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**Building the Army
for
Desert Storm**

By Charles E. Kirkpatrick

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BUILDING THE ARMY FOR DESERT STORM

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**THE INSTITUTE OF LAND WARFARE
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LAND WARFARE PAPER NO. 9, NOVEMBER 1991

Building the Army for Desert Storm

by

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This paper is drawn from the Center of Military History's study on Desert Shield/Desert Storm (scheduled to appear in spring 1992), to which Dr. Kirkpatrick is a contributing author.

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FOREWORD

The United States Army's superb performance in Operation Desert Storm has heightened interest in how the Army organized, trained and equipped for the war. As this paper shows, the process took almost two decades, beginning in the immediate post-Vietnam War years, and combined revised doctrine for battle with efforts to reequip the Army with modern weaponry and to restructure the Army at the tactical level. This paper outlines that process and points out the intimate relationship between doctrine, modernization and force structure, as well as the requirements imposed by analyses of threats and future battlefield environments.

A handwritten signature in black ink, appearing to read 'J. N. Merritt', written over a horizontal line.

JACK N. MERRITT
General, USA Ret.
President

November 1991

BUILDING THE ARMY FOR DESERT STORM

Introduction

The Army that deployed to Saudi Arabia in the early fall of 1990, the product of almost twenty years of reform and experimentation, bore little outward resemblance to the Army that left the Republic of Vietnam in 1972. At the end of the Vietnam War, some weapons systems were obsolete while others were obsolescent, and both military organization and doctrinal thought revolved around wars of national liberation and the demands they imposed. Indiscipline, drug abuse, racism and poor training were epidemic within the ranks.¹ By 1990, those problems were either well in the past or on their way to solution. Not only were new weapons in place, but military theorists and planners had also widened their perspectives to include a broad range of possibilities from small tactical deployments of short duration to major combat. Meanwhile, the Army had addressed its internal problems. High standards of recruitment, training and discipline were in place. In the intervening two decades, the service rebuilt itself around the concept of an All Volunteer Force designed to integrate the Army Reserve and National Guard into its wartime organization. Army staffs and schools evolved new doctrine and concepts for the strategic placement of ready forces, saw to the design and purchase of new military hardware appropriate to implement that doctrine, and devised a training program that combined all of those disparate strands. The United States Army in the summer of 1990 was a technologically sophisticated, highly trained and confident force.

New Doctrine

The Army's accepted maneuver doctrine as embodied in Field Manual 100-5, *Operations*, was known as "AirLand Battle." The term was an orthographic peculiarity that inclined some to believe that the tenets of that doctrine were as novel as its spelling.² But AirLand doctrine was less a fresh departure than a clear articulation of fundamentals that American generals had understood and practiced as early as World War II, with an appropriate and explicit recognition of the role air power played in making decisive ground maneuver possible.³ The teaching of AirLand Battle doctrine at the Army's Command and General Staff College acknowledged its basis in traditional concepts of maneuver warfare and made frequent use of historical examples.⁴

The doctrinal reassessment that led to AirLand Battle began with a fundamental reconsideration of American strategic policy as phrased in President Richard Nixon's "Guam Doctrine" of 1969, according to which the United States would maintain a smaller defense establishment able to fight a "1-1/2 war" contingency. This was generally interpreted to mean that the Army would prepare to engage in a general war, probably in the European theater, and in a minor conflict, presumably a third world counterinsurgency. The smaller Army the planners envisioned faced growing challenges, however. American intelligence agencies in the early 1970s noted an increase of

five Soviet armored divisions in Europe, a continuing restationing of Soviet Army divisions further to the west, and a major improvement in equipment, with T-62 and T-72 tanks replacing older models and corresponding modernization of other classes of weapons. If general war came in Europe during the 1970s, the United States Army would confront Warsaw Pact armies that were both numerically and qualitatively superior.

The Arab-Israeli War that began on 6 October 1973 further intensified concerns about the Army's Vietnam-era concentration on infantry-airmobile warfare. American observers who toured those battlefields began to create a new tactical vocabulary when they reported on the "new lethality" of a Middle Eastern battlefield where, in one month of fighting, the Israeli, Syrian and Egyptian armies lost more tanks and artillery than existed in the entire U. S. Army, Europe. Improved technology in the form of antitank guided missiles, much more sophisticated and accurate fire control systems and vastly improved tank cannon heralded a far more costly and deadly future for conventional war. Technology likewise brought changes to battlefield tactics. Egyptian infantry armed with missiles enjoyed significant successes against Israeli tank units, bolstering the argument that the day of the "pure" tank force was past and that carefully coordinated combined arms units should replace them. It seemed clear that future wars would find American forces fighting powerful and well-equipped armies whose soldiers would be proficient in the use of extremely deadly weapons. Such fighting would consume large numbers of men and quantities of materiel. It became a matter of priority for the Army to devise a way to win any future war quickly.⁵

The new operations field manual, the Army's specific response to all of those new conditions, was preeminently the work of General William E. DePuy, commander of the new Training and Doctrine Command.⁶ Surveying conditions of modern warfare that appeared to revalidate the lessons of World War II, DePuy wrote much of that revision of FM 100-5 and enlisted the help of the combat arms schools commandants to revise and improve his ideas. FM 100-5, at first touting a concept known as the Active Defense, evolved from its 1976 edition to become the keystone of a family of Army manuals that completely replaced the doctrine current at the end of the Vietnam War.⁷

By the time the 1982 edition appeared, the manual stressed that the Army had to "fight outnumbered and win" the first battle of the next war, a concept that reversed traditional American military practice by requiring a trained and ready peacetime force. The manual acknowledged the armored battle as the heart of warfare, with the tank as the single most important weapon in the Army's arsenal. Success, however, hinged on a deft manipulation of all of the arms, but especially infantry, engineers, artillery and all types of air power, to give free rein to the maneuver forces. Using that mechanized force, the doctrine required commanders to seize the initiative from the enemy; act faster than the enemy could react; exploit depth through operations extending in space, time and resources to keep the enemy off balance; and synchronize the combat power of ground and air forces at the decisive point of battle.

In practical terms, the doctrine required commanders to supervise three types of operations simultaneously. In close operations, large tactical formations such as corps and divisions fought the current battles through maneuver, close combat and indirect fire support. Close operations bore the burden of victory or defeat. Deep operations, on the other hand, helped to win the close battle by engaging enemy formations not in contact, chiefly through deception, deep surveillance and ground and air interdiction of enemy reserves. Objectives of deep operations were to isolate the current battlefield and influence when, where and against whom future battles would be fought. Rear operations proceeded simultaneously with the other two and focused on assembling and moving reserves, redeploying fire support, continuing logistical efforts to sustain the battle, and providing continuity of command and control. Security operations, traffic control and maintenance of lines of communication were critical to rear operations.

Its authors intended AirLand Battle doctrine to be evolutionary, and the service journals after 1976 carried an extended doctrinal and tactical discussion that helped to clarify and, occasionally, to modify the manual.⁸ General Donn A. Starry, DePuy's successor as TRADOC commander, superintended a substantial revision that concentrated on the offensive and added weight to the importance of the Deep Battle by stressing the role of deep ground attack in disrupting the enemy's follow-on echelons of forces. Basically, however, AirLand doctrine was simply a clear exposition of long-standing and thoroughly understood practices in the art of war. Suggested innovations to that expression of maneuver warfare doctrine mainly dealt with ways to exploit what B. H. Liddell Hart described as the indirect approach in warfare by fighting the enemy along his line of least expectation in place or time.

AirLand Battle doctrine had additional utility because it helped to define both the proper equipment for its execution and the appropriate organization of military units for battle. Indeed, the doctrine explicitly acknowledged the growth of technology both as a threat and as a requirement. The U. S. Army could match large Soviet and Warsaw Pact forces neither in masses of manpower nor in masses of materiel. To that extent, AirLand Battle was both an organizational strategy and a procurement strategy. To fight outnumbered and survive, the Army needed a qualitative edge.

New Equipment

Military theorists generally agreed that a defending army could hope for success if the attacking enemy had no greater than a local 3:1 advantage in force. The best intelligence estimates in the 1970s, however, concluded that the Warsaw Pact armies enjoyed a much larger advantage than that. Continuing budget constrictions made unlikely the possibility of increasing the size of the American military to match Soviet growth. To solve the problem of how to fight an enemy that would almost certainly be larger, the United States relied, in part, on technologically superior hardware that could defeat an enemy at ratios higher than 1:3. As the decade of the 1970s unfolded, the Army began work on the "Big Five" weapon systems aimed at achieving that end: a new tank,

a new infantry combat vehicle, a new attack helicopter, a new transport helicopter and a new anti-aircraft missile.

Several factors affected new equipment design. Among the most important was the flourishing technology encouraged by the pure and applied research associated with space programs. Although the origins of all of the Big Five weapons lay in the years before AirLand Battle doctrine was first enunciated, that doctrine quickly had its effect on design criteria. In many ways, the new weapons and the new doctrine grew up together. Speed, survivability and good communications were essential to economize on small forces and give them the advantages they required to defeat larger but presumably more ponderous enemies. Target acquisition and fire control were equally important, since the success of a numerically inferior force really depended on the ability to score first-round hits.

Such simply-stated criteria were not easy to realize, and all of the weapons programs suffered through years of mounting costs, production delays and increasing public and congressional criticism. A debate that was at once philosophical and fiscal raged around the new equipment, with some critics preferring simpler and cheaper machines, fielded in greater quantities.⁹ The Department of Defense persevered in its preference for technologically superior systems, however, and managed to retain funding for most of the proposed new weapons. Weapon systems were expensive, but defense analysts, recognizing that personnel costs were even greater, pointed out that the services could not afford the manpower to operate increased numbers of simpler weapons. Nevertheless, spectacular procurement failures, such as the Sgt. York Division Air Defense Gun, kept the issue before the public, and such cases kept program funding for other, equally complex weapons on the agenda for debate.¹⁰

The M1 Abrams tank weathered considerable criticism and, in fact, began from the failure of the preceding tank program. The standard tanks in the Army inventory were various models of the M48 and M60, both surpassed in some respects by new Soviet equipment. The XM803, better known as the MBT (Main Battle Tank), was the successor to the abortive joint American-German MBT-70 project and was intended to modernize the armored force. Concerned about expense, Congress withdrew funding for the XM803 in December 1971, thereby cancelling the program, but agreed to leave the remaining surplus of twenty million dollars in Army hands to continue conceptual studies.

For a time, designers considered using missiles for long-range engagements, an innovation that worked only moderately well in the M60A2 Main Battle Tank and the M551 Sheridan Armored Reconnaissance Vehicle, both of which were armed with the MGM51 Shillelagh gun launcher system. In the late 1960s, however, tank guns were rejuvenated by new technical developments that included a fin-stabilized, very high velocity projectile that used long-rod kinetic energy penetrators. All things being equal, the larger gun bore offered the higher velocity round, and attention centered on 105mm and 120mm guns as the main armament of any new tank.

Degree of armored protection was also an issue. The proliferation of antitank missiles that could be launched by dismounted infantry and mounted on helicopters and all classes of ground vehicles demonstrated the need for a considerable improvement. At the same time, weight was an important consideration because the speed and agility of the tank would be important determinants of its tactical utility. No less important was crew survivability; even if the tank were destroyed in battle, it was important that a trained tank crew have a reasonable chance of surviving to man a new vehicle.

The Army made the decision for a new tank in 1972 and awarded developmental contracts in 1973. The first prototypes of the XM1 reached the testing stage in 1976 and the tank began to arrive in battalions in February 1980. The M1 enjoyed a low silhouette and a very high speed, thanks to an unfortunately voracious gas turbine engine. Chobham spaced armor (ceramic blocks set in resin between layers of conventional armor) resolved the problem of protection versus mobility. A sophisticated fire control system provided main gun stabilization for shooting on the move, a precise laser range finder, thermal-imaging night sights and a digital ballistic computer to solve the gunnery problem, thus maximizing the utility of the 105mm main gun. Assembly plants manufactured more than 2,300 of the 62-ton tanks by January 1985, when the improved M1A1 was approved for full production. The M1A1 had improved armor and a 120mm main gun that had increased range and kill probability. By the summer of 1990, the M1 series had replaced the M60 in the active force and in a number of Army Reserve and National Guard battalions. Tankers had used the Abrams long enough to have confidence in it. In fact, many believed it was the first American tank since World War II that was qualitatively superior to Soviet models.¹¹

The companion vehicle to the Abrams tank was the M2 Bradley infantry fighting vehicle, also produced in a cavalry scout version as the M3. The M113 armored personnel carrier, its predecessor, dated back to 1960 and was really little more than a battle taxi. The 1973 Arab-Israeli War demonstrated that infantry should accompany tanks, but it was increasingly clear that the M113 could not perform that function because it was far slower than the M1, its obsolescence aside. European practice also influenced American plans for a new vehicle. German infantry — more properly, *Panzergranadiere* — used the Marder, a vehicle that carried seven infantrymen in addition to its crew of three, was armed with a 20mm gun and coaxial 7.62mm machine gun in a turret, allowed the infantrymen to fight from within the vehicle, and was well armored. The French army fielded a similar infantry vehicle in the AMX-10P in 1973. The Soviets, who had already built a series of infantry vehicles, soon designed the BMP, which had a 73mm smoothbore cannon and an antitank guided missile. Variants of the BMP were generally considered the best infantry fighting vehicles in the world during the decade of the 1980s. From the European perspective, the United States had fallen at least a decade behind in the development of infantry vehicles. General DePuy and Major General Starry, who at that time commanded the Armor Center at Fort Knox, agreed the Army needed a new infantry vehicle and began studies in that direction.

In 1980, when Congress restored funding to the Infantry Fighting Vehicle program, the Army placed contracts for prototypes, receiving the first production models the next year. Like the Abrams, the Bradley was a compromise among competing demands for mobility, armor protection, firepower and dismounted infantry strength. As produced, the vehicle was a heavy thirty tons, but carried a 25mm cannon and coaxial 7.62mm machine gun to allow it to fight as a scout vehicle and a TOW (Tube-launched, Optically-sighted, Wire-guided) missile launcher that enhanced the infantry battalion's antiarmor capability. The internal size of the vehicle dictated the dismounted infantry squad size, which decreased in mechanized infantry battalions to six men. That limitation led to discussions about using the vehicle as the base of fire element and to consequent revisions of tactical doctrine for maneuver. Critical to its usefulness in the combined arms team, however, the Bradley had a road speed of thirty-eight miles per hour and could keep up with the Abrams tank.

By the spring of 1991, M2 and M3 Bradleys equipped forty-seven battalions and squadrons of the Regular Army and four Army National Guard battalions. A continuing modernization program that began in 1987 gave the vehicles, redesignated the M2A1 and M3A1, the improved TOW 2 missile. Bradley production by May 1988 incorporated various redesigns to increase survivability. Those most recent models were designated the A2.¹²

The third of the Big Five systems designed to offset Warsaw Pact advantages in numbers of tanks and other vehicles was the AH-64A Apache attack helicopter. The experience of Vietnam showed that the existing attack helicopter, the AH-1 Cobra, was vulnerable even to light antiaircraft fire and lacked the agility to fly close to the ground for long periods of time. The AH-56A Cheyenne helicopter, cancelled in 1969, had been intended to correct those deficiencies. The new attack helicopter program announced in August 1972 drew from the combat experience of the Cobra and the developmental experience of the Cheyenne to specify an aircraft that could absorb battle damage and had the power for violent maneuver and to carry heavy loads.¹³ The helicopter should be able to fly "nap of the earth" and maneuver with great agility to succeed in a new antitank mission on a high intensity battlefield.

The first prototypes flew in September 1975, and in December 1976 the Army selected the Hughes YAH-64 for production. Sophisticated night vision and target sensing devices allowed the pilot to fly nap of the earth day or night. The aircraft's main weapon was the Hellfire missile, sixteen of which could be carried in four launchers. In place of the antitank missile, the Apache could carry seventy-six 70mm Hydra 70 folding-fin rockets. In the nose, the aircraft mounted a Hughes 30mm single-barrel chain gun.

Full-scale production began in 1982 and the Army received the first aircraft in December 1983. As of the end of 1990, McDonnell Douglas Helicopter Company (which purchased Hughes in 1984) had delivered 629 Apaches, which equipped 19 active attack helicopter battalions. The completed production was intended to equip 26 active, 2 reserve and 12 National Guard battalions of Apaches, a total of 807 aircraft.¹⁴

The fourth of the Big Five complemented the new attack helicopter. A fleet of utility helicopters had already been modernized with the fielding of the UH-60A Black Hawk to replace the UH-1 Iroquois used during the Vietnam War. The Black Hawk could lift an eleven-man infantry squad or a 105mm howitzer with its crew and ammunition. The new utility helicopter was both faster and quieter than the UH-1.

The last of the Big Five weapon systems was the Patriot air defense missile, conceived in 1965 as a replacement for the Hawk and the Nike Hercules, both based on 1950s technology. The Patriot benefitted from lessons drawn from design of the antiballistic missile system, particularly the highly capable phased-array radar. The solid-fuel missile required no maintenance and had both the speed and agility to match those of both known and projected threats. At the same time, the system design was more compact and more mobile and demanded smaller crews than previous air defense missiles. Despite its many advantages over existing equipment, or perhaps because of the ambitious design that yielded those advantages, the development program of the missile initially known as the SAM-D was extraordinarily long, virtually spanning the entire careers of officers commissioned at the end of the 1960s. The long gestation period and escalating costs incident to the Patriot's technical sophistication made it a continuing target of both press and congressional critics. Despite controversy, the missile went into production in the early 1980s and the Army fielded the first fire units in 1984.

The Patriot offered a more economical use of manpower and equipment. A single Patriot battalion had more firepower than several Hawk battalions, the mainstay of the 32d Army Air Defense Command in Germany. Initial fielding plans envisaged forty-two batteries in Europe and eighteen in the United States, but funding and various delays slowed the deployment. By 1991, only ten half-battalions, each with three batteries, were active.

Originally designed as an anti-aircraft weapon guided by a computer and radar system that could cope with the multiple targets of the anticipated massive Warsaw Pact air attack in a European war, Patriot also had the potential to defend against battlefield tactical ballistic missiles such as the Soviet FROG and SCUD. About the time the first units were fielded, the Army began to explore the possibility that the Patriot could also have an ATBM, or antitactical ballistic missile, mission. In 1988, testing validated the PAC-I (Patriot Antitactical Missile Capabilities, Phase I) computer software, which was promptly installed in existing systems. The PAC-II upgrade, intended to modify the missiles to be more effective against other missiles, was still being tested in early 1991.

The Patriot missile system in the hands of the troops in the summer of 1990 was expected to be very effective against attacking aircraft and to have a limited capability to intercept field artillery rockets.¹⁵ Patriot was not, however, a divisional air defense weapon, although it could extend a certain amount of air defense protection over the battlefield from its sites in the corps area. Air defense protection of the division still relied on the Vulcan gun and Chaparral missile, stop-gap weapons more than twenty years old, and on the light Stinger missile. The failure of the Sgt. York gun project and continuing

difficulties involved in selecting its successor meant that the air defense modernization program essentially stopped at the division rear boundary.

The Big Five were by no means the only significant equipment modernization programs the Army pursued between 1970 and 1991. Among other important actions, the Army purchased the Multiple Launch Rocket System (MLRS) and a new generation of tube artillery to upgrade fire support, improved small arms, and a family of new command, control, communications and intelligence hardware. The Big Five, however, were the high cost pieces of equipment consciously developed at a high priority with the aim of offsetting Warsaw Pact advantages in manpower, tanks, artillery and airplanes. Development was one thing; fielding was another. The 1970s were relatively lean years for the Army. Not only did the budget not allow purchase of new equipment, but it also did not provide adequate operations and maintenance funds. As a consequence, the weapon systems on hand were kept operational by "living off the shelf" for maintenance, depleting spare parts inventories and further reducing readiness. Political developments played a part in delivering the modern equipment to the Army's divisions by the summer of 1990, for it was the fortuitous upward swing of the defense budget during the 1980s buildup that financed acquisition of the weapons that had been developed during the previous decade.

While most of the important technical weapons developments began before Training and Doctrine Command's first publication of AirLand Battle doctrine, a close relationship between doctrine and equipment swiftly developed. New doctrine helped to justify the expenses of the high technology equipment needed to make that doctrine work. Weapons modernization, on the other hand, encouraged doctrinal thinkers to consider more ambitious concepts that would exploit the capabilities new systems offered. A successful melding of the two, however, depended upon the creation of tactical organizations that were properly designed to use the weapons in accordance with the doctrine. While doctrinal development and equipment modernization were underway, force designers also reconsidered the structure of the field army.

New Organization

The basic issue in force design has always been how best to configure units to obtain the best compromise between mobility, or maneuverability, and maximum firepower directed at the enemy. In the post-World War II era, conflicting influences complicated decisions about the correct size and organization of divisions and corps. The hazards of the nuclear and chemical battlefield deeply ingrained the notion that concentration of large bodies of troops was dangerous.¹⁶ Improved weapons technology further strengthened the imperative for dispersion, a trend facilitated by steadily improving communications systems. It was clear that the classical need to concentrate overwhelming force at the decisive point and time remained the basic prescription for winning battles.

America's isolated strategic position posed additional problems, particularly in view of the growth of Soviet conventional power in Europe and an evident Warsaw Pact intention to fight a quick ground war that would yield victory before NATO could mobilize and before the United States could send divisions across the Atlantic.¹⁷ Time governed decisions that led to forward deployment of substantial ground forces in overseas theaters and the positioning of military equipment in threatened areas. Issues of strategic force projection likewise influenced decisions about types, numbers and composition of divisions.

The third factor was largely fiscal and political. With the end of the Vietnam War, Congress abolished the draft, created the All Volunteer Army and cut the Army's appropriation. The consequence was necessarily a much heavier reliance on the reserve components for manpower.¹⁸ Under the resulting Total Army concept, the service transferred many essential combat, combat support and combat service support units to the Army Reserve and the Army National Guard. As an economy measure, some Regular Army divisions were reconfigured with only two active component brigades. Upon mobilization, they were to be assigned a National Guard "roundout" brigade that habitually trained with the division in peacetime.¹⁹ Such plans ensured that equipment modernization would extend to the reserve components, with such equipment as M1 tanks and Bradley fighting vehicles going to National Guard battalions at the same time they were issued to the Regular Army.

Such pragmatic factors had much to do with Army organization, but what might best be called philosophical questions were equally important. Differing schools of thought within the Army tended to pull force designers in different directions. There were those, strongly influenced by the war in Vietnam, who believed that the future of warfare lay in similar wars, probably in the third world. Accordingly, they emphasized counterinsurgency doctrine and light and airmobile infantry organization. Advocates of light divisions found justification for their ideas in the Soviet invasion of Afghanistan in 1979, when it appeared possible that the United States might have to confront Soviet forces outside the boundaries of Europe. That uncertainty encouraged ideas that called for the creation of light, quickly deployable infantry divisions.

Still, the emphasis within the Army throughout the decade of the 1970s remained on conventional war in Europe, where Chief of Staff General Creighton Abrams, General DePuy and like-minded officers believed the greatest hazard, if not the greatest probability of war, existed. They conceived of an intense armored battle, reminiscent of World War II, to be fought in the European theater. If the Army could fight the highest intensity battle possible, some argued, it also had the ability to fight wars of lesser magnitude.

While considering the doctrinal issues that led to publication of the Active Defense doctrine in Field Manual 100-5, General DePuy also questioned the appropriateness of existing tactical organization to meet the Warsaw Pact threat. DePuy suggested, and Chief of Staff General Frederick C. Weyand agreed, that the Army should study the

problem more closely. Thus, in May 1976, DePuy organized the Division Restructuring Study Group to consider how the Army divisions might best use existing weapons of the 1970s and the planned weapons of the 1980s. DePuy's force structure planners, like those who wrote the new doctrine, were also powerfully influenced by the 1973 Arab-Israeli War.²⁰

The Division Restructuring Study investigated the optimum size of armored and mechanized divisions and the best mix of types of battalions within divisions. Weapons capabilities influenced much of the work and had a powerful effect on force design. Planners noted a continuing trend toward an increasing number of combat support and combat service support troops (the "tail") to keep a decreasing number of combat troops (the "teeth") in action. In general, their deliberations reached the conclusion that the division should retain three brigades, each brigade having a mix of armored and mechanized infantry battalions and habitually supported by the same artillery and combat service support units. To simplify the task of the combat company commander, the group recommended grouping weapons of a type together in the same organization, rather than mixing them in units, and transferring the task of coordinating fire support from the company commander to the more experienced battalion commander. Other recommendations suggested creating a combat aviation battalion to consolidate the employment of helicopters and adjusting the numbers of weapons in various units.²¹

General Donn Starry, who succeeded DePuy at the Training and Doctrine Command, had reservations about various details of the Division Restructuring Study. He was especially concerned that an emphasis on the division and tactics was too limiting. In his view, the operational level of war above the division demanded the focus of Army attention. After reviewing an evaluation of the Division Restructuring Plan, Starry ordered his planners to build on that work in a study he called Division 86.

The Division 86 proposal, developed entirely within Training and Doctrine Command, was conceptually appropriate to fight the Active Defense articulated in FM 100-5. More robust than previous division organizations, it concentrated firepower to defeat the attacking Soviet first echelon of forces. Division 86 also considered existing and proposed doctrine in designing organizations that could both exploit modern firepower and foster the introduction of new weapons and equipment. Thus it concentrated on heavy divisions specifically designed for combat in Europe, rather than on the generic division, in outlining an armored division with six tank and four mechanized infantry battalions and a mechanized division with five tank and five mechanized infantry battalions. Anticipating a faster pace of battle, planners also tried to give the divisions flexibility by increasing the number of junior leaders in troop units, thereby decreasing the span of control.²²

The Army adopted Division 86 before approving and publishing the new AirLand Battle doctrine, but it is clear that General Starry's planners assumed that the new doctrine would be accepted and therefore used it to state the tasks the new divisions would be called upon to accomplish. Similar efforts, collectively known as the Army 86 Studies,

pondered the correct structure for the infantry division, the corps and larger organizations.²³ Although the infantry portion of Army Division 86 moved in the direction of a much lighter organization that would be easy to transport to other continents, such rapidly deployable contingency forces lacked the endurance and the survivability to fight alongside NATO divisions in open terrain. The search for a high technology solution that would give light divisions such capacity led to a wide range of inconclusive experiments with the 9th Infantry Division, officially designated a test unit.

The new Army of Excellence continued the trend toward a heavier mechanized and armored force begun by Division 86 but also reconsidered the role of light divisions. In August 1983, Chief of Staff General John A. Wickham, Jr., directed Training and Doctrine Command to restudy the entire question of organization. The resulting Army of Excellence force design acknowledged the need for smaller, easily transportable light infantry divisions for the expressed purpose of fighting limited wars. At the same time, the plan kept the heavy divisions proposed by the Division 86 study, although with some modifications. That heavy division, specifically designed to fight a defensive attrition battle, was too big and lacked the agility that evolving doctrine required. Worse, Division 86 was never fully implemented simply because it was unaffordable, creating another "hollow" force.²⁴

The Army of Excellence design necessarily changed in consonance with evolving doctrine in the Central Battle concept, which stressed attack of the Soviet second echelon forces and operations in depth. Organizing land forces primarily around functions, rather than equipment, and concentrating on the combined arms team as the heart of operations, the Army of Excellence organizations had a more offensive orientation than those of Division 86, seeking to interdict the enemy before the main battle was joined. To do so required accepting risk in combat service support units at all levels in order to keep combat power in the maneuver units, shifting some artillery and aviation missions to corps in order to streamline the divisions, and placing traditional support units in the reserve components. In its final form, the Army of Excellence organization faithfully mirrored the operational intentions of the latest edition of FM 100-5.

Thus the five corps, twenty-eight division force available to the United States Army in the summer of 1990 was the product of almost twenty years of evolving design that thoughtfully considered the requirements of doctrine for battle and the capabilities of modern weapons. In the Army of Excellence force design, Army leaders believed they had found a satisfactory way to maximize the firepower of the division so that it could exploit the capabilities of new weapons, thereby enabling it confidently to fight a larger enemy. The remaining task was to devise a training system that imparted the necessary skills so that properly organized soldiers could use their weapons effectively to accomplish the goals that the doctrine specified.

New Training

The Renaissance infantryman who trailed a pike and followed the flag, like his successor in later wars who shouldered a musket and stood in the line of battle, needed stamina and courage but required neither a particularly high order of intelligence nor sophisticated training. The modern infantryman, by contrast, was expected to master a wide range of skills and to think for himself on an extended battlefield. He faced a far more daunting challenge. To prepare such soldiers for battle under the conditions they envisioned, Training and Doctrine Command planners in the 1970s and 1980s evolved a comprehensive and interconnected training program that systematically developed individual and unit proficiency and then tested that competence in exercises intended to be tough and realistic.²⁵

Individual training was the heart of the program, and Training and Doctrine Command gradually developed a methodology based on the Systems Approach to Training, which clearly defined the desired skills and then trained the soldier to master those skills.²⁶ The systems approach cut away much of the superfluous and was an exceptional approach to the repetitive tasks that made up much of soldier training. Once the soldier mastered the skills appropriate to his grade, skill qualification tests continued to measure his grasp of his profession through a series of written and actual performance tests.

The training of leaders for those soldiers became increasingly important through the 1970s and 1980s.²⁷ By the summer of 1990, the Training and Doctrine command had created a coherent series of schools that trained officers in their principal duties at each major turning point in their careers.²⁸ Lieutenants began with an Officer Basic Course that introduced them to the duties of their branch of service and, after a leavening of experience as senior lieutenants or junior captains, returned for an Officer Advanced Course designed to ready them to command companies, batteries and troops. The new Combined Arms and Services Staff School, designated by the distinctive acronym "CAS³," instructed advanced course graduates in battalion staff duties. The premier officer school remained the Command and General Staff Officer Course at Fort Leavenworth, Kansas, where junior majors went before serving as executive officers and operations officers of battalions and brigades. Although all Army schools taught the concepts and language of AirLand Battle, it was at Leavenworth that the professional officer attained real fluency. For a selected few, a second year at Fort Leavenworth in the School of Advanced Military Studies offered additional preparation for division and higher level responsibilities. Finally, a small number of lieutenant colonels and colonels might be chosen to attend the prestigious Army War College, Navy War College, Air War College, National War College or Industrial College of the Armed Forces, the services' senior schools. Beyond those major schools, officers might attend one or more short courses in subjects ranging from foreign language to mess management.²⁹ The career officer thus expected to spend roughly one year in every four in some sort of school, either as student or as teacher.

The noncommissioned officer corps also required a formal school structure.³⁰ The noncommissioned officer education system in 1990 paralleled the structure of officer schools. The young specialist or sergeant first attended the primary leadership development course at his local NCO academy, a school designed to prepare him for sergeants' duties. The basic noncommissioned officer course trained sergeants to serve as staff sergeants (squad leaders) in their career field. Local commanders selected the soldiers who attended that course. Staff sergeants and sergeants first class selected by a Department of the Army board attended the advanced noncommissioned officer course, where the curriculum prepared them to serve as platoon sergeants and in equivalent duties elsewhere in the Army. At the apex of the structure stood the U. S. Army Sergeants Major Academy at Fort Bliss, Texas, where a 22-week course qualified senior sergeants for the top noncommissioned officer jobs in the Army.

In addition to providing an array of individual training programs, the Army developed its soldiers through collective instruction. Progressively more sophisticated unit training programs melded the individual's skills into those of the squad, platoon, company and battalion. Just as the individual was tested, so were units, which underwent a regular cycle of evaluations, known at the lowest level as the Army Training and Evaluation Program. Periodically, both active and reserve component units in the continental United States went to the National Training Center at Fort Irwin, California, where up to brigade-sized forces fought realistic, unscripted maneuver battles against a U. S. Army unit specially trained and equipped to emulate Warsaw Pact armies. Thought of as the "best Soviet brigade in the world," the cadre unit at Fort Irwin was restructured to emulate an Iraqi brigade when it appeared that the United States Army would have to fight in Kuwait. In FY1991, the National Training Center planned to train twelve brigade headquarters, twenty-four heavy maneuver battalions, three light infantry battalions, selected special operations forces units, one reserve component brigade headquarters and two reserve component battalions. The Army's goal was to send each active maneuver battalion to the National Training Center every two years and each reserve component roundout maneuver battalion once every four years.³¹ Brigades assigned in Europe conducted similar exercises at the Combat Maneuver Training Center at Hohenfels, Germany. Light forces exercised at the Joint Readiness Training Center at Fort Chaffee, Arkansas.

Tactical units of the Army were subject to further tests and evaluations, the most important of which were exercises of the plan to reinforce units in Europe, known as REFORGER. Similar exercises took units to the Middle East in BRIGHT STAR exercises, conducted in cooperation with the armed forces of the Republic of Egypt, and to Korea in the TEAMSPIRIT exercises. Periodic readiness evaluations tested divisions' capacity for quick deployment, especially the 82d Airborne Division, long the Army's quick reaction force, and the new light divisions that had been designed for short-notice contingency operations.

As the Army entered the summer of 1990, it was probably better trained than at any time in its history, and certainly better trained than it had been on the eve of World

War I, World War II and the Korean War. Sound training practices produced confident soldiers. Realistic exercises acquainted soldiers with the stress of battle as well as peacetime training could hope to manage. Force-on-force maneuvers, such as those conducted at the National Training Center, tested the abilities of battalion and brigade commanders to make the combined arms doctrine work and confirmed their confidence in their doctrine, equipment and soldiers. But thorough and professional as Army training was, the most important fact was that all training and exercises were specifically keyed to the doctrinal precepts laid down in Field Manual 100-5. Combined arms training under the rubric of "train as you fight" brought the diverse strands of AirLand Battle together.

Building the Quality Force

Sophisticated battle doctrine and weapons, wielded by thoroughly trained soldiers in appropriately structured organizations, promised to realize General DePuy's vision of a small but powerful Army that could confront the Warsaw Pact on equal terms. AirLand Battle would have been merely another academic exercise, however, had the Army not attended to the problems of morale, discipline and professionalism that were obvious at the end of the Vietnam War. By confronting drug abuse, racism and pervasive indiscipline directly, leaders gradually corrected the ills that had made the Army of 1972 both unready and unprofessional. Schools and progressive military education played a part, as did strict qualitative management procedures that discharged the worst offenders. More importantly, officer and noncommissioned officer education stressed the basics of leadership and responsibility, since the Army's problems at the end of the Vietnam War were, like most problems in any military organization, fundamentally leadership problems. There are many indicators of the regeneration of discipline in the Army. Among the most significant are statistics on punishments under the Uniform Code of Military Justice. Between 1972 and 1986 there was a steady, progressive decrease in the "indicators of indiscipline," as measured in punishments per thousand soldiers.³²

The parallel and equally important development was the progressive increase in standards of recruitment and retention. Recruiting was not a uniform success story, however, for many problems attended the creation of the Modern Volunteer Army that replaced the draftee Army of Vietnam. Unsuccessful in attracting well-qualified enlistees, the volunteer Army at first enrolled a disproportionate number of soldiers who scored in Categories IV and V, the lowest categories of its standardized tests. Project 100,000, essentially an experiment in social engineering, actively recruited such candidates after 1966 and was not officially adjudged a failure until 1972. Project 100,000 and other programs that concentrated on the disadvantaged teenager brought in 240,000 Category IV troops by 1968. Of that number over 80 percent were high school dropouts and half scored below average on standardized intelligence tests. Professional soldiers privately derided the "Cat IV Army" as incapable of executing the sophisticated battle doctrine then under discussion, or of maintaining and operating the high technology weapons that were nearing the end of their development and testing. By 1975, the attrition of bottom category soldiers had been so heavy that they made up only six percent of the

armed forces as a whole, a figure that dropped to four percent in 1977. The improvement in general recruiting standards did not similarly improve the Army's manning picture, however, and recruiting stations continued to experience the greatest difficulties in attaining their monthly quotas. The situation reached its nadir in 1979, when none of the armed forces reached its recruiting goal regardless of the qualifications of the candidates.³³

The surge of new funding of the early 1980s helped to solve the Army's problems in quality recruiting, just as it helped to fund the Big Five weapon systems. In 1980, Senators John Warner and Sam Nunn sponsored legislation that brought wage parity for soldiers, thus making military service more attractive. A second and perhaps more important inducement was the recreation of the G.I. bill. In that year, the Army experimented with an educational stipend that evolved into the Army College Fund in 1981 and eventually, in 1987, into the Montgomery G.I. Bill. Exploiting those programs, General Maxwell R. Thurman, then in charge of Recruiting Command, reached out to high school graduates and those scoring in the upper half of aptitude tests in the "Be All You Can Be" recruiting campaign. He also relocated recruiting stations to be more visible to the high-quality young person the Army wished to enlist.

As a result of those efforts, 90 percent of Army enlistments in FY 1986 were high school graduates, up from only 54.3 percent in FY 1980.³⁴ The effect on the Army's readiness was profound. By the summer of 1990, disciplined, motivated, trained and qualified soldiers manned the combat divisions. High standards of recruiting provided the last piece of the Army's post-Vietnam rebuilding, for as important as were the new equipment, doctrine and organization for battle, the key to an effective Army was, as always, its soldiers. It was, as George Patton once pointed out, not the bayonet that frightened the enemy, but the "cold glitter" in the eye of the soldier who held it.

The Army on the Eve of Desert Shield

Army accomplishments over the years after the end of the Vietnam War were impressive. By 1990, the claim could reasonably be made that the service had arrived at the correct doctrine, the proper weapons, an appropriate organization and a satisfactorily trained, high-quality force to fight the high intensity war against which General DePuy and his successors had planned. International developments in the first half of the year seemed, however, to have made the Army's modernization unnecessary. The apparent collapse of Soviet power and withdrawal of Soviet armies into the Soviet Union itself, the disintegration of the Warsaw Pact and the pending unification of Germany removed the justification for maintaining a powerful American Army in Europe. The immediate political question was whether, in view of all of those developments, the nation needed to maintain such a large and expensive Army at all. In the interests of fiscal retrenchment, the Army projected budgets for the following five years that would decrease the total size of the active service from approximately 780,000 in 1989 to approximately 535,000 soldiers in 1995.³⁵

Even after the Iraqi invasion of Kuwait, and even while Army units were in the midst of frantic preparations for movement to Saudi Arabia, Army task forces concerned with “downsizing” the service to meet the long-range strength ceilings continued to work. The Quicksilver and Vanguard task forces considered the size of combat units and training and sustainment forces and recommended inactivations that directly affected units then preparing to deploy to the Middle East. The Army 2000 study group at Headquarters, Department of the Army, considered the implications of such decreases in size and pondered the ways a smaller Army could continue to carry out its major missions.³⁶ Among the major actions that Army 2000 managed in July and August 1990 was a scheduled command post exercise named HOMEWARD BOUND, designed to test a possible removal of Army units from Europe.³⁷ Army 2000 staff officers reacted to the concerns voiced at the highest levels of the Army that the drive to save defense dollars not produce another “hollow” Army. No one wanted to reproduce the disaster of Task Force Smith in July 1950 when North Korean forces overran an ill-trained American infantry unit north of Seoul at the start of the Korean War.³⁸

Department of the Army planners in operations and logistics found themselves in the anomalous situation of pulling together the combat and support units scheduled for deployment to the Middle East at the same time that their colleagues in personnel were proceeding with plans for a reduction in force. Those plans were temporarily suspended when the Army’s deployment to Saudi Arabia was announced, and orders went out likewise suspending retirements from active duty and routine separations from the Army. Still, uncertainty about the future, both for individuals and for major Army units, hung over an Army preparing for overseas service and, possibly, for war.

Despite improvements in personnel, doctrine and weapons, the Army that went to Saudi Arabia was largely inexperienced. The limited combat actions in Grenada and Panama, which were not real tests of AirLand Battle doctrine in any case, gave very few soldiers experience under fire. The URGENT FURY operation in Grenada involved fewer than 8,000 Army soldiers, with actual Army combat being limited to the 1st and 2d Battalions of the 75th Infantry (Ranger) and certain units of the 82d Airborne Division. In fact, Army strength on the island during the period of combat probably did not exceed 2,500, and the heaviest combat, occurring during the first hours of the landing on 25 October 1983, was borne by Company A, 1st Battalion, 75th Infantry.³⁹ The fighting during Operation JUST CAUSE in Panama was similarly limited, although more Army units, totalling about 27,000 soldiers, participated.

In neither case were there serious opposing forces of the kind the Army had been training for decades to meet. Far and away the most important aspects of Operations URGENT FURY and JUST CAUSE were their utility as tests of the Army’s ability to function in a joint task force, an area in which both operations, as well as subsequent joint deployments, revealed continuing problems.⁴⁰ Joint doctrine, a matter of special concern since passage of the Goldwater-Nichols Defense Reorganization Act of 1986, was far from complete.⁴¹ Not until 1990 did the Army, acting for the joint staff, complete the draft of Joint Publication 3-0, *Doctrine for Unified and Joint Operations*, and prepare Joint

Publication 3-07, *Joint Doctrine for Low-Intensity Conflict*, as a test manual to be issued late in the year. The two most important volumes, *Campaign Planning* and *Contingency Operations*, remained to be written.⁴²

Other important questions also remained that somewhat blunted the edge of pervasive official optimism as the Army deployed to the Middle East during the summer of 1990. Chief among them was how well new weapons would perform. The M1 and M1A1 Abrams tanks and M2/M3 Bradley fighting vehicles had never faced combat, nor had the Multiple Launch Rocket System (MLRS), the Patriot air defense system, the AH-64A Apache attack helicopter or modern command, control and communications mechanisms that were supposed to weld those sophisticated implements into a coherent fighting system.⁴³ Problems with weapons procurement over the preceding decade had conditioned many to doubt how well the new “high-tech” weapons would perform. As a result, media pundits and military commentators warned of a long and bloody war of attrition if the Middle East crisis could not be resolved through negotiation.⁴⁴

The volunteer Army was a second source of concern. Overshadowed in the public eye by discussions about the efficacy of modern weapons and within the Army by the immediate concerns of preparing for war, the question of how to guarantee an adequate stream of trained replacements and a sufficient supply of new equipment loomed ominously behind the possibility that the ground battle would be long and costly. The Army of July 1990 was the Army with which the nation would have to fight any war. Lacking the mechanism to operate a selective service system, its schools had no way to train replacements for battle casualties. Similarly, without a mobilization of the industrial base, weapons production remained at a peacetime level. As the nation approached the possibility of war, the service was either fatalistic or supremely confident that the forces on hand would be sufficient, an attitude that echoes the conclusions of historian R. R. Palmer about the Army of World War II, that this was “either remarkably accurate planning of the minimum forces required or a fairly narrow escape from disagreeable eventualities — winning by the skin of the teeth.”⁴⁵

All of those worries notwithstanding, the soldiers preparing for deployment to Saudi Arabia in the late summer of 1990 shared a pervasive confidence in their units, weapons and ability to do the job assigned them. Their leaders were equally confident that, in the doctrine they had so thoroughly rehearsed, they held the keys to battlefield success. The Iraqi invasion of Kuwait chanced to come at a moment when the United States Army was completing its twenty-year process of modernization and reform. The Army of 1990 was the most proficient and professional military force the United States had ever fielded at the beginning of a foreign war.

Implications for the Post-Cold War Army

Just as Army deployments to Saudi Arabia began, President George Bush made a speech at Aspen, Colorado, in which he took cognizance of the dissolution of the Warsaw

Pact military organization and the evident waning of the Soviet threat. The new National Military Strategy he announced on 2 August envisioned a smaller force deployed overseas and an emphasis on using forces based primarily within the United States for responding to world crises. The ensuing war in the Persian Gulf did not significantly affect congressional discussions about decreasing the defense budget and size of the military establishment in general. The Army looked forward in 1992 to decreasing the active force by one corps, four divisions and 90,000 soldiers. By 1995, an Army of four corps and twenty divisions (twelve active, six in the Army National Guard and two cadre) would be 25 percent smaller than in 1991 and would approximate the size of the service in 1939. The projected defense budget for 1995 was also a fifty-year low in terms of its percentage of the gross national product and of the federal budget as a whole.

While laying plans for the balanced four-corps force that would place significant amounts of combat support and combat service support in the reserve components, Army leaders cast worried glances at previous drawdowns of the Army. Emphasizing that the defense establishment "has not done well in maintaining its effectiveness in periods immediately following major wars," Army Chief of Staff General Gordon R. Sullivan pointed out the military disasters that followed rapid demobilizations after previous wars. In World War II, the Army performed poorly in its first major battle against the Germans at Kasserine Pass in Tunisia, and against the Japanese in New Guinea. The opening battle of the Korean War was an even greater debacle, when the infantrymen of Task Force Smith were overwhelmed by North Korean troops attacking toward Seoul. On a smaller scale, the Iranian rescue attempt of 1980 produced the disaster of Desert One. That pattern, General Sullivan emphasized, could not continue at the end of the Cold War. The Army that fought Desert Storm was one of the best trained and most professional ever fielded by the United States, but he was concerned that policy makers understand the transient nature of that readiness. In the drawdown of forces, the work of the twenty years after the Vietnam War should be neither discarded nor considered adequate for an indefinite future.

In the view of Army leaders, a conservative approach to force reductions was particularly desirable in the post-Desert Storm euphoria, when it was difficult to articulate a major threat against which the United States should plan. Appearances were similar in 1919, briefly in 1945-1946, in 1954 and in 1973. In each case, the evolution of international relations produced a situation in which war or shorter, but no less sharp, combat actions became necessary. Similarly, soldiers pointed out, modern equipment becomes obsolescent swiftly in a time of rapid technological growth. Their successes in the recent war aside, the Big Five weapon systems, would not be "good enough" for very long, and research and development toward their replacements was a matter of priority. Reflecting on that situation, General Maxwell R. Thurman commented that Desert Storm became the 171st battle streamer on the Army colors, and there was nothing more certain than that there would eventually be a 172nd. Thus, as they looked to the future, Army leaders bore in mind the experience of the past twenty years and, as General Sullivan articulated it, emphasized the need to reshape the Army "in keeping with the world in which we live," a well trained and ready force, however small it might be.⁴⁶

NOTES

1. On the problems within the military establishment at the end of the Vietnam War, begin with William L. Hauser, *America's Army in Crisis* (Baltimore: Johns Hopkins University Press, 1973); Paul L. Savage and Richard A. Gabriel, *Crisis in Command: Mismanagement in the Army* (New York: Hill and Wang, 1978); Edward L. King, *The Death of the Army* (New York: Saturday Review Press, 1972); and *Comprehensive Report: Leadership for the 1970s*, USAWC Study of Leadership for the Professional Soldier (Carlisle Barracks, Pa.: U.S. Army War College, 1971).
2. Field Manual No. 100-5, *Operations* (May 1986).
3. This discussion is drawn from Robert A. Doughty, *The Evolution of U.S. Army Tactical Doctrine, 1946-1976* (Ft. Leavenworth, Kans.: U.S. Army Command and General Staff College, Leavenworth Paper No. 1, 1979); John L. Romjue, *From Active Defense to AirLand Battle: The Development of Army Doctrine 1973-1982* (Ft. Monroe, Va.: U.S. Army Training and Doctrine Command, 1984); Paul H. Herbert, *Deciding What Has to Be Done: General William E. DePuy and the 1976 Edition of FM 100-5, "Operations"* (Ft. Leavenworth, Kans.: U.S. Army Command and General Staff College, Leavenworth Paper No. 16, 1988); and Romie L. Brownlee and William J. Mullen III, *Changing An Army: An Oral History of General William E. DePuy, USA Retired* (Carlisle Barracks, Pa.: U.S. Military History Institute, 1985).
4. FM 100-5 uses historical examples that include World War II combat to illuminate the discussion of doctrine. The Command and General Staff College tactics instruction similarly uses historical examples of high intensity World War II operations. The same was true of Leavenworth's battle analysis class. Christopher R. Gabel, *The 4th Armored Division in the Encirclement of Nancy* (Ft. Leavenworth: U.S. Army Command and General Staff College text, 1986), concludes that "from the perspective of the 1980s, an analysis of the 4th Armored Division's operations around Nancy inevitably suggests that AirLand Battle doctrine is not really a new concept at all. Rather, a strong case can be made for the assertion that Major General "P" Wood practiced AirLand Battle in 1944" (p. 23).
5. TRADOC *Annual Report of Major Activities, FY 1974*, pp. 14-19; and TRADOC *Annual Report of Major Activities, FY 1975*, chapter 1.
6. The STEADFAST reorganization abolished the old Continental Army Command and transferred its training base functions to a new Training and Doctrine Command. See James A. Bowden, "Operation STEADFAST: The U.S. Army Reorganizes Itself" (U.S. Marine Corps Command and Staff College unpublished student MS, 1985); and *Operation STEADFAST Historical Summary* (Ft. Monroe, Va.: TRADOC, 1976).

7. To survey the doctrine's evolution, see Romjue, *From Active Defense to AirLand Battle*, and Donn A. Starry, "To Change an Army," *Military Review* (March 1983).
8. For a sampling of the discussion, review the many articles on this subject in *Armed Forces Journal International*, *Army*, *Military Review* and *Infantry* magazines, 1976-1988.
9. These themes were treated most thoroughly in the years after 1980 by the Military Reform Caucus, an informal organization composed of members of Congress, military analysts and journalists. On the caucus and its criticisms, see Theresa Kraus, "The Military Reform Caucus," U.S. Army Center of Military History, Military Studies Branch unpublished typescript, 1987, in CMH file. Reformers focused on concrete issues of how to train, equip and organize military forces, rather than on questions of strategy, and often used Dana Rasor's Project on Military Procurement to communicate with the press. Members held diverse views, but among those criticizing the complexity and costs of weapons were: Walter Kross, "Military Reform: Past and Present," *Air University Review* (July-August 1981); Kross, *Military Reform: The High-Tech Debate in Tactical Air Forces* (Washington, D.C.: National Defense University Press, 1985); and James Fallows, *National Defense* (New York: Random House, 1981). For a general survey, see Asa A. Clark *et al.*, *The Defense Reform Debate: Issues and Analysis* (Baltimore: Johns Hopkins University Press, 1984).
10. Bruce R. Pirnie, *Duster to DIVAD: The Army's Search for a Radar-Directed Gun* (Washington, D.C.: U.S. Army Center of Military History, 1987).
11. "M1A1 Main Battle Tank," *Army* 41:5 (May 1991); Orr Kelly, *King of the Killing Zone: The Story of the M1, America's Super Tank* (New York: W. W. Norton Co., Inc., 1989); Steve E. Dietrich and Bruce R. Pirnie, *Developing the Armored Force: Experiences and Visions. An Interview with MG Robert J. Sunell, USA Retired* (Washington, D.C.: U.S. Army Center of Military History, 1989).
12. *Weapon Systems 1991: United States Army* (Washington, D.C.: Department of the Army, March 1991), p. 17; Bruce R. Pirnie, "From Half-Track to Bradley: Evolution of the Infantry Fighting Vehicle" (Washington, D.C.: U.S. Army Center of Military History, Analysis Branch Study, 1987); "M2A2/M3A2 Bradley Fighting Vehicles," *Army* 41:6 (June 1991).
13. For a discussion of the interrelationship between close air support issues, requirements for aircraft designed to participate in the direct ground battle, the competition for missions and the design of the Cheyenne helicopter, refer to Charles E. Kirkpatrick, *The Army and the A-10: The Army's Role in Developing Close Air Support Aircraft, 1961-1971* (Washington, D.C.: U.S. Army Center of Military History, Analysis Branch Special Study, 1987).

14. *Weapon Systems: 1991 United States Army* (Washington, D.C.: Department of the Army, 1991), p. 21; "The AH-64A Apache Attack Helicopter," *Army* 41:4 (April 1991).

15. "Army's Patriot: High-Tech Superstar of Desert Storm," *Army* 41:3 (March 1991); "Modernization Program Systems Prove Themselves in the Desert," *Army* 41:5 (May 1991).

16. Thus leading, in part, to the Pentomic division, organized around Battle Groups intended to fight on the dispersed nuclear battlefield. To survey development of Army divisions between World War II and the early 1970s, refer to: *Modern Mobile Army 1965-70* (Ft. Monroe, Va.: U.S. Continental Army Command, 10 February 1960); *Reorganization Objective Army Divisions 1965 (ROAD)* (Ft. Monroe, Va.: U.S. Continental Army Command, 1 March 1961); A. J. Bacevich, *The Pentomic Era: The U.S. Army Between Korea and Vietnam* (Washington, D.C.: National Defense University Press, 1986); Robert P. Haffa, Jr., *Rational Methods, Prudent Choices: Planning U.S. Forces* (Washington, D.C.: National Defense University Press, 1988); William W. Kaufmann, *Planning Conventional Forces, 1950-1980* (Washington, D.C.: The Brookings Institution, 1982); Virgil Ney, *Evolution of the U.S. Army Division 1939-1968* (Ft. Belvoir, Va.: U.S. Combat Developments Command, 1969); John J. Tolson, *Airmobility 1961-1971* (Washington, D.C.: U.S. Government Printing Office, 1973); and Maxwell D. Taylor, *Swords and Plowshares* (New York: W. W. Norton and Company, Inc., 1972).

17. For a discussion of this and related issues, refer to Haffa, *Rational Methods, Prudent Choices*, and Kaufmann, *Planning Conventional Forces, 1950-1980*.

18. To survey the Volunteer Army, refer to Willard Latham, *The Modern Volunteer Army Program: The Benning Experiment, 1970-1972* (Washington, D.C.: U.S. Government Printing Office, 1974); and Harold G. Moore and Jeff M. Tuten, *Building a Volunteer Army: The Fort Ord Contribution* (Washington, D.C. U.S. Government Printing Office, 1975).

19. In reaction to the failure to use the reserves in Vietnam, General Creighton Abrams, during his term as Army chief of staff, deliberately so structured the Army Reserve and National Guard with respect to the Regular Army that it would literally be impossible to go to war without calling up the citizen soldiers. See Lewis Sorley, "Creighton Abrams and Active-Reserve Integration in Wartime," *Parameters* 21:2 (Summer 1991), 35-50.

20. Discussion of the Division Restructuring Study and Army 86 organization is drawn from John L. Romjue, *A History of Army 86* (Ft. Monroe, Va.: U.S. Army Training and Doctrine Command, 1982), 2 vols.

21. Complete recommendations are in *Division Restructuring Study* (Ft. Monroe, Va.: U.S. Army Training and Doctrine Command, 1977).

22. The rationale for personal decisions relating to the Division 86 proposal is outlined in *Report of the Secretary of Defense Caspar W. Weinberger to the Congress on the FY 1984 Budget, FY 1985 Authorization Request and FY 1984-88 Defense Programs* (Washington, D.C.: U.S. Government Printing Office, 1 February 1983).

23. Infantry Division 86, Corps 86, Echelons Above Corps 86.

24. See *The Army of Excellence Report* (Ft. Leavenworth, Kans.: U.S. Army Combined Arms Combat Development Activity Force Design Directorate, 1 October 1984), 3 vols.

25. Critiques from within the Army, such as Arthur S. Collins, Jr., *Common Sense Training: A Working Philosophy for Leaders* (San Rafael, Calif.: Presidio Press, 1978), spurred changes to training methods.

26. TRADOC Regulation 350-7, *Systems Approach to Training*, discusses the design of Army training; Field Manual 25-100, *Training the Force*, outlines the principles of all Army training. In October 1990, Field Manual 25-101, *Battle-Focused Training*, applied those principles to battalions and smaller organizations.

27. Major studies include: [OPMS Task Group], *Review of Army Officer Educational System* (Washington, D.C.: HQDA, 3 vols., 1 December 1971), known as the "Norris Report"; [TRADOC OPMS Task Group], *Education of Army Officers Under the Officer Personnel Management System* (Ft. Monroe, Va.: U.S. Army Training and Doctrine Command, 2 vols., 14 March 1975); [Study Group for the Review of Education and Training for Officers], *Review of Education and Training for Officers (RETO)* (Washington, D.C.: HQDA, 5 vols., 30 June 1978); and [Study Group for the Chief of Staff, Army], *Professional Development of Officers Study Final Report* (Washington, D.C.: HQDA, 6 vols., February 1985). For a summary, refer to [Command Information Division, Office of the Chief of Public Affairs], *Report to the Officer Corps: Results of the Professional Development of Officers Study Surveys* (Washington, D.C.: HQDA, April 1985); and a special issue of *Commanders Call* (DA Pamphlet 360-888), "The Professional Development of Officers Study" (May-June 1985).

28. The Army outlined the skill it expected the officer to develop at each grade in the Military Qualifications Standards, the product of a continuing series of study groups. STP 21-I-MQS, *Military Qualification Standards I: Manual of Common Tasks (Precommissioning Requirements)* (Washington, D.C.: HQDA, January 1991, but available in draft throughout 1990).

29. Army Regulation 351-1, *Individual Military Education and Training*, outlines the structure of the Army's formal schools; for the scope of resident training, see Department of the Army Pamphlet 351-4, *Army Formal Schools Catalog*.

30. DA Pamphlet 600-25, *U.S. Army Noncommissioned Officer Professional Development Guide* (Washington, D.C.: HQDA, 31 April 1987).

31. Daniel P. Bolger, *Dragons at War: 2-34 Infantry in the Mojave*. (Novato, Calif.: Presidio Press, 1986), depicts the realism of NTC training. *Army Focus* (Washington, D.C.: HQDA, September 1990), p.32.
32. For evidence of progress, refer to the *Department of the Army Historical Summary* (Washington, D.C.: Center of Military History, U.S. Army, annually).
33. For a general discussion of the personal situation emerging from the end of the Vietnam War, consult "A Study of Strategic Lessons Learned in Vietnam," volume 7, *The Soldier* (McLean, Va.: The BDM Corporation, 11 April 1980), chapters 1 and 4.
34. Speech, General Maxwell R. Thurman, to George Washington Chapter, AUSA, 26 June 1991, printed in substance as "Today's Victories and Tomorrow's Army," AUSA Landpower Essay Series No. 91-3, July 1991; and *Department of the Army Historical Summary* (Washington, D.C.: Center of Military History, U.S. Army, annually), sampling fiscal years 1972, 1976, 1982 and 1986.
35. Various sections of *Army Focus* (September 1990) consider these questions. Especially see "National Security Environment," pp. 5-14.
36. Army Chief of Staff General Carl E. Vuono pointed out the uncertainties of the future and made a bid for the Army as the nation's reaction force in a speech entitled "The United States Army: A Strategic Force for the 1990s and Beyond," Army Speech File Service (February 1990). Information Paper, Subj: Army 2000 Team, DACS-ZB-Q, 7 August 1990. CMH file.
37. Memorandum, U.S. Army Concepts Analysis Agency, for Deputy Chief of Staff for Operations and Plans, Department of the Army, Subj: CPX HOMEWARD BOUND, 6 August 1990. CMH file.
38. Memorandum for Commander/Chief of the United States Army Center of Military History, Subj: Selcom Meeting, 10 July 1990, 11 July 1990. CMH file. For details on the Task Force Smith debacle, refer to Roy E. Appleman, *South to the Naktong, North to the Yalu (June-November 1950) (United States Army in the Korean War Series)* (Washington, D.C.: USGPO, 1961), chapter 6.
39. CMH Fact Sheet, Subj: U.S. Army Operation URGENT FURY Statistics, 9 April 1991. CMH file.
40. Various recent publications discuss URGENT FURY and JUST CAUSE, but by far the best, most accurate and most analytic studies are those authored at the Center of Military History, but which remain unpublished or classified. See Bruce R. Pirnie, *Operation Urgent Fury: The U.S. Army in Joint Operations* (Washington, D.C.: U.S. Army Center of Military History, 1987); Edgar F. Raines, Jr., "The Rucksack War: U.S. Army Operational Logistics in Grenada, October-December 1983" (Washington, D.C.:

U.S. Army Center of Military History unpublished MS, 1989); and Theresa Kraus, "The Army Staff and Operation Just Cause" (Washington, D.C.: U.S. Army Center of Military History unpublished MS, 7 December 1990). The broadest survey of the era, although one that hews very much to orthodox judgments about Army performance in these skirmishes, is Daniel P. Bolger, *Americans at War, An Era of Violent Peace* (Novato, Calif.: Presidio Press, 1988). The best published work on Grenada, although still to be used with care, is Mark Adkin, *Urgent Fury: The Battle for Grenada* (Lexington, Mass.: Lexington Books, 1989).

41. For a summary, see Theresa Kraus, "DOD Reorganization and the Army Staff" (U.S. Army Center of Military History typescript, 1990). A discussion of earlier attempts at reorganization is Edgar F. Raines, Jr., and David R. Campbell, *The Army and the Joint Chiefs of Staff: Evolution of Army Ideas on the Command, Control and Coordination of the U.S. Armed Forces, 1942-1985* (Washington, D.C.: U.S. Army Center of Military History, 1986).

42. *Army Focus* (September 1990), p. 23. Discussions between the Army and the Air Force on cooperation had been going on for years. For a summary, see Richard G. Davis, *The 31 Initiatives: A Study in Army-Air Force Cooperation* (Washington, D.C.: Office of Air Force History, 1987).

43. The limited actual combat in Grenada and Panama did not rigorously test the capabilities of the various systems Army units used in those actions. In Panama, for example, eleven AH-64A aircraft flew a total of 246 combat hours, of which 138 were at night. Other weapons and communications systems were similarly unproven. A General Accounting Office analysis of hardware employment in Grenada (URGENT FURY), Lebanon, Libya (ELDORADO CANYON) and deployments to the Persian Gulf (EARNEST WILL) showed "significant problems" with joint communications equipment and several categories of precision-guided munitions. The report rated utility helicopters as "effective." [United States General Accounting Office] *U.S. Weapons: The Low-Intensity Threat is not Necessarily a Low-Technology Threat* (USGAO/PEMD-90-13, Report to the Chairman, Committee on Government Operations, House of Representatives, March 1990), appendix II.

44. Such discussions began as soon as the possibility of war arose. The best articulated warnings about the dangers of a ground war came from analyst Edward Luttwak in various television interviews, a point that he and others stressed as soon as the virtually unopposed air campaign unfolded. Many articles in the public press sounded themes of doubt. Typical of the genre: Gary Hart, "The Military's New Myths," *New York Times* (30 January 1991); "Intimations of a Long War," *Washington Post* (25 January 1991); "M1A1 will get stern test from T-72," *Washington Times* (24 January 1991); and "Westmoreland says war could last a year," *Ft. Worth Star-Telegram* (23 January 1991).

45. R. R. Palmer, "Mobilization of the Ground Army" (Washington, D.C.: Historical Section - Army Ground Forces, Study No. 4, 1946), p. 42.

46. Speech, Army Chief of Staff Gen. Gordon R. Sullivan, to 113th General Conference of the National Guard Association of the United States, Honolulu, Hawaii, 4 September 1991.