Alamos Scientific Laboratory, 3–5 September 1969), LA-4350-LS: 30.

explosions, after the war the Nagasaki design was chosen as the variant to pursue in early post-war manufacturing), but also designed new nuclear weapons specifically intended for use on battlefields in support of ground operations. This was accomplished through miniaturizing the designs of larger yield weapons and designing delivery systems suited to various tactical uses such as backpacks for delivery to naval targets and the M65 atomic canon which was deployed to bases in Europe. Additionally, in the early 1950s the U.S. began a program of troop participation in nuclear testing at the Nevada Test Site that both acclimated troops to nuclear detonations, trained them in tactics imagined as essential on “nuclear battlefields,” and gauged their physical and psychological capacity to follow orders and execute complex manoeuvres in the presence of nuclear devastation and nuclear radiation. Throughout the Cold War, even into the 1980s, a nuclear ground war fought against an imagined Soviet incursion into Germany remained a fixture of both the U.S. nuclear stance and NATO war gaming.

Nuclear World War Two

While grasping the importance of strategic bombing to war planning with the Soviet Union in a post-World War Two world, American military planners envisioned atomic bombs as accomplishing these goals with more force and quicker than previous ordnance. As the Iron Curtain came to define the borders of empire in the emerging Cold War, American strategists envisioned conflict with the Soviet Union as resulting from a Russian incursion into Western Europe. Initially nuclear policy understood atomic bombs to act as a deterrent to Soviet superiority in conventional military strength. In this scenario, nuclear weapons might be used to attack Soviet cities directly, but also would find a role in shaping outcomes on the battlefield such as in destroying armoured formations or bases. Later came deep-strike missions (e.g. from GLCMs and medium range bombers) and discussions about maritime use.

In a 1957 article in *Military Review: The Professional Journal of the U.S. Army*, Lieutenant Colonel Robert M. Walker of the U.S. Army Command and General Staff College wrote about how nuclear weapons would

be an effective counter to a favoured tactic of the Red Army in World War Two. "Of particular interest was the Russian use of the night attack. They crossed the Dnepr River at night without the use of bridge equipment, and in 1943 accomplished another major river crossing and decisive breakthrough of German lines with tanks at night...In the atomic situation an understanding of the conduct of night attacks will be of vital necessity to the frontline commander." Walker goes on to advise that, "there is a good case for the retention of the battle-trying tactics of World War Two, superimposing on them the different tactics required for a possible atomic conflict."⁹

This thinking persisted deep into the Cold War, even beyond the development of thermonuclear weapons, which would make a U.S.–Soviet encounter on the "battlefield" of Europe far less likely. "Even with the development of the thermonuclear bomb, which increases many times the power of the original atomic weapon, our problem is not solved," advised Army Captain Thomas M. Waitt, downplaying the fact that thermonuclear weapons are thousands of times more powerful than fission weapons and not simply several times more powerful. Waitt continued, "Our enemy will, perhaps, be holding the territory of our allies. We will have to fight ground battles to defeat him." He imagined that, "Coordinated land, sea and air forces will be required. Since we must fight our battles on the ground, we want to use atomic power to help accomplish our mission."¹⁰

Traditional military doctrine pervaded attempts at integrating nuclear weapons as radical additions to armaments of warfare. "The same over-all mission of the rifle squad on the atomic battlefield remains much the same as in the past, with few modifications to keep step with the faster tempo imposed by swifter means of transportation and greater destructive force," wrote Colonel George W. Dickerson.¹¹ Marine Colonel George C. Reinhardt emphasized the same continuity, arguing the

⁹ Robert M. Walker, "The Night Attack Blueprint for Atomic Victory," *Military Review* 37:7 (1957): 52–56.

¹⁰ Thomas M. Waitt, "Deep Thrust with a One-Two Punch—that's the Atomic-Airborne Team," *Army* 7:5 (1957): 80–83.

¹¹ George W. Dickerson, "Squads in Atomic Battle: The Training of the Pentomic Squad," *Army* 8:4 (1957): 31.

changes necessitated on the atomic battlefield actually reinforced existing doctrines, "Increasing deadliness of weapons has for years required dispersion on the battlefield, but it never 'protected' any individual from a bullet. 'Extended order' replaced close lines so that a bullet aimed at one man would be less likely to hit his neighbour. It 'protected' the battalion from destruction by enemy machine guns, if you can use protection in that sense, but it never protected the individual soldier. Dispersion in atomic warfare does not alter that principle."¹² Lieutenant Colonel Robert B. Rigg advised commanders that, "Your men must recognize atomic tactical weapons as *supplementing* and not *supplanting* their role in the ground services."¹³ Describing a NATO repulsion of a Soviet incursion into Germany and the use of nuclear weapons, Army Colonel T. C. Mataxis envisioned that the tactics employed by soldiers under atomic attack would follow traditional procedures, "In case of a large-scale enemy attack supported by atomic weapons, plans must provide for the possibility of an entire reserve's occupying blocking positions, relying on the next higher unit to execute the counterattack."¹⁴

To be sure, these were not the only views being expressed among American military commanders. Many of these ideas were being expressed by senior Army personnel who were feeling their funding and status being usurped by the new Air Force, and especially by the Strategic Air Command (SAC) that had the primary task of waging nuclear war against the Soviet Union. However, to understand the distance between the military planning of these battlefield commanders and SAC commanders at this very same time, it is useful to consider U.S. nuclear warfighting strategies as SAC had developed them, even before most of these articles were written. After attending a SAC briefing in March of 1954 Captain William B. Moore, Executive Assistant to the Director of the Atomic Energy Division of the U.S. Navy, wrote to his superiors that in the "optimum plan" of the Strategic Air Command for attacking the Soviet Union, "It was estimated that SAC could lay down an attack under these conditions

¹² George C. Reinhardt, "Tomorrow's Atomic Battlefield," *Marine Corp. Gazette* 38:3 (1954): 17.

¹³ Robert B. Rigg, "Simulating Atomic Blast Effects," *Army Information Digest* 10: 9 (1955): 19.

¹⁴ T. C. Mataxis, "Defense on the Atomic Battlefield," *Infantry School Quarterly* 46:3 (1956): 61.

of 600–750 bombs by approaching Russia from many directions so as to hit their early warning screen simultaneously. It would require about two hours from this moment until bombs had been dropped using a bomb-as-you-go system in which both BRAVO and DELTA targets would be hit as they reached them.” Moore concluded, “The final impression was that virtually all of Russia would be nothing but a smoking, radiating ruin at the end of two hours.”¹⁵

The Army’s means of participating in the new nuclear potential was focused on tactical –battlefield – nuclear weapons. Speaking about the 280 mm atomic cannon, Sgt. Bernard Henry bragged that, “We can get her emplaced and into firing action a whale of a lot faster than we can any other artillery gun now in use.”¹⁶ Colonel Mataxis described these battlefield nuclear weapons as immensely practical, “In addition to air delivery of an atomic bomb by the Air Force, the Army has today the Corporal guided missile, the Honest John rocket and the 280mm gun. These weapons are in the hands of our troops in the field. Realizing this, let us first analyse the effects of the tactical employment of atomic weapons on our current organizations and doctrine of defense and then examine a situation showing the actual planning of a battlefield atomic strike.” Mataxis then proceeds to war game the battlefield usage of tactical nuclear weapons, “in order to best illustrate the detailed planning and coordination necessary when using atomic weapons in support of a field army, visualize the following situation. Following the normal pattern of concentration for the routine spring maneuvers in eastern Europe, aggressor forces launch a surprise attack supported by heavy bombing raids with conventional weapons on all NATO airfields, communication and supply centers.”¹⁷ Mataxis then war games a battlefield nuclear confrontation between the Red Army and NATO troops in Germany. Mataxis’ article is written a full two years after the SAC briefing described above.

¹⁵ Quoted in David Rosenberg, “A Smoking, Radiating Ruin at the End of Two Hours: Documents on American war plans for nuclear war with the Soviet Union, 1954–55,” *International Security* 6:3 (Winter 1981/82): 25.

¹⁶ Quoted in, Frank W. Penniman, “Atomic Cannoneers,” *Life of the Soldier and Airman* 36:1 (1954), 11.

¹⁷ Mataxis, “Defense on the Atomic Battlefield,” 62.

War gaming with soldiers and real nuclear weapons

In response to the Soviet acquisition of nuclear weapons in 1949 and to prepare to fight a battlefield nuclear war with the Soviet Union, the US Army undertook a program of troop participation in nuclear weapon tests at the newly created Nevada Test Site in 1951. There were several reasons to begin to expose troops to nuclear weapons. The first was to give real world experience to battlefield commanders and troops in the new roles necessitated by the radiation effects of nuclear weapons. This included members of the Chemical Corps who were charged with surveying the radiological contamination of weapon use and determining threats to troop manoeuvres. Each commander was responsible for the training of his own survey personnel and participation in nuclear tests allowed those personnel to encounter and train with actual radiation. However, the lack of a centralized training regime left the quality of individual radiation monitors in various units inconsistent.¹⁸

Participation in nuclear tests also allowed battlefield commanders to gain experience in how the effects of nuclear weapons would both limit and enable battlefield manoeuvres. Beyond this, exposure to actual nuclear weapon detonations was seen as necessary to psychologically condition troops to perform in the presence of the new weapons. “Psychological condition of troops to permit exploitation in defense of atomic weapons is essential,” wrote Brigade General R.W. Porter, Jr., “To achieve this, false notions as to radiation and other dangerous characteristics of atomic weapons must be dispelled.”¹⁹ This dismissal of the serious nature of the threat of radiation from tactical nuclear weapon use can be seen in the 1953 book, *Atomic Weapons in Land Combat*, which claimed that, “The duration of dust cloud (fall-out) contamination is usually short... radioactive decay (half-life span) is usually swift enough to permit early use of equipment without taking special measures.”²⁰

¹⁸ Stanley W. Fair, “Measuring Radiation,” *Army* 9:8 (1958): 72.

¹⁹ R.W. Porter, Jr., “Atomic Weapons in Land Combat, Review,” *Armor* 62:6 (1953): 57.

²⁰ George C. Reinhardt and W.R. Kintner, *Atomic Weapons in Land Combat* (Harrisburg, PA: Military Service Publishing Company, 1953): 142.

At first, in 1952, troops were kept at a distance of ten miles from the detonation points, and simply observed the nuclear tests. However, within one year the troops were being stationed as close as three miles from the test epicentres. Test site personnel objected to troops being so close to the detonations, and responsibility for their wellbeing was transferred from test site personnel, many of whom were scientists, to military commanders. Eventually troops were placed in foxholes at what was judged to be the periphery of the weapon's effects, and following the detonation manoeuvres were carried out on the "atomic battlefield."

For many of the soldiers involved, the experience of participating in a nuclear test was a very existential experience. "I was sitting in a row of sandbags, facing away, my forearm covering my eyes even though they were closed," wrote Captain Harry Olmsted, "Just after the final tone squeezed through the sound system I was conscious of an unbelievable white, searing light. It was dark, but yet it was light. I felt isolated and alone because of the complete silence all around me. For a time that seemed like a full minute but was actually only a few seconds, I tried to close my eyes even tighter. A hurried voice told us to turn around slowly and open our eyes. This voice was joined by probably a hundred others, each a little louder and a little faster. Now I saw what was undoubtedly the most astounding sight I had eve(r) seen."²¹ Many soldiers recount seeing their bones through their closed eyes as the flash and burst of gamma radiation and x-rays from the detonation enveloped them. Master Sergeant Roy Heinecke reports that a Marine Colonel he interviewed described how, "I instinctively closed my eyes as the blinding light hit, yet I could still see the pebbles and small rocks around my feet. Nothing could be done to get away from it."²²

Following the detonation, the troops would frequently rise out of their foxholes and advance towards ground zero. Official reports of the manoeuvres of Desert Rock V, as described by MSgt. Heinecke above stated that: "For the tower shots the men remained kneeling in the trenches until the shock wave from the explosion had passed over the trenches. At this point they were allowed to rise from their trenches to

²¹ Harry E. Olmsted, "Test Shot Smokey," *Army Information Digest* 12:12 (1957): 17.

²² Roy E. Heinecke, "Desert Rock V," *Leatherneck* 36:7 (1953): 35.

watch the atomic cloud. After the forward area had been monitored, they were ordered to advance in simulated attack toward ground zero. Upon reaching this forward area, they inspected the damage done to animals and equipment in the area, and then returned to camp by truck. Within 24 to 48 hours after a shot, most of the participants were on their way back to their home stations.”²³

In many of these manoeuvres, the following scenario was modelled. American and Soviet troops were opposed to each other on a traditional battlefield with a traditional front line. An American commander decides to use a nuclear weapon to breach the enemy’s lines. American troops dig in to prepare for nuclear assault. When the nuclear detonation creates a devastating hole in the enemy’s line, infantry and airborne troops advance through the hole. However, this scenario involved troops advancing directly into the epicentre of the nuclear detonation even as the mushroom cloud rises above it.

One internal assessment of the value of the participation on Marines in a nuclear test in Nevada in 1955, concluded that, “The experience of Brigade troops in participating with an actual nuclear detonation served to familiarize them with the phenomena incident to it, as well as its effects. In observing the effects thereof on the displayed demonstration material troops were familiarized with realistic means of the passive defense measures which serve to minimize or protect against the effects of atomic explosion. It served to remove apprehensions concerning the capability of the weapon. All hands gained a high degree of appreciation of its power as well as its limitations and its proper place in the family of weapons, both nuclear and conventional, available to the Marine Corps.”²⁴

A second scenario involved the use of both a low yield and then a high yield nuclear device, a tactic described by Lt. Col. George B. Pickett, Jr. as “squeeze ‘em an’ blast ‘em.”²⁵ This tactic involved the use of a

²³ Benjamin W. White, *Desert Rock V: Reactions of troop participants and forward volunteer officer groups to atomic exercises*, Fort Ord, CA: Army Field Forces Human Research Unit No.2 (1953), 1.

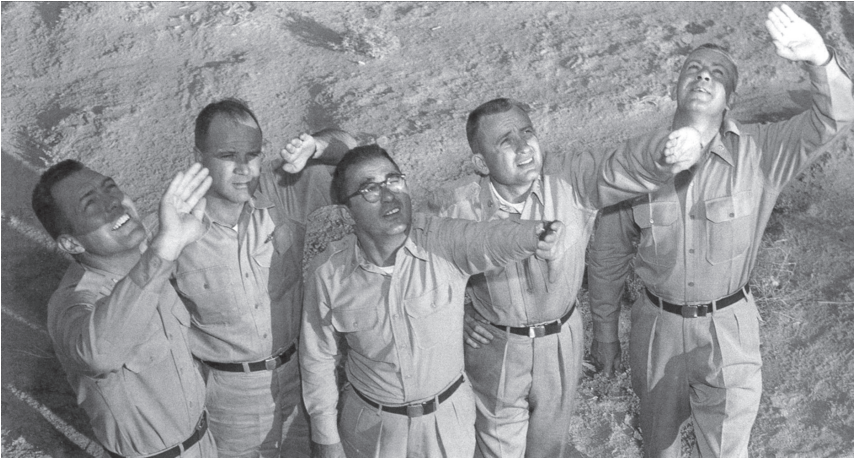
²⁴ United States Government, *Exercise Desert Rock VI: Marine Corps. Report* (March 1955): VII-1.

²⁵ George B. Pickett, Jr., “Squeeze ‘Em an’ Blast ‘Em,” *Military Review* 35:6 (1955): 58.

low yield nuclear weapon to force an enemy to withdraw front line personnel and equipment to a rear area that was also a command location. Once the enemy's forces had been "squeezed" into this rear area, which had now become a nuclear killing ground, a larger yield nuclear weapon would be used to destroy the enemies command and artillery units in a single blow.

In 1953, the United States conducted its only test of an artillery fired tactical nuclear weapon, the Grable Test at the Nevada Test Site, fired from an M65 280 mm atomic cannon and utilizing a Mark 9 nuclear weapon. While it was described as a tactical, battlefield weapon, its yield was 15 kt, or roughly the same size as the Hiroshima weapon. Nuclear artillery shells were later distributed to forward locations on NATO bases in Western Europe. The United States also built tactical nuclear weapons in the sub-kiloton range such as the bazooka fired Davy Crocket which fired an M388 nuclear weapon, and the SADM (Special Atomic Demolition Munition) which could be placed in a backpack and carried by infantrymen, or taken underwater by navy divers and attached to naval vessels.

During the course of American atmospheric nuclear weapon testing several hundred thousand military personnel took part in nuclear weapon tests in both Nevada and the original American test site in the Marshall Islands where the U.S. conducted tests from 1946 to 1957, including all of its tests of thermonuclear weapons. While the United States did not track the subsequent health progression of the troops it placed in close proximity to nuclear weapons, it did engage in extensive studies of the psychology of those soldiers, as will be discussed in the following section. Many of the soldiers who took part in nuclear weapon testing suffered illnesses related to exposures to radiation. Most of these illnesses were the result of internalized alpha-emitting and beta particles, whose resulting disease presentation typically unfolded over decades and involved ingestion cancers that cannot be causally attributed to their internalization of radionuclides. Proper understanding of the disease burden borne by these troops could only be demonstrated through long-term epidemiological studies involving most of the participating service personnel, similar to the studies conducted on the survivors of the nuclear attacks on Hiroshima and



Air force officers stand directly below ground zero for an atmospheric nuclear test, attempting to prove that these nuclear tests are safe. Las Vegas, Nevada, 18 July 1957. U.S. Government

Nagasaki. As the subsequent health care provider to most of these veterans, the U.S. government was uniquely positioned to conduct such follow up assessments, but neglected to pursue this, or to compensate most personnel for later illnesses.

The psychological indoctrination of atomic soldiers

While the battlefield usage of nuclear weapons followed closely behind strategies for smaller ordnance, the US military fixated on what it perceived to be the most unique aspect of the use of these weapons – what soldiers thought about them and how they were anticipated to react to the use of nuclear weapons near to their positions. Consequently, psychology came to play a key role in preparing U.S. servicemen to fight on the atomic battlefield and to adapt to nuclear weapons. In 1948, Colonel James P. Cooney, the chief of the Radiological Branch, Division of Military Application, of the nascent Atomic Energy Commission (AEC), told an audience of his conclusions after having participated in nuclear-

weapons testing: "I have observed the reactions of the military, who were not acquainted with the technical details on two missions, Bikini and Eniwetok, and the fear reaction of the uninitiated is appalling." The solution seemed obvious: "Psychological training for the military level of acceptable radiation hazard is possible and should be prosecuted, even if operational training is not."²⁶

In 1951, the Pentagon contracted with researchers at two universities to design and analyse programs intended to educate and motivate soldiers in order to better prepare for nuclear war.²⁷ These programs and materials were to be tested on military personnel scheduled to take part in battlefield manoeuvres during upcoming atomic tests. The soldiers would then be tested for their responses to the materials, so that they might be refined and improved. In this way, the atomic soldiers were to become both physical *and* psychological guinea pigs.

The tests were designed to assess the effectiveness on the soldiers of various indoctrination techniques and to gauge their responses to the weapons' detonations. The psychological exercises and the briefings they reinforced also functioned to instruct the soldiers in how to feel about the bomb, encouraging them to see it as just another extension of the machinery of warfare and not an entirely different category.²⁸

The two programs set out to measure two different sets of data. Psychologists from George Washington University in Washington, D.C., established the Human Resources Research Office (HumRRO), which focused on gauging the effectiveness of the education and indoctrination programs presented to troops who took part in atomic tests. HumRRO researchers administered questionnaires before and after soldiers participated in tests to determine if they had retained the information they had

²⁶ James P. Cooney, "Psychological Factors in Atomic Weapons," Speech before the American Public Health Association, November 12, 1948, Federation of American Scientists papers, University of Chicago Library.

²⁷ Howard Rosenberg, *Atomic Soldiers: American victims of nuclear experiments* (Boston: Beacon Press, 1980), 40–41.

²⁸ Human Resources Research Office (HumRRO), *Desert Rock I: A psychological study of troop reactions to an atomic explosion*, Technical Report 1 (TR-1), Washington, DC, February 1953; Human Resources Research Office, *Desert Rock IV: Reactions of an armored infantry battalion to an atomic bomb maneuver*, Technical Report 2 (TR-2) Washington, DC, August 1953.

received during the briefings in Nevada and if the briefings had successfully alleviated their fear of the weapons.²⁹

Human-behaviour specialists from the Johns Hopkins University Operations Research Office (ORO) set out to measure troops' levels of fear and anxiety during the actual weapons tests.³⁰ While HumRRO worked to gauge the effectiveness of indoctrination efforts aimed at the servicemen, ORO researchers sought to measure the anxiety and fear among participants in weapons tests through such somatic indicators as heart rate and perspiration rate before, during, and after the tests. ORO's physical measurements detected much higher levels of anxiety than HumRRO's assessments, which were largely based on voluntary responses to written questionnaires.³¹

"A major objective of this exercise," HumRRO's Technical Report No. 1 stated, "was to evaluate psychologically the troops' reactions to the maneuver, before indoctrination, after indoctrination, after the detonation, and after a lapse of about three weeks. Attitude research techniques as well as psychological measures were used to estimate (1) the effectiveness of the indoctrination procedures in increasing the troops' knowledge about atomic warfare and (2) the effects of the detonation, together with its accompanying consequences, on the troops' confidence in their ability to do well in A-bomb fighting."³²

The HumRRO analysis of Desert Rock IV in 1953 concluded that there was evidence of "both the presence of fear ... and the absence of disruption of performance." However, the conclusion that the performance was not impaired should not be considered grounds for not funding a further, more nuanced study, since "less easily observed aspects of fear may be important in serving to prepare or energize men to react in an emergency situation."³³

²⁹ HumRRO, *Bibliography of Reports: As of 30 June 1958* (Washington, DC: George Washington University, 1958): 1.

³⁰ The Operations Research Office was established by the U.S. Army at Johns Hopkins University in 1948 and served as the Army's civilian "think tank," much as the RAND corporation did for the Air Force.

³¹ Rosenberg, *Atomic Soldiers*, 46–48. ORO researchers would come to play a central role in designing Cold War psychological-warfare techniques.

³² HumRRO, *Desert Rock I*, x.

³³ HumRRO, *Desert Rock IV*, 52–53.

The results of these studies were integrated into military planning for the atomic battlefield. Writing in the magazine *Army* in 1956, General John E. Dahlquist advised that “the way the survivor of an atomic blast reacts depends on how well his leaders have prepared him for this moment. If they have led him well he will, *at this supreme moment*, become his own leader.”³⁴

There were, however, voices of dissent within the military. Some of these critics thought that the preparation of soldiers to perform on the atomic battlefield should go beyond indoctrination and exposure to blasts from “safe” distances. In 1959, Major John T. Burke, an Army human-engineering specialist, advocated “shock training.” He theorized that unless troops were exposed to the realistic horrors of nuclear war, lectures would be useless. Burke proposed a nuclear shock course, where “within appropriate radii of ground zero, every horror of the nuclear battlefield will be duplicated as realistically as possible. The area will be strewn with blood and plastic replicas of dismembered human bodies. Sickening stench will emanate from carcasses and chemicals ... on every side he will be attacked by blinded comrades.” Only through such training, he felt, could soldiers truly be expected to perform adequately in actual nuclear combat. “Eventually this procedure will engender both respect for nuclear effects and confidence through familiarity.”³⁵ Burke clearly felt that the performance of soldiers on the atomic battlefield depended more strongly on their ability to deal with shock and horror than it did on their indoctrination, a perspective he termed *realism*.

Conclusion

By 1954 both the United States and the former Soviet Union had developed thermonuclear weapons with yields thousands of times larger than those used in the nuclear attacks on Hiroshima and Nagasaki. The March 1954 Bravo Test conducted by the United States in the Marshall Islands

³⁴ John E. Dahlquist, “We Will Survive if We Have Leadership,” *Army* 6 (1956): 34–36, italics added.

³⁵ John T. Burke, “Mind against Nukes,” *Army* vol. 10 (1959): 55.

resulted in a civilian casualty from radiation sickness of a fisherman located 100 km away from the epicentre of the detonation, far beyond any effects from the blast or heat of the weapon. Yet planning and training for a nuclear ground war to be fought in the defence of Western Europe persisted. Even after nuclear weapons had been placed onto missiles, and then MIRVed missiles (missiles with multiple, independently targetable warheads), there remained a separate target category in American nuclear targeting in support of ground troops engaged in combat in Central Europe. In the early days of nuclear missile targeting three classes of targets were designated. BRAVO targets were the sites of Soviet nuclear assets, a primary target in a direct nuclear confrontation between the two superpowers. DELTA targets were designed to degrade the enemy's industrial capacity, and were concentrated on Soviet urban and manufacturing areas. ROMEO targets were designated as supporting NATO troops in a ground war with the Soviet Union, presumably in Germany and other parts of Western Europe.³⁶ It is easy to imagine that nuclear weapons that were placed on intercontinental ballistic missiles were of a yield that their use in any battlefield scenario would devastate the friendly troops as well as the enemy combatants, and could quickly compel both sides up the escalation ladder to the point that both BRAVO and DELTA targets were also being attacked.³⁷ Thus, the use of nuclear weapons, either tactical or strategic, on an imaginary battlefield in Western Europe, could result in a direct and full-scale thermonuclear war between the superpowers against each other's military forces and urban populations.

The Army's reflexive insistence on the importance of tactical nuclear weapons for use by or in support of infantry soldiers reflects a number of important developments. First, after World War Two the previous Army Air Corps had been separated out into the U.S. Air Force. This reflected

³⁶ Robert Jacobs, "The Bravo Test and the Death and Life of the Global Ecosystem in the Early Anthropocene," *The Asia-Pacific Journal* 13(29): 1 (20 July 2015).

³⁷ Use of nuclear weapons on the battlefield would be calibrated for blast and heat effects to impact enemy soldiers. For this to be the case the weapons would have to be detonated at a height that would allow the fireball to be close enough to ground level that the subsequent radioactive fallout would affect areas far from the detonation point. For a contemporary discussion of theories of escalation see, Herman Kahn, *On Escalation: Metaphors and scenarios* (New York: Frederick A. Praeger, Inc., 1965).

both the increasing importance of aerial bombardment, and that airplanes were the first and most essential delivery system for nuclear weapons, as had been the case in the nuclear attacks on Hiroshima and Nagasaki. This loss of an entire corps of the Army left it fighting for resources, now distributed between four service branches rather than the previous three, and asserting its relevance in the imagined nuclear wars of the future. Even as nuclear weapons surpassed the yield whereby they could be employed in any manner that guaranteed the safety of nearby friendly troops, the Army persisted in strategizing battlefield tactics in which infantrymen and nuclear weapons would share the same horizon. Beyond this, they persisted in training troops during actual nuclear weapon tests, subjecting them to risk in an effort to psychologically acclimate them to nuclear detonations.

The essential similarity of this imagined nuclear war, and ground engagements in Europe during World War Two embossed a strategic and tactical integration onto Army battlefield commanders that merely extended World War Two tactics to a battlefield that now included nuclear weapons. While the weapons that had actually been used during World War Two had not been used in Europe, or on a battlefield that had American troops nearby (or even in country), the Army's model remained a nuclear ground war fought with friendly troops in close proximity to the weapon's effects. This reflected the belief that the enemy in a nuclear war would be the Soviet Union, and that the likely scenario for this war would be a Soviet incursion into Western Europe that both reflected the Red Army's progression through Europe in World War Two, and also the experience and tactics required to fight against the Nazis in those very same locations. For these strategists and battlefield commanders, nuclear weapons were simply bigger bombs. The exposure of so many American soldiers to fallout radiation during their participation in nuclear weapon testing in Nevada reveals a dismissal of the importance of protecting American troops from fallout following the use of tactical nuclear weapons on the battlefields of a nuclear European theatre.

Bibliography

- Brodie, Bernard, ed. *The Absolute Weapon: Atomic power and world order*. New York: Harcourt, Brace and Company, 1946.
- Burke, John T. "Mind against Nukes," *Army* vol. 10 (December 1959): 55.
- Cooney, James P. "Psychological Factors in Atomic Weapons," Speech before the American Public Health Association, November 12, 1948, Federation of American Scientists papers, University of Chicago Library.
- Dahlquist, John E. "We Will Survive if We Have Leadership," *Army* vol. 6 (February 1956): 34–36.
- Dickerson, George W. "Squads in Atomic Battle: The Training of the Pentomic Squad," *Army* 8:4 (1957): 30–33.
- Eliot, George Fielding. "Atomic Bomb Said to Overthrow Basic Tenets of Military Science," *New York Herald Tribune*, quoted in Donald Porter Geddes, ed. *The Atomic Age Opens*. New York: Pocket Books, 1945, 166.
- Fair, Stanley. "Measuring Radiation," *Army* 9:8 (1958): 72–74.
- Fair, Stanley. "Tactical Concepts in Theater Operations," *Proceedings of the Tactical Nuclear Weapons Symposium*. Los Alamos Scientific Laboratory (3–5 September 1969) LA-4350-LS.
- Heinecke, Roy E. "Desert Rock V," *Leatherneck* 36:7 (1953): 30–35, 74.
- HumRRO, *Desert Rock I*.
- HumRRO, *Desert Rock IV*.
- Jacobs, Robert. "The Bravo Test and the Death and Life of the Global Ecosystem in the Early Anthropocene," *The Asia-Pacific Journal* 13(29): 1 (July 20, 2015), <http://apjif.org/2015/13/29/Robert-Jacobs/4343.html>.
- Kahn, Herman. *On Escalation: Metaphors and Scenarios*. New York: Frederick A. Praeger, Inc., 1965.
- Mataxis, T. C. "Defense on the Atomic Battlefield," *Infantry School Quarterly* 46:3 (1956): 58–68.
- Net Evaluation Subcommittee. "A Study of the Management and Termination of War with the Soviet Union" (November 15, 1963).
- Olmsted, Harry E. "Test Shot Smokey," *Army Information Digest* 12:12 (1957): 2–19.
- Penniman, Frank W. "Atomic Canoneers," *Life of the Soldier and Airman* 36:1 (1954), 10–13.
- Pickett, Jr., George B. "Squeeze 'Em an' Blast 'Em," *Military Review* 35:6 (1955): 556–560.

- Porter, Jr, R.W. "Atomic Weapons in Land Combat, Review," *Armor* 62:6 (1953): 55–57.
- Reinhardt, George C. and W.R. Kintner. *Atomic Weapons in Land Combat*. Harrisburg, PA: Military Service Publishing Company, 1953.
- Reinhardt, George C. "Tomorrow's Atomic Battlefield," *Marine Corp. Gazette* 38:3 (1954): 16–23.
- Rigg, Robert B. "Simulating Atomic Blast Effects," *Army Information Digest* 10:9 (1955): 17–21.
- Rosenberg, David. "A Smoking, Radiating Ruin at the End of Two Hours: Documents on American War Plans for Nuclear War with the Soviet Union, 1954–55," *International Security* 6:3 (Winter 1981/82): 3–38.
- Rosenberg, Howard. *Atomic Soldiers: American victims of nuclear experiments*. Boston: Beacon Press, 1980.
- Shirer, William L on CBS Radio, Aug. 6, 1945, quoted in Wilber M. Smith, *The Atomic Bomb and the Word of God*. Chicago: Moody Press, 1945.
- Truman, Harry. "Text of Statements by Truman, Stimson on Development of Atomic Bombs," *New York Times*, 7 August 1945, 4.
- United States Government. *Exercise Desert Rock VI: Marine Corps. Report* (March 1955).
- United States Strategic Bombing Survey. *Summary Report (The Pacific War)*. Washington DC: U.S. Government Printing Office, 1946.
- Waitt, Thomas M. "Deep Thrust with a One-Two Punch—that's the Atomic-Airborne Team," *Army* 7:5 (1957): 80–83.
- Walker, Robert M. "The Night Attack Blueprint for Atomic Victory," *Military Review* 37:7 (1957): 52–56.
- White, Benjamin W. *Desert Rock V: Reactions of troop participants and forward volunteer officer groups to atomic exercises*. Fort Ord, CA: Army Field Forces Human Research Unit No. 2, 1953.
- Wilson, John B. *Maneuver and Firepower: The evolution of divisions and separate brigades*. Washington DC: United States Army Center of Military History, 1998 (CMH Pub 60-14).