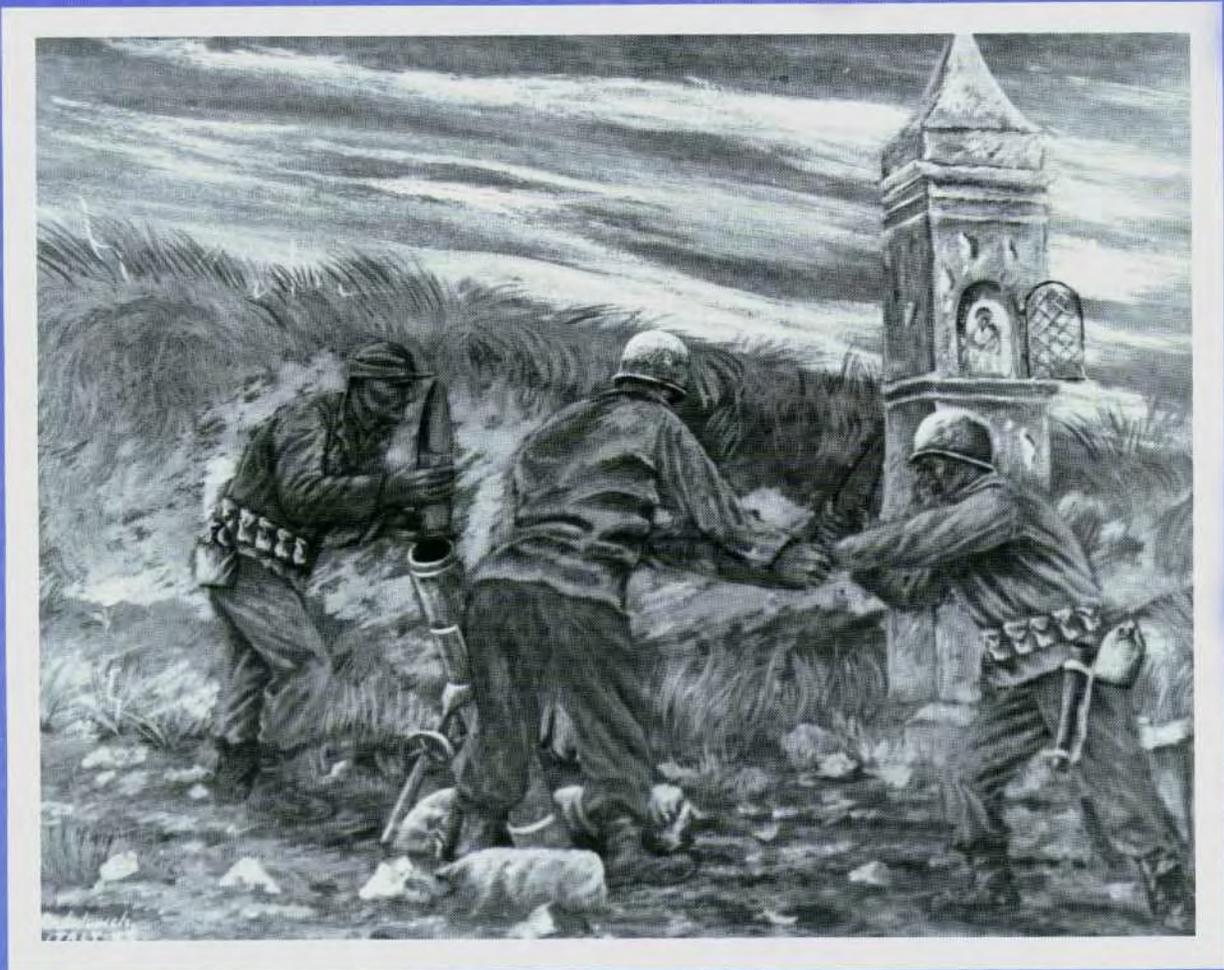


Infantry



Infantry

May-June 1992

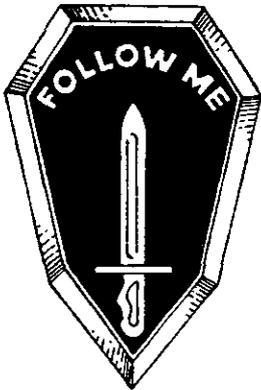
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- 23 COMMANDING A LIGHT INFANTRY HEADQUARTERS COMPANY**
Captain Christopher M. Holden
- 28 ENVIRONMENTAL INFLUENCES ON DESERT OPERATIONS**
Colonel Robert H. Clegg

DEPARTMENTS

- 1 COMMANDANT'S NOTE**
- 3 LETTERS**
- 5 INFANTRY NEWS**
- 9 PROFESSIONAL FORUM**
- 9 INTERVIEW: The Reshaping of an Army**
- 13 OPERATION DESERT STORM: Armored Brigade in Combat**
Lieutenant Colonel G. Chesley Harris
- 19 THE SOLDIER'S LOAD**
Lieutenant Scott C. Porter
- 35 TRAINING NOTES**
- 35 FIRE SUPPORT: Wedge Formation in DESERT STORM**
Captain Ronald A. Hoskinson
- 38 COMBAT LIFESAVER TRAINING**
Lieutenant Kyle C. Campbell
- 40 MORTAR EMPLOYMENT IN KOREA**
Lieutenant Chadwick W. Storie
- 43 SCOUTS: Engagement and Risk Assessment Criteria**
Captain Kevin J. Dougherty
- 45 TRAINING MANAGEMENT TIPS**
Captain David H. Johnson
- 48 OFFICERS CAREER NOTES**
- 49 BOOK REVIEWS**

FRONT COVER: Chemical Mortarmen, Italy 1945
By Savo Radulovic

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Commandant's NOTE

MAJOR GENERAL JERRY A. WHITE Chief of Infantry

OWNING THE NIGHT

An Iraqi commander said after DESERT STORM, "When you killed my tanks before I could see you, I could not fight." And a U.S. commander said, "We enjoyed a 2,000-meter stand-off advantage against the Iraqis; they could see only 500 meters with their infrared, and we could acquire them at 2,500 meters."

These comments dramatically illustrate that U.S. forces did indeed "own the night" during operation DESERT STORM. The ability to see without being seen was a significant factor in the swift and decisive victory.

The technological advantage our forces enjoyed in Southwest Asia is the culmination of an aggressive research and development program. Although that program has produced gratifying success on a modern battlefield, we cannot afford to rest on our laurels.

We have developed and maintained an unprecedented lead in night fighting technology for both armored and aerial operations, but we have not yet exploited the technology that would give our dismounted soldiers and leaders the same capability. The inherent challenge is to fight as effectively at night as we do during the day. Dismounted Infantrymen must be able to identify their position on the ground at all times, thus enabling commanders to maintain positive command and control. We must meet these challenges both through training and through technology.

Although most units are already emphasizing night training, if we are truly going to own the night, we must conduct tough and realistic night training to

standard, under all weather conditions, and on all types of terrain.

A specific training concern that is related to night fighting and requires special emphasis is the prevention of fratricide. Although this problem also exists during the day, it is worse at night because weapon ranges can significantly exceed the shooter's ability to identify his target. Until a passive, covert identification technology can be developed, some of the most effective measures for preventing fratricide are situational awareness, enhanced individual and unit discipline, positive position identification, and the selection of recognizable and identifiable boundaries.

Especially important during night operations is the ability to navigate accurately. In Southwest Asia, the global positioning system (GPS) receivers proved their value to small-unit movement at night and during periods of limited visibility. Soon (FY 1993), the GPS receivers with dismounted forces will be smaller and lighter and will be accurate to 15 meters or less and eventually will be integrated into computer and radio systems.

The proliferation of laser technology warrants increased training emphasis on conducting operations in a laser environment. Lasers are particularly effective at night because they degrade night vision equipment and seriously affect eyes that have adjusted to night vision devices. Unprepared and untrained soldiers can suffer both physically and psychologically from the effects of laser weapons. Effective training can meet many of the challenges associated with a laser intensive environment and, at the same time, reduce the danger of fratricide.

It is imperative that we field state-of-the-art technology and do it faster than we have in the past—especially to the units that are expected to be the first to fight. The night vision capability for the dismounted infantryman is an excellent example of technology available now, or in the very near future, that could greatly increase the lethality and survivability of our soldiers.

Several Infantry School initiatives are focused on providing the dismounted infantryman with state-of-the-art equipment. For example, the Soldier Enhancement Program (SEP), which can quickly evaluate and field non-developmental (off-the-shelf) soldier items, includes five items of equipment relating to night fighting:

- The night sight bracket for the AT-4, which will allow a gunner to use the night sight from his assigned weapon on an AT-4.
- The AN/PVS-7 flip-up/down bracket, which will allow the wearer to flip his goggles up when he encounters bright light and down again as required.
- A target pointer that will allow a squad leader to designate targets for members of his squad to engage using their night vision devices.
- A common rail mount that will allow our current night sights to be installed on the new M16A3 rifle and the M4A1 carbine.
- A sniper night sight for the M24 sniper rifle that will give snipers equal capability day and night.

All of the night fighting equipment in this program will be in the field for evaluation before the end of this calendar year and should be totally fielded by 1995. If these items were to follow the normal acquisition process rather than SEP, the first fielding would be five to seven years from now and full fielding could be three to five years after that.

Another item that is not part of SEP, the AN/PAQ-4B improved aiming light, is being procured now for distribution to the field. This aiming light will be

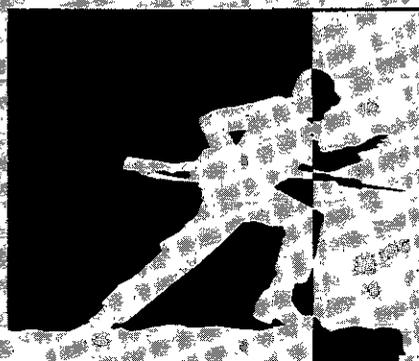
lighter and smaller than its predecessor, the AN/PAQ-4A, and will have a range limited only by the gunner's ability to see the target.

In the long term, the Infantry School is developing the thermal weapon sight for small arms weapons. By FY 1996, this initiative will give soldiers a day/night capability that can operate through battlefield obscurants and be less susceptible to countermeasures than the image intensification devices now in use. All thermal weapon sights will have a capability to the full range of the individual or crew-served weapon.

With increased emphasis on night fighting, communications will become extremely important, especially at the squad and platoon level. Arm-and-hand signals and voice commands are certainly less effective at night and during periods of limited visibility. To fill this requirement, the AN/PRC-126—a lightweight, handheld, short-range radio—has been distributed to the field, except for units in Europe, which will receive their radios in FY 1993. In the long term, we plan to upgrade this radio to include a dual band, an increase in range, and selectable high/low power.

In addition to providing our infantrymen the best available night vision equipment, another effective method of maintaining the edge in owning the night is to degrade the enemy's ability to use his own night devices. The laser countermeasure system (LCMS) and the combat protection system (Stingray) have been developed for this purpose. These devices will give us the edge we need to locate and disrupt enemy optics and protect our forces in future night operations.

We are working hard to give our soldiers the best night fighting equipment and to develop and field that equipment faster. With this effort, coupled with increased night training, we can ensure that the U.S. Infantryman will indeed own the night.



INFANTRY LETTERS



SOLVING THE ITV PROBLEM

The M901 improved TOW vehicle (ITV), once the mainstay of the Central European defense, has fallen on hard times. This antiarmor system failed to see much action in the Persian Gulf war, primarily because VII Corps deployed to Saudi Arabia without its complement of ITVs. Given the Corps' imminent offensive role, that decision appears sound. The ITV does not move as rapidly as the Abrams-Bradley combined arms team and could well have slowed the momentum of offensive operations.

Last fall, the U.S. Army decided to reduce operating costs in the out-years by washing the ITV and other older systems out of the inventory before 1994. Unfortunately, though, the Army also decided recently to defer procurement of the new line-of-sight, antitank (LOSAT) weapon system, and this could significantly reduce the antitank capability of mechanized infantry battalions until a new system is fielded.

The current downsizing of the Army offers the infantry community some options to consider in solving this problem:

- M3A2 cavalry fighting vehicles (CFVs) made available from deactivated heavy forces could replace ITVs in those mechanized infantry battalions that are programmed to remain on active duty. Like the ITV, the CFV carries 12 TOW missiles and provides mobility and armor protection comparable to those of the Bradley fighting vehicle. This option would also preserve Echo Company space authorizations until LOSAT can be fielded.

- Separate ITV-equipped antitank battalions (up to four companies, 48 launchers) could be organized in I Corps and XVIII Airborne Corps to reinforce light divisions, pending deployment of the armored gun system

(AGS). ITVs have gunner-under-armor survivability and twice the stowed missiles of the TOW-equipped high mobility multipurpose wheeled vehicle (HMMWV). To alleviate the logistical burden on supported divisions, these battalions would have their own direct support maintenance, track recovery, and missile resupply teams. The best ITVs culled from all available assets could be used to equip these battalions.

- The reduced density of TOW launchers in active forces provides an opportunity to improve gunner and assistant gunner proficiency by increasing the number of live missiles fired in annual training. The Army still has a large stockpile of older, unimproved BGM-71 TOW missiles that are no longer considered effective against Soviet-developed improved armor and explosive reactive armor.

In summary, it may be possible to solve the ITV problem while benefitting both heavy and light forces.

RICHARD K. FICKETT
Annandale, Virginia

PREVENTING FRIENDLY CASUALTIES

During Operation DESERT SHIELD and DESERT STORM, the 3d Battalion, 7th Infantry, 24th Infantry Division, developed and used a number of techniques designed to prevent friendly casualties. These techniques were the result of many hours of discussion by many staff members; other officers and soldiers contributed to the development of the battalion's tactical SOP. As commander of Company D at the time, I would like to share some of these techniques.

Because of the lack of a linear battlefield in AirLand Battle doctrine, it is

often difficult to tell friend from foe, particularly during limited visibility. A leader must realize that combat is fast-paced and chaotic and that other units may be misoriented or performing missions he does not yet know about. If his soldiers cannot positively identify a target, they simply do not engage that target until it is identified or shoots at them.

A number of techniques are available to help a commander control direct fires. First, leaders should designate sectors of fire and ensure that each unit fires only within its own sector. If the soldiers in a subordinate unit positively identify a target and can engage it without endangering a friendly unit, they should do so.

On the basis of the sector of fire and the position of his subordinate units, the leader can designate a weapon control status (WCS)—either *free*, *tight*, or *hold*—directed to platoon and squad level.

WCS *free* means the unit can engage any target not positively identified as friendly. This status is used when the unit is the lead element during movement and no friendly units are to its front.

WCS *tight* allows a unit to engage any positively identified enemy target at will, while WCS *hold* allows a unit to fire only in self-defense. *Tight* and *hold* are used when friendly units are in the unit's area of operation.

When a unit does identify a target, the platoon's designated shooter engages initially. A designated shooter is the platoon's best shot and the one who confirms the range to the target for the rest of the platoon. Once the target is acquired, the rest of the platoon engages it until the target either surrenders or is destroyed.

The designated shooter can mark the target location with the Bradley's 25mm

HEI-T (high explosive incendiary-tracer), with 5.56mm tracer, or with M203 HE illumination rounds—basically, anything that allows the platoon to engage the target quickly.

Friendly casualties can also be caused by friendly munitions. Air Force cluster bomb units (CBUs) and artillery dual-purpose improved conventional munitions (DPICMs), for example, do have a dud rate, and leaders must be aware that they risk casualties when they assault an objective on which these type munitions have been fired.

There are several passive techniques leaders can use to improve friendly identification and reduce the probability of friendly casualties. VS-17 panels, reflective tape, chemical lights, and battery-operated infrared lights are all available to help with friendly identification. Whatever technique is chosen, redundancy must be used to prevent friendly casualties.

Finally, leaders must not send units out without alerting adjacent units one last time. One technique is to do a net call on the battalion command net to remind everyone that a patrol is either outbound or inbound. Enough time should be allowed for the warning to be disseminated to all adjacent units.

Friendly casualties will continue to haunt us, but with proper training and coordination, they can be reduced significantly.

EDWIN J. KUSTER, JR.
CPT, Infantry
Little Rock, Arkansas

EXPERIENCE AT BROWN 1

Decisions made in combat can carry far more weight than those made during peacetime. For those of us who saw combat for the first time during Operation DESERT STORM, the effect of even our most fleeting decisions soon became clear.

As dawn broke on the morning of 25 February, my battalion—the 2d Battalion, 18th Infantry—had been moving unopposed through Iraq for nearly 16 hours. To my relief, we had

lost no tracks due to mechanical breakdown or any other mishap; our greatest threat had been the foul weather and the jagged rocks that plagued our route of march. That morning, we were to seize Objective Brown 1, the first of our march objectives leading to the Euphrates River Valley. Intelligence reports had told us that small-scale enemy engineer activities were being conducted in the area. But the intelligence updates we had received the previous night from divisional air cavalry units and ground cavalry to our front indicated that no enemy troops were in the Brown 1 area.

As we approached the objective area, my company, Company E, was on the battalion's right flank where we were to sweep around and form a hasty perimeter defense to the north, while the rest of the task force defended to the east, south, and west. As expected, we encountered no enemy fire moving onto the objective. But as my company moved to position in the north, I heard the Company A commander on the battalion radio saying that he was taking multiple prisoners. Sure enough, when I looked in his direction I saw enemy soldiers with raised hands coming out of holes and the few buildings left standing on the objective.

Contact with the enemy had been made. Instantly, one of my platoon leaders reported Iraqi soldiers in front of his position. The Iraqis were about 1,000 meters to the north and running away. Through my binoculars, I could see them clearly, carrying AK assault rifles and using terrain and foliage to mask their escape. The platoon leader wanted permission to open fire with MK-19 grenade launchers, which could easily reach the enemy at that range. I was hesitant since the battalion still had not received any fire and had yet to fire the first shots in anger. I reported the situation to battalion. My battalion commander was near our position and came over for a look. When he arrived, the Iraqis were difficult to see, as they had run into a shallow draw thick with foliage. He made the decision not to engage the fleeing Iraqis and to carry on with our assigned mission.

Even in hindsight, I am certain this was the correct decision, based on the facts at hand. We later continued the attack, reached the Euphrates River and left Brown 1 far behind. As the war ended, we heard a report that an Army major involved in the logistical resupply of the forward units had been killed by a sniper near Objective Brown 1. I also learned that he had been an ROTC instructor and had taught my company executive officer in college. I have often wondered whether the soldiers we had allowed to escape had anything to do with the major's death. I probably will never know. But I learned an important lesson—that even the smallest, quickest decisions in combat can have far-reaching consequences.

THOMAS E. BERON
CPT, Infantry
Washington, D.C.

ARMY SCIENCE CONFERENCE

The 18th Army Science Conference will be held at the Hyatt Orlando in Orlando, Florida, 22-25 June 1992. This biennial event is intended to provide a forum for the presentation, discussion, and recognition of significant accomplishments by U.S. Army scientists and engineers in their efforts to support the combat soldier of tomorrow.

For further information, anyone who is interested may write to Army Science Conference, 4031 Colonel Glenn Highway, Dayton, OH 45431-1600, or call (513) 426-8530.

VICKIE E. DOYLE



INFANTRY NEWS



THE MORTAR MASTER PLAN, the newest in a series of Infantry School plans for charting future infantry systems, focuses on the present capabilities and benefits of mortar systems and on future mortar requirements. The plan emphasizes system description, structure and organization, threat, doctrine, training, analysis of current and future systems, and requirements and priorities for future systems, including fielding dates.

The foundation of the master plan is an analysis to determine the way current and future systems benefit AirLand Battle operations. This analysis will consider the contribution of the 120mm mortar to the mechanized infantry force to validate its benefits as the only organic indirect fire asset available to the maneuver commander. The analysis will also include the contribution of the towed 120mm mortar to the light forces and will consider the contribution of 60mm and 81mm mortars.

Conventional munitions will be studied to validate suppressive effects. The turreted mortar and "smart" munition enhancements are a part of the continuing analysis.

The Mortar Master Plan is scheduled for release in September 1992.

THE ENHANCED MORTAR FIRE Control System (EMFCS) is being developed to replace the M2 aiming circle in laying mortars and the aiming stakes used as a reference point for each mortar. The EMFCS will significantly increase survivability, lethality, and responsiveness through the use of four components:

- The global positioning device (GPS) will enable a mortar element to position accurately to within 15 meters. Currently, location is a function of the leader's ability to determine his location accurately by using terrain association

and a map.

- The north-finding module, which is a gyro, will replace the M-2 aiming circle, which is manually manipulated, and will determine the mounting azimuth to within one mil in two minutes.

- The collimator, which is used by the artillery, is a reference point in the immediate vicinity of the mortar system; it does not require emplacement at the procedurally correct distances of 50 and 100 meters.

- The digital compass, located at the squad leader and driver positions, helps the mortar crew when it is moving into position. Coupled with the global positioning device, it can be an excellent navigation tool.

The current mortar ballistic computer (MBC) is used to compute firing data but with the software modified to generate data that is unique to each weapon. The MBC is likely to remain at the fire direction center.

In recent concept evaluation tests, the times required to emplace the mortars and fire rounds down range were reduced by half, and with increased accuracy. The benefits of the system are expected to be more dramatic during limited visibility operations—the crews never have to dismount.

The EMFCS has been developed primarily for application to mechanized mortars, but a system for the 81mm mortar is also being developed.

M249 MODIFICATION KITS continue to be issued for the upgrade of machineguns that have already been fielded. A modification kit has a new buttstock that incorporates a hydro-pneumatic buffer, an improved gas system, a barrel heat shield, and a fold-away barrel change handle. The modification kit changes will also be incorporated into all the M249s produced in

the future.

In addition, steps are being taken to procure and issue a spare barrel, a barrel bag, and an extra heat shield for each M249 already in the field. These three items will also accompany the fielding of all future M249s in both their squad automatic weapon and machinegun roles.

THE AN/PVS-6 MINI EYESAFE laser infrared observation set (MELIOS) laser rangefinder will be fielded to infantry units beginning in mid-1993. The AN/PVS-6 is lightweight, battery-powered, and can be either handheld or tripod-mounted. It will replace the non-eyesafe AN/GVS-5 handheld laser rangefinder that infantry units now have.

The AN/PVS-6 weighs less than four pounds and can range targets out to about six miles. A solid-state electronic digital compass that is to be tested later this year will allow an operator to measure the vertical angle and azimuth to target. The operator can choose to receive a range reading or an azimuth or both.

THE LIGHTWEIGHT CHEMICAL biological protective garment (LCBPG) was initiated by the Infantry School as a supplement to the current battledress overgarment (BDO). The need was established for an overgarment that would provide protection from liquid and vapor hazards without causing excessive heat stress on the soldier.

The original proposed basis of issue was one suit for each light infantryman. Then the popularity of the lightweight suit grew within the Army community, and other services also wanted a lighter weight overgarment. In a joint effort with the Chemical School, the original statement of need was modified to reflect the following requirements for

the garment:

- Provide at least six hours of protection from 10 grams of liquid agent per square meter of clothing after seven days of continuous wear.
- Weigh 30 to 50 percent less than the BDO.
- Have a package volume of no more than 300 cubic inches.
- Permit donning or doffing in times equal to or less than those of the BDO.
- Provide 20 percent (preferably 30 percent) less heat stress at 90 degrees Fahrenheit than the BDO.

After several candidate suits from various countries were evaluated, the British Mark IV was identified as an initial candidate to undergo an extensive test program. Wear testing was conducted at Fort Drum, New York; Fort Benning, Georgia; and Fort Hood, Texas; and in Hawaii. Chemical agent challenge testing began at Dugway Proving Ground, Utah, and is now under way at Battelle Laboratories in Columbus, Ohio.

To date, a variety of systems have been considered, but none has met the requirements.

THE M40 PROTECTIVE MASK was first fielded at the U.S. Army Chemical School in December 1991, and is expected to go next to chemical depots and surety sites, followed by designated field units.

The M40 mask provides many new features that its predecessor, the M17A2, did not have. These features include a silicone rubber facepiece with improved periphery, a binocular eye lens system, side voicemitters, drink tube, clear and tinted outserts, and a filter canister with NATO thread standards.

On the M42 mask for combat vehicle crewmen, the canister is attached to the end of a hose and has an adaptor for connection to the gas particulate filter unit. The M42 has a built-in microphone for wire communication.

Both masks are issued with a butyl-coated fabric hood that protects the facepiece and the head and neck areas.

Additional benefits of the M40 protective mask are the following:

- The silicone construction provides greater comfort and fits better.
- A side-mounted, screw-on filter canister makes changing filters easier. The M40 series filter can be mounted on either the left or the right side,

whichever is easier for the soldier when firing his personal weapon.

- Larger lenses provide a greater field of vision.

Further improvements are already on the drawing board: quick-doff hood/second skin; laser/ballistic protection outserts; canister interoperability; and a communication system that will facilitate the installation of a microphone in any mask.

The M40 and M42 protective masks will be issued on a one-for-one exchange for the M17 and M25 series.

THE NAVSTAR GLOBAL POSITIONING System (GPS) is designed to give worldwide terrain location and navigation information to users of all services. The U.S. Army Signal School is proponent for all Army GPS user equipment, but infantrymen are among the largest users.

The NAVSTAR GPS program consists of three major segments: the control segment, the space segment, and the constellation segment.

The control segment tracks satellites with a master station to determine and maintain accuracy. An upload station

BRADLEY CORNER

THE BRADLEY FIGHTING vehicle and its weapon systems thoroughly proved its combat capability during Operation DESERT STORM, and its performance was beyond our greatest expectations.

Eight years ago when the Bradley was fielded, we at the Infantry School began the *crawl, walk, run* technique of developing our soldiers' knowledge of the system and their skill in employing it. Initially, we focused on individual and crew skills. Today, we are in the *run* stage, and the primary focus is on platoon gunnery, Bradley Table (BT) XII. This approach supports the Bradley's two most important missions: to provide mobile, protected transport to get infantrymen to the critical point on the battlefield, and

to provide fires to support the infantrymen when they fight dismounted.

BT XII measures the ability of a platoon's mounted crews and dismounted infantry to execute a tactical operation while achieving specified gunnery standards. This table is the culminating event in our gunnery training strategy, and all our efforts should be focused on it. It is the combination of the dismounted infantry and the supporting vehicle crew that makes a Bradley platoon so deadly. The commander must instill in all his leaders the idea that platoon qualification is the ultimate training goal, and he must tailor the training sources with platoon qualification in mind.

Although Field Manual 23-1 estab-

lishes the guidelines and requirements of BT XII, the commander has considerable influence and flexibility in conducting the event. On the basis of his unit's METL (mission essential task list) and his command guidance, he and the S-3 determine which ARTEP 7-8 MTP (mission training plan) operation will be evaluated. A scenario is developed that encompasses both maneuver and gunnery tasks based on the resources available and the tasks to be trained. The S-3 develops an operations order, the exercise is initiated, and the platoon is evaluated on the way its soldiers fight as a cohesive unit.

For further information, call CPT Stone, Directorate of Training and Doctrine, DSN 835-7210/1418, or commercial (404) 545-7210/1418.

relays data to the satellite constellation and four monitoring stations strategically placed around the world.

The space segment consists of 24 satellites that broadcast position and timing information to users. The satellite constellation continuously sends timing signals to earth. The GPS receiver takes the timing signal from three or four satellites and calculates the coordinates, direction of travel, and elevation.

The satellite constellation is scheduled to reach full operational capability early in 1993. Sixteen satellites are now in orbit and operational. This means there are some gaps in coverage every few hours as one satellite falls below the horizon before another comes into view. These daily times are published monthly and made available by the Army Space Command. About 16 hours of three dimensional coverage are available around the Earth, during which the GPS receives signals from four satellites. This system provides the most accurate navigation information possible.

The Army's user equipment program consists of devices that receive and process information from up to four satellites and then obtain accurate position and velocity measurements. The most common user equipment items in infantry units are the following:

The TRIMPACK Small Lightweight GPS Receiver (SLGR). This is the set most commonly found in ground force operations. More than 9,000 of these are now in the inventory. These receivers weigh about four pounds each and are accurate to within 75 meters under normal operations. The SLGR can be mounted in a vehicle or can be hand-carried by a soldier. This receiver comes with an installation kit that consists of an external antenna mounting bracket and a power cable. The power cable comes with two open-end connectors that allow it to be hooked into any vehicle electrical system with between 6 and 30 volts.

The Magellan "GPS NAV 1000M" SLGR. This receiver weighs about three pounds and is accurate to within 75 meters. These receivers are usually hand carried, because an external power

supply is required for vehicle installation. More than 1,000 are in the inventory.

Other SLGR versions are used by Field Artillery, Special Forces, Air Defense, and Aviation elements.

During Operation DESERT STORM, more than 3,000 GPS receivers were in the hands of the coalition ground forces by the start of the ground war. In the desert, where key terrain features are rare, GPS receivers kept units oriented on their objectives. The increased accuracy of position location information reduced the time required for forces to maneuver from point to point. As way points, or position coordinates, were loaded into a GPS receiver, the set would guide the operator to his next point.

This experience clearly demonstrated the ease of finding points during periods of limited visibility, guiding units to a feasible lane through enemy minefields, and maneuvering through slow-go areas. In addition, the receivers improved fire control systems by providing an accurate base of fire.

The necessary technology is available and being tested to put an electronic digital compass, or a direction-seeking gyroscope, in line with a GPS receiver to give an operator a vehicle heading reference system.

Computer circuit boards are now available to add GPS capability to maneuver control system computers on the battlefield. Circuit boards under this same concept can be embedded in the single channel ground and airborne radio system (SINCGARS).

The GPS receivers are not meant to replace the individual soldier's map, compass, and land navigation skills. He must always excel in his ability to navigate on the battlefield, no matter what technology may be available.

THE RANGERS' 50th ANNIVERSARY celebration is scheduled for 17-19 June 1992 at Fort Benning. The anniversary will commemorate the activation of the 1st Ranger Battalion in June 1942 at Carrickfergus, North Ireland, under the command of Colonel

William O. Darby.

The three-day celebration will include the dedication of the new Ranger Hall of Fame and of a new Ranger wing at the National Infantry Museum, along with ground-breaking ceremonies for the Ranger Memorial on Ranger Field adjacent to Infantry Hall. A parade with Ranger veterans of all wars will be led by the surviving members of Darby's 1st Ranger Battalion.

THE BRANCH AUTOMATION Officer Course trains officers, noncommissioned officers, and civilians in skills that will enable them to apply automation to Army problems and branch-specific needs. The ten-week, three-day course is offered by the Computer Science School at the U.S. Army Signal Center, Fort Gordon, Georgia.

The course is open to commissioned officers, noncommissioned officers in the rank of platoon sergeant and above, and civilians in the grade of GS-7 and above who need a knowledge of automation technology.

Requests for attendance should be submitted through the Army Training Requirements and Resource System (ATRRS) and civilian personnel offices. For information on ATRRS representatives, call the ATRRS help desk at DSN 225-2353/2060. Officers may also call their branch management divisions to request the course as part of temporary duty enroute moves.

THE UNITED STATES ARMY Officer Candidate Alumni Association, Inc., has initiated a campaign to solicit voluntary donations to a special fund dedicated to the maintenance of Wigle Hall, the OCS Hall of Fame, at Fort Benning. Reduced budgets have left the 3d Battalion, 11th Infantry, the OCS training battalion, without enough funds to improve or properly maintain the building.

The OCS Hall of Fame recognizes those graduates of OCS at Fort Benning and The Ground General School, Fort Riley, who have distinguished them-

selves by attaining the rank of colonel, by earning the Medal of Honor, or by achieving success in state or Federal service.

Anyone who wants to participate in this voluntary effort may make a check payable to USAOCAA, mark it "Wigle Hall Fund," and send it to Secretary TUSAOCAA, Inc., P.O. Box 2192, Fort Benning, GA 31905-2192.

Regular membership in the association is open to graduates of any Army OCS program. Associate membership is open to graduates of OCS programs of other services and other persons who support OCS programs. Annual membership dues are \$10 for either regular or associate memberships. Lifetime dues are \$100. Additional information is available from the secretary at the address given above.

THE DISTRIBUTED TRAINING Program (DTP) is intended to modernize institutional training and maintain the Army's technical edge into the next century. By implementing advanced training technologies (computer-based instruction, video tape, and video tele-training), and by distributing lessons to the field, the program will promote training effectiveness and improve student learning. With DTP, individuals can pursue pre-resident, self-development, leader development, and sustainment training at their respective home stations.

Several proponent school courses have been selected as pilots for recon-

figuration and distribution. The courses to be tested using the pre-resident concept include 12 basic noncommissioned officer courses (BNCOCs), four advanced noncommissioned officer courses (ANCOCs), and eight officer advanced courses (OACs). Initially, the pilot courses will consist of resident lessons reconfigured for distribution using printed instructional materials. Later, they will include advanced training technologies to modernize, improve, and enhance resident instruction and distribute courseware to the field.

This program will ensure that all students arrive for resident instruction with a common base of knowledge. This will reduce the frustration and boredom associated with repeating material already mastered by some yet new to others.

DTP is similar to the Army Correspondence Course Program (ACCP) except that the lessons contain material extracted from the resident curricula. Individuals who are already familiar with the distributed subject matter may choose only to review the training materials and take a test to certify their knowledge of it. Students who are less familiar with the course material are advised to follow the study plan and learn the material at their own pace.

When these students arrive for the resident course of instruction, they will have a higher average knowledge of course material. They can then proceed at a rate of instruction that stimulates, motivates, and challenges all the students in the class. DTP will also enable

soldiers to perform their duties more effectively in their units.

The Infantry School will test DTP pilot courses for both ANCOC and IOAC. The pilot test for ANCOC begins with Class 1-93, which is scheduled to report for the course 7 January 1993. The students scheduled to attend this class are to have completed 59 hours of Sergeants Major Academy common core subjects and 22 hours of Infantry branch specific subjects before they arrive at Fort Benning.

The School's pilot course for IOAC will commence with Class 3-93, which is to report on 22 March 1993. Students scheduled to attend these courses will receive a total of about 80 hours of branch specific curriculum materials and will be responsible for knowing the subject matter in these lessons before they arrive at Fort Benning.

The Army Training Support Center at Fort Eustis, Virginia, will mail the material to students 26 weeks before the start of resident instruction to ensure enough time for receipt, completion, return, and scoring.

The distribution of IOAC material will not shorten the resident course. The course will still be 20 weeks long and will require student permanent changes of station.

Further information is available from the Army Distributed Training Office, ATSC, Fort Eustis, VA 23604; DSN 927-2043 or commercial (804) 878-2043.



PROFESSIONAL FORUM



INTERVIEW

The Reshaping of an Army

EDITOR'S NOTE: The following is the text of an interview with General Frederick M. Franks, Jr., Commanding General, Training and Doctrine Command, Headquarters, Fort Monroe, Virginia, conducted by Lieutenant Colonel Colin K. Dunn, Editor of FIELD ARTILLERY. Before the interview, INFANTRY and the other combat arms professional bulletins were given an opportunity to submit questions of interest to their particular branch audiences.

As the Army moves toward a continental U.S.-based contingency force, what capabilities do you see as critical to responding to crises?

General [Gordon R.] Sullivan [Chief of Staff of the Army] is reshaping our Army into a post-Cold War Army and not just a smaller version of our Cold War Army. We are reshaping both intellectually and in our training and leader development programs.

As we move toward a strategic Army, the majority of our forces will be in the United States. But forward presence also will be part of our national military strategy. So we'll deploy from either forward presence or CONUS locations.

With this strategy, rapid mobilization and deployment become increasingly

important. The circumstances under which the Army can deploy are more ambiguous now than they were a few years ago. When we had the certainty of the Cold War contingencies, commanders trained and prepared to win in those particular circumstances.

Now we must be more versatile—mix and match units in tailored force packages, fight battles at the tactical and operational levels, and organize our contingency theater to defeat threats in many scenarios. This versatility is critical, but we've shown such versatility before. A lot of the capabilities we demonstrated in operations such as JUST CAUSE and DESERT SHIELD and STORM will continue to be important for our contingency Army in the future.

What are some of the greatest challenges the Army faces in training for joint operations?

First, we have to base our training on the situations we could face—the circumstances unified commanders need their forces to practice. We must have a relevant set of circumstances or conditions within which the training takes place.

Scenarios are very important in joint operations. So, as we watch scenarios being developed in unified commands,

in our schools, leader development programs, and CTCs [combat training centers], they should be relevant for the U.S. Army now and in the future.

Next, we must capitalize on the significant strengths each service brings to the operation and harmonize them in accordance with emerging joint and Army doctrine. For example, joint special operations at the JRTC [Joint Readiness Training Center, Fort Chaffee, Arkansas] harmonize air-ground fires, both close and deep. As the organic fires of our Army systems reach out farther and farther—MLRS [multiple launch rocket system], cannon artillery, Army tactical missile system [Army TACMS], Apaches—as the ground commander can employ these assets at greater distances, that requires more coordination and more training in joint operations.

How do you see the Army increasing the lethality of our early deploying forces in a contingency operation?

We can increase our lethality in several ways. The most talked-about way is through materiel solutions. Certainly, we'll pursue developing the armored gun system [Armor's lightly armored gun system with a high-velocity cannon, which is transportable by C-130 aircraft], HIMARS [Artillery's high-

mobility artillery rocket system, a lightweight, wheeled version of MLRS], the Javelin [Infantry's one-man operated, fire-and-forget, advanced anti-tank weapon with a 1.25-mile range] and others that give us more lethality on the ground early. Fielding the M119 light howitzer and adding fuel pods to Black Hawks, Apaches, and the CH-47D model of the Chinook, plus the helicopters' capability to be refueled in mid-air, give us lethality options early on. Our aviation now can self-deploy as well as deploy aboard ships and inside strategic aircraft. Again, versatility is key.

Depending on the contingency's circumstances, deployment means and time available, the commander can increase the lethality of his deploying light forces by introducing other types of units early on. He can mix and match his light, special operating and heavy forces to meet that particular threat.

You'll see more mixing and matching in your NTC [National Training Center, Fort Irwin, California] and JRTC rotations as you train on contingency operations. Those CTCs are employing heavy and light forces in operations specifically aimed at developing versatility.

In the joint arena, our sister services are helping us get forces on the ground faster in contingencies. The Navy, for example, is committed to building more fast sea-lift ships in the next few years. So we'll see a dramatic improvement in our forces' ability to deploy by surface means. The Air Force has committed to the C-17. So our strategic transport aircraft capability is improving. Additionally, we can pre-position Army materiel on ships at selected locations.

The materiel, force package and other solutions to increasing our lethality early on are all part of being versatile enough to meet any contingency. What we don't want to do is get locked into inflexible formulas for specific scenarios. Our doctrine should guide us—describe how to *think about* mobilization and deployment—how to think in terms of versatile force mixing and matching in combat, combat support,

and combat service support forces, etc. Using such doctrine, we would be flexible enough to organize and operate in any situation.



“Fires are too important to be left solely to the Artillery.”

As the sponsor of the “Fighting with Fires” initiative being worked by the Field Artillery School, would you explain your notion of the combined arms commander's role in synchronizing operating systems?

My goal—with Major General [Fred F.] Marty, Brigadier General [Tommy R.] Franks [Field Artillery School Commandant and Assistant Commandant, respectively] and the Field Artillery School leading the way—is to ensure the Army makes the most of our increasingly lethal fires.

In what General George S. Patton called the “Musicians of Mars,” the combined arms commander is the “conductor of his orchestra” of operating systems performing on the battlefield. He's responsible for pulling together all the elements of combat power to fight and win. In the tactical battle, major engagements or campaigns, the elements of combat power are the same: firepower, maneuver, protection, and leadership.

The combined arms commander must be as involved in the fires part of his battle as he is in the maneuver part. I want combined arms commanders Army-wide to know how to skillfully maneuver fires, and we accomplish that first in our doctrine and leader development programs and then in training.

And I want those skills honed.

The lethality of our fires has increased significantly. During DESERT STORM, in one-half hour we delivered more fires more effectively than World War II artillery could have delivered in eight hours. So we have extraordinary fires capabilities—and the systems and munitions under development promise even greater lethality.

The maneuver commander must become the *combined arms* commander and fight more than the maneuver battle—know how to fight with fires and make them an integral part of the battle. He must be able to quickly maneuver and mass fires and skillfully employ counterfire.

If the fire support officer [FSO] plans fires as a separate entity—not integrated in the total battle by the combined arms commander—the plan ends up having little relevance to the conduct of the battle. Fires are too important to be left solely to the Artillery.

Fire planning by the FSO is certainly necessary, but the plan has to have an agility built in—an interrelationship with maneuver—to make the maximum contribution to winning.

Planning is one thing, fighting is another. The fire plan can't be “put on automatic” and executed as though the enemy's not going to react to it. He will. In a fight, you've got two minds working on the same problem: the commander's and the enemy's.

How would you rate our ability to synchronize operating systems at the combat training centers (CTCs)?

I was enormously proud of the DESERT STORM commanders' orchestrating capabilities, at least those I observed personally. Their ability to synchronize fires and maneuver was superb. The 1st Infantry Division in the breach, the 1st Armored Division (United Kingdom) with the 142d Field Artillery National Guard from Arkansas and the 1st Cavalry Division in their raids, feints, and demonstrations, the artillery raids and counterfire ambushes with MLRS, were all professional, skillful operations. The 1st and 3d Armored Divisions in their zones of action

against the Iraqis demonstrated their success in employing massed fires. (I define "massed" as the fires of two or more battalions, not batteries.)

We need to continue this awareness of the capabilities of fires, an awareness forged in DESERT STORM. And we need to practice it at the CTCs. I'm encouraged by some recent work at the National Training Center. Both counter-fire and target acquisition are beginning to get the attention they deserve. I also see some encouraging changes at the JRTC, such as the participation of key players, for example ANGLICO [air and naval gunfire liaison company] teams.

We need continued emphasis on getting every player on the combined arms team "on the field" at the CTCs. That way, combined arms commanders can train to synchronize the team.

How do you envision the future CTCs evolving to maintain our Army's warfighting edge?

We've got to ensure our practice fields remain relevant to the circumstances in which the Army finds itself. At one time we trained to fight based on the Cold War world order. Now the playing field has changed, and we've changed our training accordingly.

General Sullivan has directed we conduct contingency operations at both the NTC and JRTC. At the JRTC, you'll see joint operations on a continuing basis and armor-mech, light and special operating forces. You'll see light and armor-mech forces at the NTC. Units now face the threat in a variety of configurations as opposed to one threat. In our BCTPs [battle command training programs] for our divisions and corps, you'll see the same type of changes occurring. We're shifting quickly to post-Cold War warfighting.

But relevancy is key. Our training has to be relevant to the circumstances in which the Army finds itself. We must sustain excellence and relevance in training and leader development.

Current doctrine addresses the commander's intent in his concept for fires and maneuver but in general terms.

What should fire support and maneuver expect from the combined arms commander?

The commander needs to precisely describe the effects he's trying to achieve and where and when he wants them. In simple, straightforward language, he should describe his desired effects in the conduct of the operation, the point of his main effort, a sensing of the speed of the operation and where it needs to be relatively tightly controlled. And depending on the echelon, the commander may have to tell where he chooses to fight the decisive battle over time. If he's the corps commander, he's probably describing two to four days of operations.

But the combined arms commander doesn't come up with his intent in isolation. Before he expresses the intent, either verbally or in the order, there needs to be continual dialogue face-to-face with subordinate commanders and



"The maneuver commander must become the combined arms commander and fight more than the maneuver battle—know how to fight with fires and make them an integral part of the battle."

his staff so he can harmonize his operating systems. He gets advice for his running estimate by talking to subordinate commanders, members of his staff, commanders of fire support and engineer units, and so forth. That's the way to make the combined arms orchestra play.

But when the intent arrives, then it's

the responsibility of the logistician, fire supporter, engineer, etc., to say, "How can I involve my organization to best achieve the desired effects?" For example at the division or higher level, the fire support officer should give the commander some alternatives for task organizing the artillery and weighting the effects of fires to achieve his desired outcome.

How can artillerymen best help commanders synchronize firepower?

The formulations of the intent and plan are a team effort. So the fire supporter needs to take an active role in ensuring that fires are a part of those thought processes. And that happens at all levels—company/team, task force, brigade, etc.

What the combined arms commander doesn't want to do is "sub-optimize" his systems—have each piece of the orchestra playing its own tune. He must optimize his systems at his level. The one thing the commander never wants to run out of is options, and synchronized systems give him options.

Then, the fire support officer should be close to the commander during the fight because one of the first casualties of the fight is usually the plan. The commander has to be prepared to adjust fires and maneuver and the tempo of operations. He may need to shift the point of his main effort.

For the orchestra to continue in harmony, everyone has to have his "head in the game." The fire supporter and commander have got to keep talking back and forth. If the fire support coordinator spots the need for an adjustment before the commander does, he grabs the commander to fix it.

The relationship between the commander and his fire supporter is critical from the company/team to corps levels—in a sense, all the way through the theater level. To promote that relationship Army-wide, we need continuing dialogue in our schools—Forts Knox, Benning, Sill, and Rucker—on integrating fires and maneuver. Integrating the two must be built into our doctrine, leader development programs, and training.

AARs [after-action reviews] at the NTC, JRTC, and in BCTP should look at this relationship during the planning for and conduct of the battle.

The observer-controller or evaluator's question should be: Did the combined arms commander take full advantage of the fires available to him to accomplish his mission?

What impact do you believe future intelligence and fire support systems will have in terms of achieving success on the battlefield without major engagements of maneuver forces?

Most combined arms commanders would tell you that the major intelligence shortcoming in terms of identifying targets is their inability to see over the hill. What they're trying to avoid is unplanned meeting engagements. Friendly reconnaissance out front, either in the defense or the attack, is of utmost importance to commanders. Our ability to see over the hill will be improved, by and large, by the UAV [unmanned aerial vehicle].

We need the ability to rapidly target and deliver fires that contribute to the overall tactical scheme. For example, in Southwest Asia, we were fortunate to have the Pioneer [UAV]. So we flew it and, with a quick-fire capability, spotted and fired on targets in real time. It's the real-time capability we're looking for in delivering fires—not only with cannons, but also with the Army TACMS and MLRS.

As far as fires substituting for maneuver engagements is concerned, you have to watch how you think about that. Fire and maneuver are linked; one contributes to the other.

Of course, it depends on the type of target you're talking about. With MLRS and Army TACMS, you can achieve lethal effects without involving maneuver forces. For example, if you're firing at a SAM [surface-to-air missile] site with Army TACMS, you can probably put it out of business.

How can the combined arms commander make the most of his fire support and aviation assets?

In the factors of METT-T [mission,

enemy, terrain, troops and time available], he looks for those elements of combat power he can rapidly shift from one part of the battlefield to another. I call those "reusable combat assets." Though the commander can usually shift his artillery the quickest, his reusable combat assets also include aviation and close air support.

So the commander formulates his plan to take advantage of the reusable combat power available to him. But a fire plan is just that—a plan. The fire supporter, the aviator, and the Air Force representative must understand that the



"The one thing the commander never wants to run out of is options, and synchronized systems give him options."

commander will have to deviate from the plan to seize opportunities, and rapidly adjust to take advantage of situations as they occur during the fight.

The notion of positive control of indirect fire—as opposed to "silence is consent"—has caused some concern that fires on the battlefield could be less responsive. What are your thoughts on this?

As we saw in DESERT STORM, clearing fires quickly is critical. Certainly that's an area we'll continue to talk about and develop procedures for, especially as our artillery can fire at longer ranges.

We have to clear fires so we know the area we're firing into has no friendly

forces in it. It's an issue of force protection versus the risk you incur in your situation—the commander has to weigh all the factors.

We must start with the base line of an agreed set of tactics, techniques, and procedures for using fires. We've got to establish the right joint coordinating measures. Then we need to practice them in a variety of scenarios—the more practice, the better.

Clearing fires is important in any battle, whether you're clearing close air support, TAC [tactical aircraft], helicopters or cannon, and rocket or missile artillery. It's a difficult challenge, especially on a highly mobile, fluid battlefield, using day and night all-weather systems.

The Army's capstone warfighting doctrinal manual, FM 100-5, Operations, is under revision. How is this manual changing?

The Chief of Staff of the Army has charged TRADOC with leading the Army through this intellectual change to a post-Cold War world by using doctrine as the engine of change. A part of this effort includes revising FM 100-5. Our doctrine isn't broken. But we need to include in it the operational versatility our Army now requires in a post-Cold War era.

FM 100-5 will describe how to think about mobilization and deployment, how to think about employing Army forces in actions short of war, and other intellectual changes we must make—all of which we've done before in some form or other. But the centerpiece of the revised 100-5 will continue to be fighting at the tactical, operational, and strategic levels—guidelines for employing forces, conditioned by the factors of METT-T.

We're engaging not only TRADOC, but also the total Army in developing FM 100-5. The process is as important as the product. If we do the process right, if we have the kind of dialogue we need, we'll accomplish two things. First, we'll inform the Army about the need for change as we change. And second, by the time we publish the manual sometime in 1993, we'll have

(NBC threat, ammunition exchange, crew evacuation, formation, actions on contact), recognition signals, equipment maintenance, soldier care (rest plans, food and water), and the combat lifesaver program.

We all had fears but were too busy to worry. Psychologists talked with soldiers, leaders, and families about detecting and coping with stress and anxiety. Security tightened to protect the kaserne against terrorism. Shots were given, eyeglass prescriptions were verified and filled, wills were revised, and debts were cleared.

Family support groups of wives and friends mobilized to identify families with problems, distribute information, dispel rumors, and learn to help each other more. Partnership units, the German Federal Railroad, local police, and German friends stood ready to help.

On 30 November, the United Nations endorsed the use of any means necessary to remove Iraqi forces from Kuwait. Saddam Hussein had until 15 January 1991 to withdraw.

More than 6,000 wheeled vehicles and almost 2,000 tracked vehicles now moved to seaports. It took more than 200 trains and 180 convoys, then more than 100 planes and 44 ships to ferry our soldiers and equipment to Saudi Arabia. New soldiers arrived to fill critical shortages, and a new brigade commander arrived to find his brigade divided between two continents.

By 4 January the entire brigade was in Saudi Arabia—somewhere. The air deployment of soldiers accelerated because of the availability of reserve aircraft from the United States, but all our equipment would not arrive for three more weeks—well after the air war had started.

Our tasks were extremely complex and resource intensive—assembling units from the various airfields and ports, preparing their equipment and getting it to them, moving them to the desert, establishing camps, training them, and rapidly establishing a coherent defense. Every unit was involved in these operations at the same time, with portions of units spread more than 400 kilometers apart.

At the ports of Damman and Al Jubayl, the unloading of ships continued 24 hours a day. The plan had been for the wheeled vehicles to arrive first, then the combat vehicles, but the arrivals were jumbled and units assembled piecemeal. Several ships, heavily laden, moved too slowly or broke down. Some container ships carrying special equipment and spare parts that were needed early did not arrive until the war had ended. Many containers were never found. We were able to paint only selected vehicles because there was not enough tan paint and not enough time.

Aircraft with soldiers from Europe landed at various airports within hours of ships' arrival at the seaports, then the available equipment and soldiers linked up.

Our home, a temporary holding area eight kilometers north of the port, looked like a refugee camp. A tent city designed for 9,000 soldiers was home at times for more than 12,000. There the soldiers were acclimated, intensive close combat training continued, first aid was rehearsed, and physical training directed. Personal hygiene was rigidly enforced—showers, use of specified toilets, and litter control. Five international telephones served the camp, and long lines of soldiers waited to use them 24 hours a day.

Now the soldiers could see and feel the war—checkpoints with armed guards, SCUD missile attacks, and thousands of military vehicles moving northward. The pace was frenzied—assemble, complete combat checks, and deploy quickly to tactical assembly areas 500 kilometers into the desert. The huge port area was an easy target, and we knew it. Our Abrams tanks were no defense against SCUDs; our defenses were hope and Patriot missiles. As soon as enough of a unit was assembled, usually a company or larger, it moved to our desert defensive locations.

Convoys moved by day with armed escorts and helicopter cover because of the fear of terrorist ambush on the single road northward. Many tracked vehicles were moved by transport, but even the hundreds of transports available could not support the theater-wide com-

mitments. One of our Bradley battalions—more than 100 tracked vehicles—had to drive the 500 kilometers.

Deep in the desert camps, the soldiers felt safer but led Spartan lives. Nothing in any direction but sand, rocks, nomads headed south, and the Kuwaiti border 100 kilometers to the north. Bulldozers pushed up berms around the camp for security and protection. Advance parties erected tents, brought in water and food supplies, and dug latrines. Flies, sand fleas, small rodents, dogs, and camels gathered around our living areas. Hygiene was a major concern, because any soldier who was medically incapacitated would be a major loss and a burden as well.

Then the flood of soldiers and units began to arrive. Daily physical training was enforced to accelerate acclimatization and also to relieve stress. The terrain varied significantly from that in Europe—no trees, infinitely flat land—but it was neither warm nor dry. It rained torrents most of January and February. One or two meters of fine sand and rock covered an impermeable shale rock foundation. After a rain, water stood more than 10 centimeters deep, with the sandy dirt underneath saturated to a sticky goo. The fine sand, like chalk dust, rivaled the mud at a construction site when combined with water, and wheeled vehicles mired to their axles.

The water never stayed long, though, because of the wind and sun, and once vehicle traffic broke through the fragile desert crust, the dust underneath was often intolerable. Noses and ears filled with dust and sand, and blood-shot eyes watered constantly. Dust storms reduced both human vision and normal optics to less than 100 meters visibility.

Although we could normally see four to six kilometers across the flat desert, it was made up of soft sand, non-trafficable rocky regions, drop-offs of one or two meters, and huge depressions. Night fell quickly, and groups that did not have satellite navigation systems had to stop lest they wander aimlessly. For instance, one water team that was four kilometers from camp when night fell traveled 150 kilometers during the

night trying to find us and arrived late the next morning. If not for aerial photography, whole brigades could have hidden or disappeared.

We had the month of January to conduct our final training. Detailed chemical decontamination exercises, mass prisoner processing, obstacle reduction, and rearming or refueling procedures were incorporated into day and night maneuver exercises—company through division.

We had never maneuvered as a brigade, even in Germany. The brigade formation of more than 1,100 vehicles would move in a wedge five kilometers wide and nine kilometers long—providing speed, security, and massed fire-

power (Figure 2). We laid the formation out on a scaled sand table—down to every vehicle and trailer. Since we anticipated conducting most operations at night, every soldier had to know the entire operation, with nothing left to chance.

The support battalion was tailored. Its 500 vehicles, laden with critical food, water, fuel, ammunition, and medical supplies, would travel protected inside the brigade wedge. Armor battalions would be to the flanks, with infantry and artillery forward. Tracked ambulances would travel with each maneuver company.

Casualty treatment and evacuation were major concerns, and we designed

special exercises to rehearse these procedures. Soldiers gave each other intravenous plasma and practiced simulated traumatic amputation procedures—a skill that would later save the lives of two of our Bradley crewmen. Time and distance factors for every action and drill had to be collected and verified for both day and night operations. The plan was simple, but its execution would be very complex.

Terrain models as big as two football fields were scaled to reflect the terrain and enemy positions in our zone of attack. The models were updated daily on the basis of the latest photo imagery on the enemy's occupied revetments and gun-tube orientations. Templates were made for maneuver drills, including locations for artillery illumination and smoke marking rounds for each attack. Vehicle attack speed and artillery times of flight were adjusted.

All the soldiers understood the commander's intent, the objective, the location of all units, as well as checkpoints, codes, recognition signals, vehicle night marking schemes, and drills. Very little was kept from them. From backbriefs and daily battle drills, they understood their mission and had confidence in the plan, their leaders, and their equipment. Soon, though, the reality of war would reduce these detailed plans to rough estimates; nothing ever happened as planned.

When 15 January came and the Iraqis positioned 400,000 soldiers in Kuwait, we knew the war would start soon. At 0300 on 17 January, the duty officer awakened me to say the air war had begun. I stepped outside my tent, hoping to glimpse a piece of it. But it was dark and cold, and nothing moved but the wind.

Here we sat, with only half of our vehicles on hand and few of our critical combat systems. Almost all the support structure was there but with little to protect it. We, the entire VII Corps, lay 100 kilometers south of four to six Iraqi armored formations that could be on us in six hours. In anticipation of a preemptive Iraqi attack down the Wadi Al Batin, all the combat forces in our division were placed under the operational

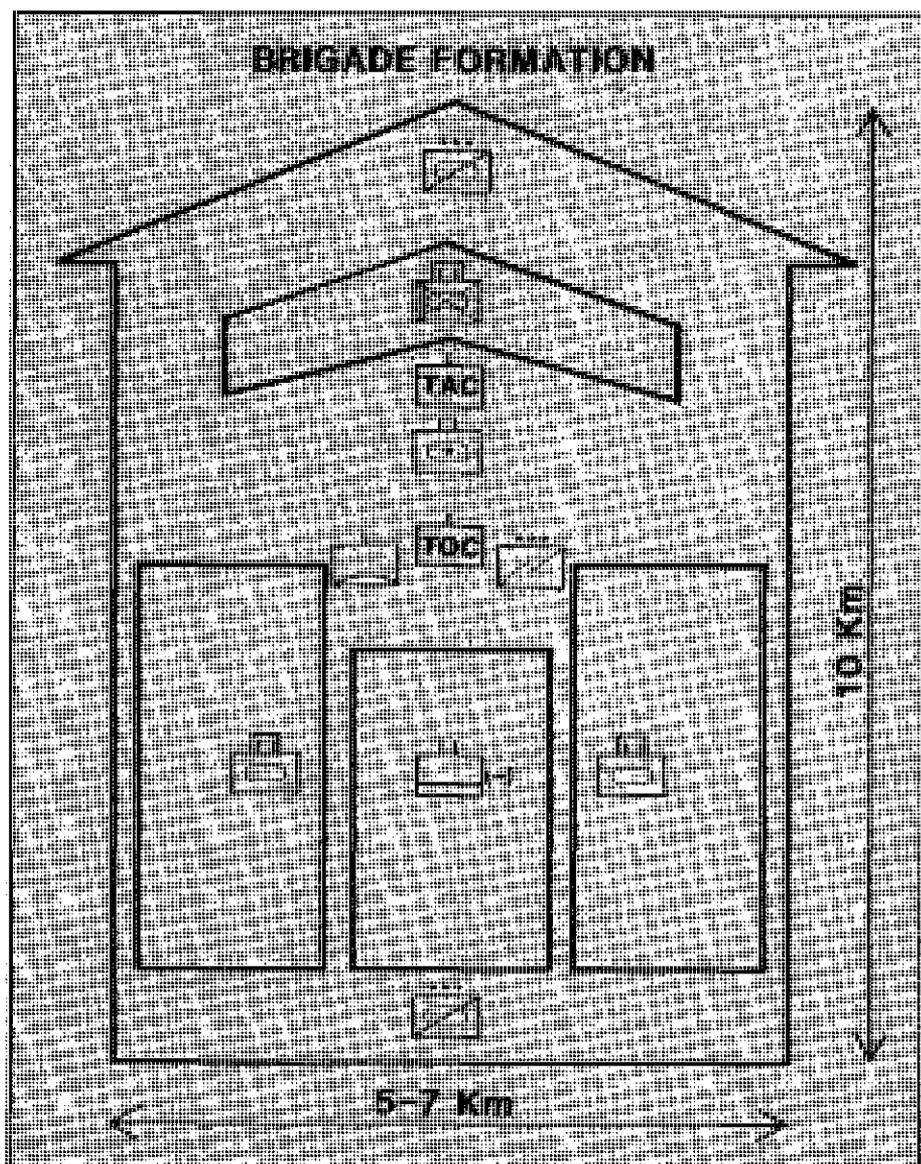


Figure 2

control of our brigade. Our complete brigade headquarters was operational. Full-scale rehearsals and detailed sandtable exercises were conducted daily. The task organization changed as new units arrived from the ports. For three weeks, our brigade remained as the 1st Armored Division's and corps' reserve. With every Iraqi border crossing or major troop movement, we went to full alert. Both soldiers and leaders hardened in the process.

At the desert camp, the problem of nomads in our perimeter increased. They raced about the desert in pick-up trucks, many of them believed to be Iraqi spies. Saudi Bedouins provided unexpected aid: Knowing the land and the other nomads, they quickly reported to us any Kuwaiti or Iraqi Bedouins.

Equipment maintenance took top priority. Many containers with repair parts could not be located, and other parts were in the depots at the seaports. Special lubricants for the high-technology equipment were impossible to find.

Ammunition had deployed on our tanks from Germany, but it had to be exchanged for the combat loads planned for the upcoming engagements. Limited quantities of training ammunition remained for practice in the desert; in the end, we had five rounds per tank, eight per Bradley, and ten per machine-gun for practice. The artillery and attack helicopters would fire precision munitions in combat that they had never fired in training. Drills were refined for the laser designation of targets and joint attacks with the Air Force.

From this tactical assembly area in Saudi Arabia, we finalized plans for war and reinforced the theater deception plan—we would attack directly into Kuwait along the historical invasion routes toward Kuwait City. The Iraqis took the bait and defended accordingly: Protecting Kuwait's southern border were two defensive belts of Iraqi infantry divisions behind multiple complex obstacle belts. To the rear, highly mobile armored brigades and divisions formed the Iraqis' tactical reserve. And to their rear, along the northern border of Kuwait, was the Republican Guard Corps—the operational and strategic



A Bradley fighting vehicle takes up a position at the first border berm between Saudi Arabia and Iraq.

reserves. Deeper to the west were weakly manned supply depots and thin lines of communication, all very vulnerable.

These last few weeks of training were precious. Vehicle maintenance problems were corrected, ammunition exchange completed, and critical weapon qualifications verified. Vehicles that could not operate on the sand were exchanged for all-wheel-drive vehicles.

Days before the attack, the entire XVIII Airborne Corps, followed by the VII Corps—our major headquarters—moved unnoticed hundreds of kilometers westward against the unprotected section of Iraq. For us, this move rehearsed the corps attack plan, further verifying formations and critical time-distance factors. Now in the attack position 30 kilometers south of Iraq, we waited to execute the left hook deep into Iraq and destroy the Republican Guard Corps in northern Kuwait.

At 0400 on 24 February, coalition forces in the east attacked the Iraqi defenses in Kuwait. Their immediate success rippled across the theater, accelerating the ground campaign in the west for the VII Corps. We were not scheduled to attack until 0600 the next day, but at 1000 the division commander directed us to go to Readiness Condition 1 (ready to move on notice) by 1200.

Moments earlier, we had refueled our combat vehicles and sent the fuel trucks off, and they were not scheduled to return for more than six hours. As it was, they would return to an empty camp, collect their equipment, and race to join us deep in Iraq later that night.

As 1200 approached, the brigade battle staff passed current intelligence updates and reviewed the plan of attack with the assembled commanders. The soldiers rapidly donned their NBC protective suits, took their nerve-agent tablets, completed crew checks, and prepared for the attack. At 1200 the brigade attack formation assembled in a sandstorm, with visibility less than 100 meters, and slowly moved northward toward the border. Meanwhile, aircraft attacked deep against the objectives we would assault the next day.

As planned, two battalions of engineer bulldozers had begun reducing the double three-meter berms at the border during the previous night. We arrived to find gaps every 100 to 200 meters across the division's 20-kilometer front. At 1500, with dust swirling, we crossed and moved deep into Iraq, stopping at 2100 to refuel.

This was our most vulnerable period. We had moved 100 kilometers, consuming seven of our 10 hours of on-board fuel. The fuel trucks were racing

to catch us, and air filters were being blown out. We made no enemy contact and had detected few enemy radio transmissions. But we were well within range of enemy fighters, bombers, and helicopters, as well as SCUD and ASTRO rockets and artillery. Our own attack helicopter staging operation leapfrogged forward into Iraq to better support deep operations.

An Iraqi attack now would stall the plan, especially if it included chemical or biological agents. A few Iraqi outposts surrendered; we learned that they had no radios. By 2300, intelligence updates from aerial platforms were complete. Our objective was still the Iraqi 26th Infantry Division headquarters and one of its brigades. From there, we would attack another 70 kilometers and wait. Our ultimate objective was the Republican Guard, but we wanted them to move out of their prepared defenses first.

It was cold and very dark that night, with hardly any moonlight. Vehicles moved with no lights, the drivers using night vision goggles. Special lights mounted on the rear of vehicles with unique color schemes for each unit and flank vehicle ensured that formations remained tight and cohesive during movement and attack drills and also helped service vehicles move rapidly through the formation to designated units. With my night thermal optics, I could see nothing but our tanks and Bradleys on all sides.

Our attack plan was simple: We would execute trained drills and saturate known enemy positions with rocket fire as the brigade moved forward and positioned our own artillery just out of range of the enemy's artillery. At the same time, attack helicopters would maneuver on our left flank to destroy the six to ten Iraqi tanks that had been identified in satellite photos. Then the helicopters would continue north along the west flank to destroy the threatening artillery deep on the objective. This would set the stage for the ground maneuver.

It didn't happen that way.

Before first light, we were moving again, and faster than planned. The

rocket battalion couldn't get into position fast enough from the division's west side; scout helicopters from the attack battalion arrived and confirmed that there were no tanks but did locate some air defense guns. Our support battalion stopped outside Iraqi rocket range, prepared now to receive casualties and dispatch preconfigured resupply and maintenance vehicles. Fifteen minutes later, our artillery positioned and fired more than 800 rounds of special bomblet munitions that killed many Iraqis and caused many others to lose the will to fight.

Aerial scouts to our rear, using special optics, viewed the objective and reported movements—both ours and the enemy's. The artillery fire continued while the Bradley battalion and the two tank battalions maneuvered precisely, according to drill, to their attack positions. The lead battalion made unexpected contact with several armored reconnaissance vehicles at 1300. That fight lasted 10 seconds from report of contact to cease-fire.

The artillery fire was lifted, and the mounted assault began. Tanks with blades pushed through the bunkers and the defensive positions. All battalions reported contact with small arms fire. The prisoners captured early in the southern fight provided key information on other enemy locations throughout the brigade objective, and this information was rapidly passed on the radio. By 1630, the brigade cleared the objective, refueled, and moved farther north to reestablish our attack formation. It happened so fast.

By 2230, the brigade re-formed. With moonless and cloudy conditions, the sky turned darker, with thunder, lightning, and rain. Our first fight was over, but another was under way on our northern flank. Rocket fire streaked overhead throughout the night against a commando unit and an armored unit protecting a logistics base to our front. Explosions shook the ground and sent shock waves through the dense air.

The commanders assembled and reviewed the fight. We discussed the lessons we had learned and how we would do it differently next time. Our

plan had been good, but it had not been executed as planned. Intelligence had not been as exact as we had expected, and flexibility had been the secret to success.

We reviewed intelligence updates and plans for the next attack. Then a message came from division: The plan to hold here for 24 to 36 hours had changed. Our new mission was to continue the attack eastward toward Kuwait, with the objective being the Republican Guard divisions. Indications were that Saddam Hussein and his elite operational reserves had no idea we had moved so deep. A new brigade attack plan was quickly disseminated. We would not receive the written plan from division headquarters until the next morning—after the attack was under way.

Early the next morning, the brigade on our west flank attacked the logistics depot shelled the previous night. A tank company with other armored vehicles augmented the Iraqi defense. The exchange of intensive small arms fire began. The identified enemy tanks were quickly destroyed; then more artillery fire was called in to neutralize several enemy bunker positions. A Bradley battalion attacked again; cannon and machinegun fire saturated the area. The engineer tanks moved in, destroying the remaining bunkers and building defenses. With the area secure, a critical rear area threat was eliminated. The attack accelerated and continued eastward.

Around 1430, the brigade rounded the elbow eastward. Close air support attacked our next objective 80 kilometers ahead. Psychological warfare leaflets were dropped—"surrender now or you die." The linear enemy tank positions were confirmed. Our aircraft reported destroying 25 tanks. At least that many more remained in prepared positions manned by a brigade of the Republican Guard Tawakalna Division. We would later find the reported success had been grossly overstated and its location off by several kilometers. Our rocket battalion was still too far away to help and cover our approach. Fortunately, speed and surprise were on our side, because we were in this fight

alone—or so we thought.

At 13 kilometers from the objective, now around 1900, our artillery battalion stopped and initiated fire. The brigade maneuvered closer. At three kilometers out, the lead battalion opened direct fire from its tanks and Bradleys. Technology was on our side. Thermal optics made the night fight seem like day, except for the green or red tint. Burning Iraqi tank hulks now dotted the horizon. Radios crackled with reports. Two Iraqi tank battalions and an armored infantry battalion were on the objective. The rest of the Iraqi division stretched south into our flank division's zone. It was a night fight of the worst kind. Someone's attack helicopters started firing missiles at our objective. Our hot tank engine turbines became potential targets. It was pandemonium. Our artillery continued showering the objective as we maneuvered into position.

The artillery and direct fire from our base battalion stopped. One of our tank battalions dropped its lightly armored and wheeled vehicles and maneuvered its tanks across the objective. Finally, we got the Apache helicopter fire from our south to stop. Hidden Iraqi tanks engaged ours; then their infantry started firing. Secondary explosions ripped across the objective. The Iraqi tanks were in superb fighting positions, but their gun orientations limited their ability to traverse and fire completely into our attack. Our tank battalion lost four tanks in the assault. The casualties were evacuated by another battalion in the brigade. Four of the six personnel casualties would return to duty the next day.

Reports of our losses rippled across the radio nets—mines, the indiscriminate hidden killers that could lift a 60-ton tank three meters into the air. On cue, our wheeled vehicles moved into columns in the cleared tracks laid by the tanks. Destroyed enemy tanks and their crews, the smell of burning metal and gunpowder, and reports of dead soldiers kept the reality of death near. All the soldiers saw it as they moved forward. A burning U.S. tank lit the sky all night with secondary explosions.

The night fight lasted four hours, but

its intensity made it feel like minutes. We destroyed the better part of three Iraqi battalions in prepared defenses. Not until then did I fully realize the brigade's potential for focusing violent and lethal combat power. Our training had paid off. We were good, but we were also lucky. A report on the division radio net said enemy artillery had shelled our cavalry squadron's command post. Many soldiers had been wounded and many vehicles damaged.

By 2300 the brigade moved to the east side of the objective, refueled, rearmed, then started to move again—less one battalion. In rehearsals we had practiced completing this brigade-wide refueling in 45 minutes. Now we had to do it fast if we were to maintain the momentum of the attack. The tank battalion that had attacked the objective took about an hour more to sweep the area with infantry, then rearm and refuel—their support vehicles had remained well to the rear. They could see their tanks burning.

The engineers built a temporary holding camp for the Iraqi prisoners of war—almost 450—and interrogators went to work. Water and rations were distributed, and aid teams provided medical assistance.

Then our focus shifted. The logistics base ahead, our next objective, was defended by a mechanized armored battalion, and we would have to travel all night to reach it at dawn. We started to move at 2330; by 0200, the entire formation was re-formed and moving. That night fight was the last against a prepared defense. We were now in pursuit; the 1,100-vehicle brigade attack formation surged forward, with observers and drivers rotating positions.

It had been 20 hours since a sleep halt, and for most it would be 18 more. We lost both physical and radio contact with the division on our right flank. The formation changed; we shifted more combat power to guard that flank. We were 20 to 30 kilometers out in front and exposed.

Early on 27 February, we made contact with the hasty defenses guarding the massive logistics base. The defending battalion seemed to vaporize. In the

first minute of fire, 10 Iraqi armored vehicles erupted in flames. The brigade attacked on line, an armored formation of more than 150 tanks and Bradleys abreast moving 15 kilometers an hour. Psychological warfare teams broadcast warnings on huge speakers, asking the Iraqi soldiers to come out of their bunkers and surrender, not to fight and die. Huge ammunition bunkers and fuel cells were everywhere. It was a powder keg waiting to explode, and we were smack in the middle of it.

On the way, my Bradley detonated several unexploded scatter bombs and small mines, but only its tracks and shock absorbers were damaged. If we were to continue the attack across Kuwait toward the Gulf, I needed to stop and change my maps. A tank company protected my front, another to each side. Apache helicopters overhead provided deep fire and observation. We found a small revetment for cover and concealment. Iraqi soldiers surrendered in groups to the units around us.

When my driver and operations NCO stepped out, they detonated a mine and were seriously injured. It took 15 minutes for the tracked ambulance to arrive, and it seemed an eternity. By that time, thanks to the combat lifesaver program of one per vehicle, both soldiers were stabilized, and their lives were saved. (See "Combat Lifesaver Training" elsewhere in this issue.)

We started encountering Iraqi convoys and mixed units trying to escape northward. Among them, an Iraqi tank battalion turned and attacked in the gap between us and the brigade to our north. Reports were incomplete. Our ability to locate targets at three kilometers was countered by our inability to confirm their identification. And when in doubt, no one fired for fear of fratricide.

The commanders talked, trying to assess the situation. We were not sure whether an offensive was developing. Should we counterattack? Then the tank fire exchange began, but it lasted only minutes. What next? A battalion of Iraqi tanks was destroyed. Many burned for days. Six hundred more prisoners were taken on this day alone, and the engineers as well as some com-

bat units helped the military police. The lack of transportation, food, water, and shelter for these prisoners was overwhelming.

The brigade formation changed again, anticipating a mission to continue eastward and with continued lack of contact to our south. Dark hazy oil smoke weighted the late afternoon air. We crossed into Kuwait and knew we really had the Iraqis now. Then we heard that a convoy of 40 vehicles was coming from the south headed into our flank. We rapidly reoriented a tank battalion to protect the southern flank, but nothing ever showed. We would learn later that the report, which should have said "northern flank" instead, was a delayed report of the Iraqi tank battalion we had destroyed an hour earlier.

Night fell. A scout identified an Iraqi tank company several kilometers to our front in Kuwait, and our artillery battalion fired 120 rounds of bomblet munitions. We would not know the results until the next morning. Again, our commanders huddled, the intelligence officer provided an update, and we reviewed the attack plan for the next day.

It had been 40 hours since I last slept. Exhaustion overcame me, and I collapsed in the corner of my Bradley, as reports continued across the radio nets, for four hours of sleep that went too fast.

At 0530 on the 28th, a one-hour rocket and artillery preparation preceded the attack. The brigade commander and I made our way to the front of the formation. The artillery fire made the air

shake, and rockets screamed like holiday fireworks. The low-lying fog was blackened from the burning oil wells. Hundreds of fleeing Iraqi units battled to get back into Iraq.

Our attack helicopters stayed close to the fight, providing long range observation and fires. Because friendly forces were converging, target identification was critical. At 0720 the brigade commander directed a cease fire. A unit to our south reported that we were firing into their zone. Luckily, our scouts identified the problems. A friendly company there had mistakenly wandered into our zone, forward of our lead battalion, and our ricochets had hit their vehicles. After they moved out of our zone, the fight continued, only to be stopped by the international cease-fire at 0800. The war was over.

Our follow-on clear-in-zone mission was slow and dangerous. Huge ammunition dumps and unexploded munitions littered the battlefield—two more of our soldiers would lose their lives there. In four days, we had to return through the areas of the last three fights and destroy by-passed equipment, munitions, and positions back in Iraq—a monumental task.

Our mission then turned to humanitarian aid along the southern side of the Euphrates River valley. We gave medical aid to more than 2,000 civilians. More than 100,000 refugees were searched and processed. The bodies of unknown hundreds were carefully collected, marked, and buried with compassion.

Reflecting on the battles, we collected detailed data on every portion. More than 750 combat vehicles had been destroyed, more than half of them tanks and infantry armored assault vehicles. More than 1,000 enemy prisoners of war had been captured.

Battles were fought at extreme ranges, and engagement information was critical. On the average, we acquired targets three kilometers away and destroyed them two to two-and-one-half kilometers out. Most Iraqi direct fire systems could not extend farther than one-and-eight-tenths kilometers.

There were many reasons for our success at brigade level: No secrets were kept from the soldiers; they knew the plans and knew we would tell them everything they needed to know before an attack. Their clear understanding of the intent provided the continuity for the offensive. Our NCOs and young officers provided the discipline, enforced the standards, and kept the soldiers alive. The soldiers' confidence in their leaders, the plan, and the equipment made the force resilient and cohesive. We could not have asked for more.

Lieutenant Colonel G. Chesley Harris was S-3 of the 3d Brigade, 1st Armored Division, during the division's deployment to DESERT STORM and now commands the 279th Support Battalion in Europe. He previously served with the 24th Infantry Division at Fort Stewart. He is a 1975 graduate of the United States Military Academy.

The Soldier's Load

LIEUTENANT SCOTT C. PORTER

During Operation DESERT SHIELD, a brigade conducted a live fire training assault to seize a bridge. The brigade commander noticed that

the equipment the soldiers carried was interfering with the accomplishment of their mission. At the after action review he directed the battalion com-

manders to investigate the weight the soldiers carried in their battalions. At the briefback one commander indicated that the average soldier in his battalion

carried more than 100 pounds.

At the beginning of DESERT STORM, as this same brigade moved into Iraq, its load remained unchanged. The problem was that all of the items were indispensable, and the supply lines were stretched so tight that the soldiers had to carry large amounts of water and ammunition. The soldiers did not even carry sleeping bags, despite temperatures that approached freezing at night.

The Army has concerned itself with this problem repeatedly since the end of World War II. In 1948 and through the early 1950s, Field Forces Board #3 conducted some of the earliest official studies of the soldier's load. During the early 1960s, the Infantry Combat Developments Agency met and made its recommendations on the subject. Most recently, the Army Development and Employment Agency issued its report in 1987, and many of this agency's suggestions were incorporated into Field Manual 21-18, Foot Marches, dated June 1990.

STUDIES

Since 1950, official studies such as these have relied extensively on S.L.A. Marshall's *The Soldier's Load and the Mobility of a Nation*, which examined a man's physical load-bearing limitations and ways of overcoming them.

Marshall noted that the infantryman is "a beast of burden" but that his chief function in war does not begin until he delivers that burden to the appointed place. His load should therefore be light enough to enable him to fight unimpaired when he arrives at the field of battle. In the past, this has not always happened. Marshall contended, for example, that during the assault on Normandy, the troops were slow coming off the beaches because they were exhausted from their heavy loads.

John English, in *Perspectives on Infantry*, agreed:

Most infantry in the leading waves were, in fact, criminally overloaded. The American soldier carried more than 80 pounds, and any careful exami-

nation of photographs of British and Canadian troops waddling ashore on that day will reveal that they, too, were weighted down with roughly the same load.

Leaders need to remember that weight must often be sacrificed in the interest of speed. A soldier must not only arrive at the battlefield capable of fighting but must also arrive early enough to influence the action. Any extra equipment he carries will be useless if it arrives too late. Leaders throughout history have demonstrated the advantages of fast-moving forces carrying as little equipment as possible. Figure 1 shows how increased weight affects a soldier's ability to march on different types of surfaces and, not surprisingly, as weight increases, speed decreases. The following rules of thumb apply:

- The distance marched in six hours decreases by one mile for every 10 pounds a soldier carries over 40 pounds.
- The time of an assault course increases by 15 percent for every 10 pounds over 40 pounds.
- The distances traveled are reduced by half when moving over average gradients of 10 percent.

Marshall said that the Army must "break away from the stubborn idea, dating from the Medes and the Persians,

that what a soldier can carry on a hard road march during training is a fair measure of the load that he can manage efficiently when under fire." Interestingly, he had observed during World War I that troops could hardly carry their loads when marching to the front but had no trouble with the same loads when marching to the rear. Another important consideration during combat operations is that fear burns the same energy stores as physical work.

To reduce the load on the soldier's back, leaders must use their available transportation effectively and must develop a unit's ability to carry what it must through load planning and training.

Although load planning is a critical task for all leaders, senior commanders should limit their guidance and allow the sub-unit commander who must carry out a mission to decide what his soldiers will carry for each operation. Load planning consists of tailoring the load to the mission and then dividing it into echelons (combat load, sustainment load, and contingency load), calculating its weight, and arranging for its transport.

The first step in this process is analyzing the mission to determine the packing list. A leader should base his list on guidance from higher headquarters and on the minimum-load concept,

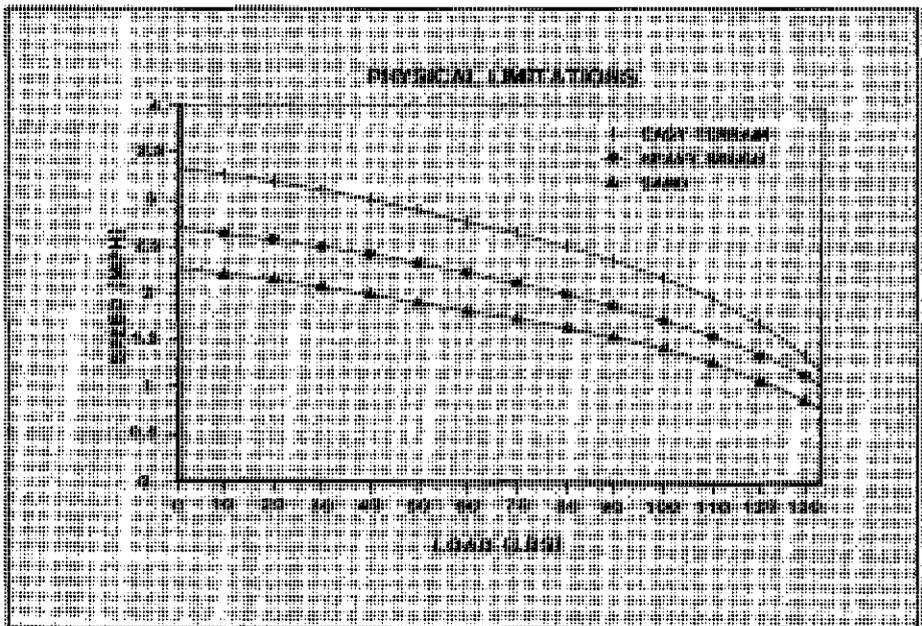


Figure 1

which lays out certain items that are common to all missions.

Any additions to or deletions from this minimum load configuration will be based on the estimate of the situation. FM 21-18 (Table 5-3) contains a list of factors that should be assigned priorities as part of that estimate. A leader can examine the factors on this list and then tailor his soldiers' loads for each specific mission. Once the leader has determined what the soldier needs for his mission, he can begin to divide the load into the three echelons (Figure 2).

Providing transportation for the combat load is the responsibility of the company, and this load is split into the fighting load and the approach march load. The items that go into each of these loads depends upon where in the operation the items will be needed. Both of these loads should be kept as light as possible.

The fighting load includes weapon, load-bearing equipment (LBE), helmet, and a reduced amount of ammunition. (Clothing worn is not considered part of the load because the body is accustomed to carrying that weight.) If heavy items such as radios, crew-served weapon ammunition, and mortar rounds are carried, they must be cross-loaded. This cross-loading will make the fighting load too heavy for a quick maneuver during combat, and the items not essential to the immediate operation should be dropped before, or upon, enemy contact.

The approach march load—the load a soldier carries as he moves toward the battle—contains the items needed for slightly more extended operations against the enemy. It consists of weapon, basic load of ammunition, and LBE, plus a small assault pack or lightly loaded rucksack, which the soldier drops as soon as he begins to close with the enemy. Once the pack is dropped, it should be cached or otherwise secured during the fight.

As many items as possible should be put in the sustainment load instead of being carried in the combat load. This echelon of the load is left with the battalion S-4 to be secured and transported.

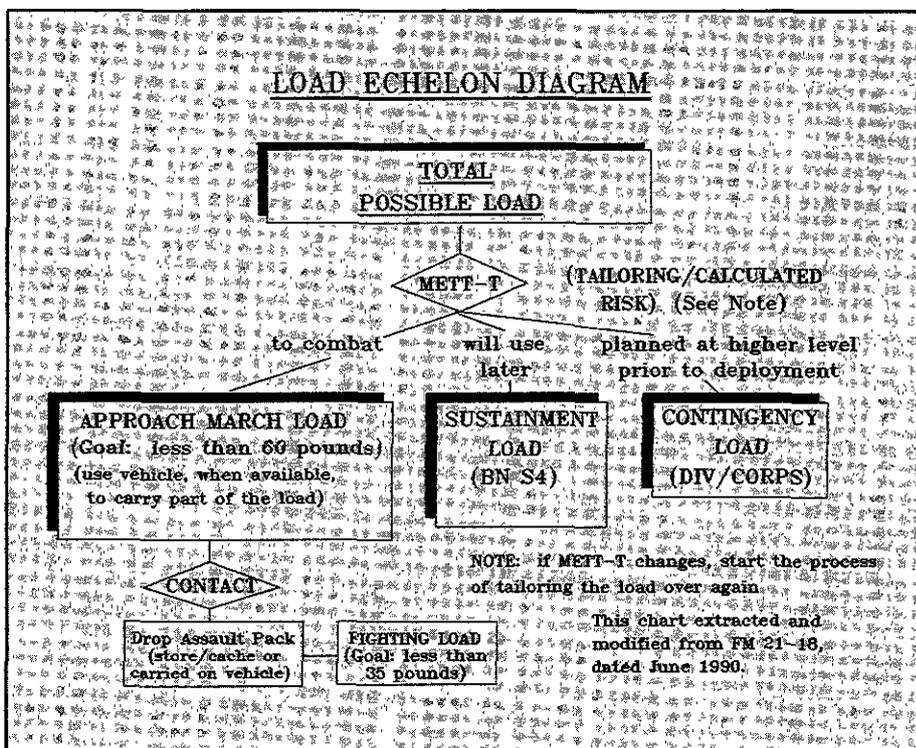


Figure 2

It contains spare clothing and equipment, protective items for specific threats, limited personal effects, and anything the commander deems necessary for extended operations. This load should be stored in a forward operations base or field trains to be delivered by the S-4 as the commander requests.

Another echelon of the load is the contingency load, which contains items that will not be needed immediately—personal effects and items for threats that are not imminent. This load, stored and maintained at division level, allows a unit to change its mission once it has deployed.

The operations of the 2d Brigade, 82d Airborne Division, during Operation DESERT SHIELD/STORM provide an example of the relationship between these loads. At Christmas 1990 the brigade was conducting training far to the south of the front. During this relatively peaceful time, and especially as a result of the holiday, the soldiers had accumulated many items they could not take into combat.

When the order came for the brigade to spearhead the French 6th Light Armored Division's attack into Iraq, the chain of command took steps to care for

the soldiers' personal effects and excess baggage. They made lists of what a soldier would carry on his person (fighting load), what he would carry in his rucksack (approach march load), what he would pack in his A-bag (sustainment load), and what would go in his B-bag (contingency load). Items that did not fit in these categories, the soldier shipped home. In this way, the leaders ensured that the soldiers properly accounted for all of their belongings and equipment.

As a commander tailors and echelons his load, he should be conscious of how much the load weighs. The goal is for the soldiers to carry as little as possible.

In July 1991, the Commander of the U.S. Army Training and Doctrine Command (TRADOC) amended the guidance in FM 21-18 concerning the total weight of the combat load. The fighting load should not exceed 35 pounds, and the approach march load should not exceed 25 pounds, keeping the total to no more than 60 pounds (Figure 3). These weights apply to the basic rifleman. Soldiers who carry other weapon systems may have heavier loads that are based on the additional weight of those systems.

Once the company commander has tailored and echeloned his load, he must arrange transport for the various echelons. He needs to coordinate with the S-4 for the delivery of the contingency and sustainment loads at the appropriate time. He must also ensure that the soldiers in the company supply system understand their responsibility for delivering the combat load.

While load planning is entirely the province of the commander, each soldier is responsible for executing the various types of training that prepare him for carrying the unit's load in combat.

The most obvious aspect of training is probably physical conditioning, which is vital to the unit's ability to carry its load. But physical training will not condition a man to carry more than a certain amount of weight. Marshall talks of tests in which men were given 69 pounds to carry on a 15-mile march. Regardless of the amount of training, the men always exhibited the same amount of fatigue. Training is vital, but it cannot raise men above their physical capabilities.

What physical training can do is bring a unit to its maximum load-bearing ability. To accomplish this, the leader must institute a program that prepares his men for load carrying.

FM 21-18 contains a training program that is designed to keep a unit prepared for its Army Physical Fitness Test (APFT) as well as to exercise its load-bearing ability. The program suggests that aerobic conditioning not be done more than three times a week, because excessive aerobic conditioning could interfere with other types of conditioning. The progressive resistance training to strengthen muscles should also be done two or three times a week. This part of the program will sustain a soldier's ability to perform well on the APFT.

Specific, progressive road marches

should be scheduled to develop a soldier's ability to march well. The weight carried and the distance marched should be increased systematically but not at the same time.

The final type of training done in conjunction with march training is lead-

practice accounting for, securing and, when necessary, delivering the higher echelons of the load. Junior leaders should also be taught to assess the risks involved in load planning. This enables them to understand the concept of load planning and also to make sensible load planning decisions when necessary.

Training and planning are the essential ingredients of successful load bearing. These underlying principles, as well as specific programs for both training and planning, are found in FM 21-18. Chapter 5 of the manual is dedicated to a complete discussion of the soldier's load problem and solutions to it.

The battalions that entered the Euphrates River Valley had learned a valuable lesson as a result of their earlier training attack on the bridge. Although their fighting and approach march loads were still as heavy, they knew better how to manage them. When units arrived at their landing zones, the battalions secured their rucksacks (approach march load) with a minimal guard force while the rest of the soldiers occupied their positions. As soon as practicable, soldiers went back, a few at a time, to retrieve the rucksacks. In at least one instance, a unit placed excess ammunition and water in kick-out bundles that could then be taken forward and stored in a central location for further distribution.

This was load planning in action. By using this technique, commanders ensured that their soldiers arrived in the right place at the right time with the right equipment, and that they were ready and able to fight.

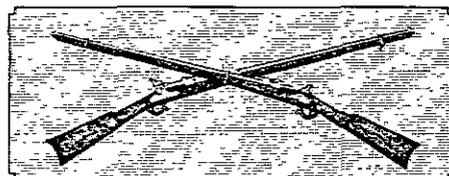
COMBAT LOAD	
FIGHTING LOAD	
LOAD	WEIGHT (POUNDS)
Helmet, ballistic	3.4
Pistol, Belt, suspenders, and first-aid pouch	1.6
Canteen, 1-quart, and cover with water (2 each)	5.6
Case, small-arms (2 each)	1.8
Bayonet with scabbard	1.3
Protective mask w/decontamination kit	3.0
Rifle, M16A2 w/30 rounds	
5.56mm in magazine	8.8
Magazines (6) with 180 rounds 5.56mm	5.4
Grenade, Fragmentation (4)	4.0
TOTAL	34.9
APPROACH MARCH LOAD:	
LOAD	WEIGHT (POUNDS)
ALICE, medium with frame	6.3
Rations, MRE (2 each)	2.6
Canteen, 2-quart and cover with water	4.8
Toilet articles	2.0
Towel	0.2
Bag, waterproof	0.8
E-tool with carrier	2.5
Poncho, nylon	1.3
Liner, poncho	1.6
TOTAL	22.1

Figure 3

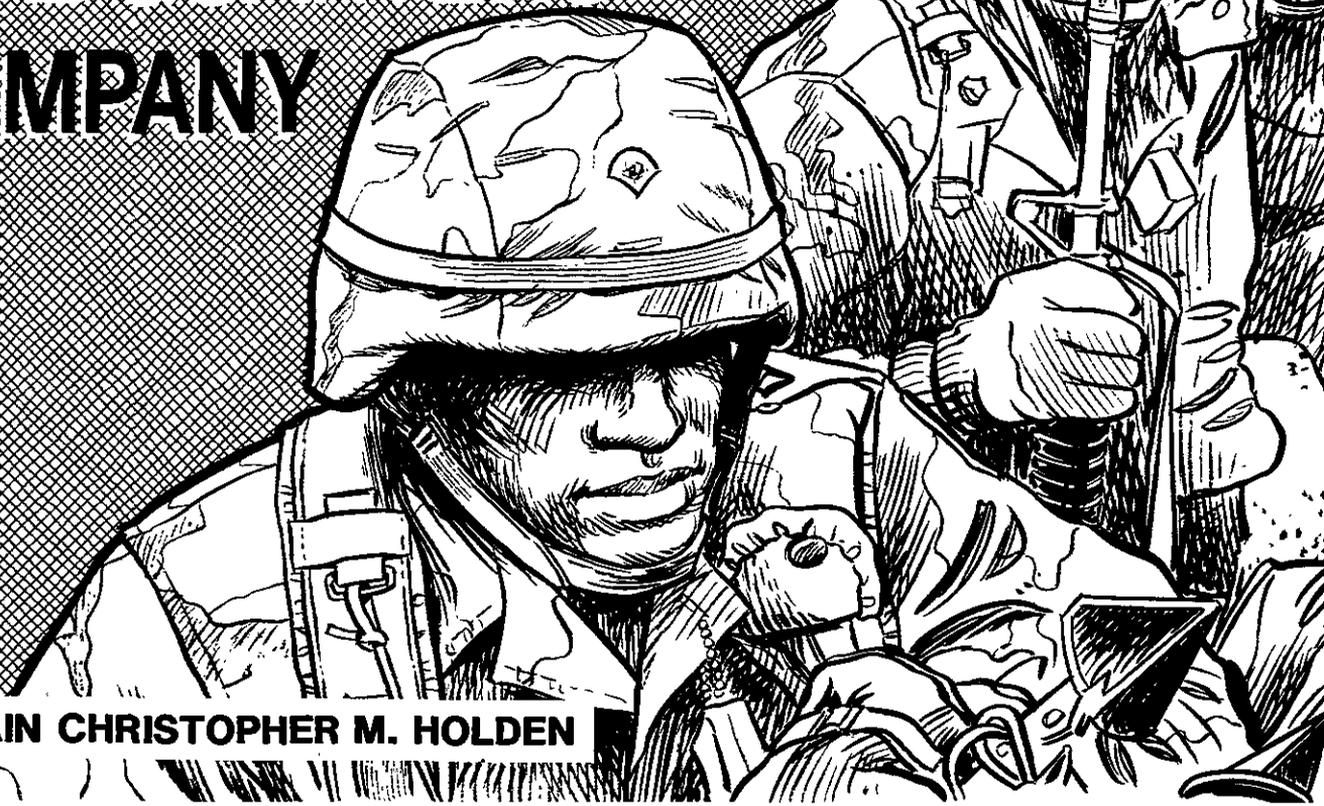
er training. This may well be the most important aspect of training, because leaders must properly plan loads if a unit is to succeed in combat.

Leader training must be conducted at all levels. Company leaders must practice planning loads and handling the combat load through the company trains. Echelons above company must

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COMMANDING A LIGHT INFANTRY HEADQUARTERS COMPANY



CAPTAIN CHRISTOPHER M. HOLDEN

When I took command of a headquarters company, I thought to myself, "How in the world will I ever train such a diverse group of soldiers?" The company included scouts, antitank crews, medics, mortarmen, support platoon drivers, communications men, staff soldiers, and those in the headquarters section.

Commanding a rifle company had been easy compared to this. Ninety-five percent of the soldiers were in MOS 11B. We all trained together—we had a common mission essential task list (METL). My military experience and schooling had all focused on commanding a rifle company. I had found good articles that included sample plans for rifle company command. (*Two of those were in the September-October 1988 issue of INFANTRY: "On Company Command," by Captain Richard D. Hooker, Jr., and "A Plan for*

Command," by Captain Danny W. Davis.)

As a headquarters company commander, though, I found little material to tell me, for example, where I should locate myself in the field, what my relationship with the battalion staff should be, or how to train my specialty platoons.

During the next 15 months, through numerous field exercises, a deployment to the Joint Readiness Training Center (JRTC) at Fort Chaffee, some ego-bruising lessons, and some good teachers, I found answers that worked for me and my battalion. I discovered that an HHC commander cannot lead the same way as a rifle company commander. To accomplish his mission, he must determine whether a task should be executed in a centralized or a decentralized fashion. To build teamwork and cohesion, he must establish a mutually supportive relationship with the battalion staff.



On the basis of what I learned, I would like to offer some advice to those of you who will command headquarters companies.

To gain a better understanding of the way an HHC works, let's examine first what I believe should be your top priority, and that is training!

Training

Read Field Manual 25-101. Although the HHC's training mission is more diverse than that of a rifle company, the principles discussed in the manual are the same. In their INFANTRY articles, Captains Hooker and Davis stressed the importance of the chain of command, counseling, training, administration, and maintenance from a rifle commander's view, but the HHC has some idiosyncrasies.

The relationship I tried to nurture with the HHC platoon leaders was different from the one I had with my rifle company leaders. I gave them more responsibility and initiative in planning their own training, so long as they followed their METL and mission training plan (MTP) standards. The specialty platoon leaders coordinated for their own training resources and kept me informed of their progress or problems.

I had to remember that my platoons would fall under battalion control as soon as the battalion was given a mission. Consequently, my first objective was to train the platoons to be combat-ready.

I initiated the performance appraisal system with my platoon leaders by giving them copies of my OER support form and allowing them a couple of days to complete theirs. Immediate follow-on counseling sessions included reviewing the OER support form and making sure each objective was measurable.

Then, instead of leading from a desk, I spent two or three days with each platoon in the field. Fortunately, my battal-

ion held a platoon field training exercise (FTX) a couple of weeks after I assumed command. My specialty platoons, except for the medical platoon, served as an opposing force against the line platoons. This gave them all a chance to exercise the tasks on their METLs, and gave me a chance to observe them.

I conducted an insertion behind enemy lines by UH-60 helicopter with the scouts. I operated as a TOW gunner with the antitank platoon during battle drill competitions. I served as gunner, ammunition bearer, and computer check during the mortar platoon's live fire. I went with the medical platoon during a night casualty evacuation exercise. The communication platoon gave me classes on their systems while I taught them the rudiments of defense.

I even managed to catch up with the support platoon long enough to listen to their concerns and offer assistance. Their major problem involved a lack of qualified drivers. In fact, when they did receive an 11B infantryman from one of the rifle companies, it was too often one with a background of disciplinary problems. Soon afterward, I went to the command sergeant major to ask if we could begin getting higher quality soldiers assigned to the support platoon.

All of these experiences gave me an excellent opportunity to understand the strengths and weaknesses of each platoon, to acknowledge their problems, and also to earn some respect from the soldiers. I got a first-hand look at their METL and at the way they incorporated the MTP into their training. I also earned the qualification needed to critique them. I served as mentor to each platoon leader and counseled him formally after each FTX. I did the same with the executive officer and the first sergeant.

The training meeting proved to be the most important event in the company. I used FM 25-101 as a guide and held my training meetings the day after the battalion's so I could compile my notes and make sure I could pass along current, accurate information. The platoon leaders and platoon sergeants, staff section NCOs in charge, the first sergeant and XO, and commodity area managers attended.

During these meetings, we developed our plan for getting 100 percent of the soldiers in the company to complete a task, whether it was shots, weapon qualifications, or an NBC battle run. This was always a training challenge. For example, I could not just set up one M16 range, pass out the information during a training meeting, assign a platoon to run the range, and expect good results. I had to run the range on at least two days, maybe three, to qualify all of the company. The first sergeant talked about the range weeks in advance and reminded the company daily to ensure that the platoon sergeants and section NCOs in charge (NCOICs) accounted for all their people. On the range days, I went to the staff areas and made sure leaders released their soldiers to go to the range to shoot. Then we tabulated all results at the end of each day to determine who did or did not qualify. For those who failed to qualify, we repeated the process. Other tasks require similar planning, executing, and follow-up. During all this, the first sergeant and I always had to remember to be patient and to maintain a sense of humor.

In preparing for the JRTC, we spent a lot of time in the field. As a result, my platoons were able to win (and lose) a lot of battles, learn by their mistakes, and become better light fighters. To design training and establish standards, HHC leaders need to train extensively with the following MTPs—7-90, Mortar Platoon; 7-91, Antitank Platoon; 7-92, Scout Platoon/Sniper Team; and 7-94, Headquarters Company.

Physical training in HHC, as in any infantry unit, provides the foundation for mentally and physically tough soldiers. The soldiers in my company did their best PT when it was decentralized down to platoon level. The various soldiers in MOS 71M of the personnel administration center (PAC), for example, may not need to run as fast or as far as the scouts. They have different METLs and different physical needs. Consequently, I incorporated the following physical training into the program:

Monday—Platoon calisthenics and a run of 3.5 to 4 miles.

Tuesday—Organized platoon athletics.

Wednesday—Platoon calisthenics and a run of 3.5 to 4 miles.

Thursday—Foot marches of various distances (4 to 12 miles) or NCO and officer development programs, depending on the training cycle.

Friday—Company calisthenics and 4-mile run.

The platoon calisthenics were done at the same general location. Each platoon leader designed his own program and presented it to me for approval at every quarterly training brief. The staff sections rotated responsibility for the PT formations. The first sergeant, company XO, and I did PT with the sections in rotation. I used Friday sessions to compare everyone's PT level, as well as to build company unity.

PT accountability proved to be a major concern. The first sergeant and I monitored details, taskings, and last-minute staff crises. The platoon and section sergeants explained each absence to the first sergeant. I cannot overemphasize the command priority you need to place on accountability if you want to run a good PT program.

The decentralized approach was ideal for all the specialty platoons. Each platoon significantly increased its average scores on the Army Physical Fitness Test (APFT). The only disadvantage I observed concerned the staff sections: There were many instances, despite numerous corrections, in which the selected staff section PT instructor failed to have a plan for executing the exercises. The staff section performed better under the centralized approach to training.

Battalion Staff

Paramount to your success as an HHC commander is a mutually supporting relationship with the battalion staff. Although they are all members of your company, the battalion commander, executive officer, and S-3 outrank you. If you do not recognize your special role and responsibilities, this can be a potentially uncomfortable and career-threatening situation. Their primary purpose is running the battalion,

not serving the HHC. You must therefore cultivate a rapport between the company and the staff, and each has to support the other.

I paid daily visits to each staff during garrison days to talk over problems, first from their perspective and then from the company's, and this formed the framework for resolving conflicts. For example, one morning only three staff representatives showed up at a PT formation. I knew from my daily visits that most of the staff members wanted to do PT but that if one of them was given a short suspense project to complete, PT time was the only time he would have available in which to do it.

A little tact is needed in this situation. Avoid going behind their backs and telling the XO who was or was not at PT today. Instead, go directly to the staff sections and persuade them to get back to it. I always felt that directly addressing the accountability problem was the beginning of a solid relationship. Of course, you can use their future attendance at PT as a gauge of how firm you have to be.

One of the most important steps toward gaining a mutually supporting relationship with the battalion staff members is to start building a rapport with the battalion XO. Visit him in his office or, better yet, invite him to some of your company training to find out what his main concerns are. And go to his battalion XO meetings. I found this an excellent way of finding out in advance about maintenance, training support, and administrative problems in the battalion that I might be able to handle. This provides another forum for making people aware of your requirements, as you also become aware of the staff's requirements. If the problem dealt only with the S-3 section, I would go over and talk to the S-3. A solid relationship with the battalion XO and S-3 will pay big dividends for your company later on.

You might also invite the staff personnel to attend all company award presentations, end-of-the-week "safety talk" formations, and social get-togethers. The simple fact of the matter is that when I got involved with staff activities, and they paid attention to company business, such problems as the lack of staff personnel in PT sessions decreased.

Field Responsibilities

Doctrine dictates that a light infantry HHC commander be in the field trains. Still, the battalion commander must evaluate the experience and talents of the HHC commander, the first sergeant, and the XO, along with the battalion S-1 and S-4, to determine everybody's responsibilities. Because each battalion has its own distinctive talents, I am not recommending that all battalions do what we did, but it worked for us—after a few mistakes and a few lessons learned.

After I had spent time with my platoons, the battalion commander put me in charge of the field trains. After a couple of field exercises, I had a field trains SOP. We practiced establishing the defense and displacing and coordinated with the combat service support slice elements. Then boredom set in. I knew the mission was important but, as a former

rifle company commander, I wanted to contribute more to the battle. I pleaded with the battalion commander to let me come forward. He acquiesced and put me in charge of the main CP.

Inherent in this responsibility was establishing the main CP defense, serving as the quartering party officer, and helping the S-3 and the battalion XO with current future planning. I planned and executed main CP defense battle drills and rehearsals. I ensured that all vehicles were tactically parked and that everyone knew the proper passwords. I always received one rifle squad to secure the CP and accompany me on quartering parties. But most important I was up forward to observe and talk with my platoon leaders. Back in the field trains, I could not keep abreast of their actions. At the main CP, the platoon leaders, now under battalion control, used me as a sounding board before backbriefing the battalion commander. They told me their problems, and I exercised my command influence where it was needed.

The obvious disadvantage to having the HHC commander forward is that the battalion commander has to select another competent leader to take charge of the field trains. The choice is either the S-1, the S-4, or the command sergeant major. Normally the S-1 and the S-4 are in the combat trains, and their respective NCOICs are in the field trains. One option is to place one of the NCOICs forward in the combat trains while his officer counterpart goes to the field trains. Again, obvious advantages and disadvantages are involved.

Our battalion commander experimented by putting the command sergeant major in charge of the field trains. Of course, the obvious disadvantage was not having his experience forward. But to help him, the battalion effectively used the HHC first sergeant as the field trains NCOIC. Having a strong HHC first sergeant is another variable in determining who should run the field trains. My first sergeant implemented the defense plan and guard schedules but, most important, made sure everyone in HHC received a meal. That sounds a lot easier than it really is, especially getting chow to the scouts forward, or trying to figure out the HHC headcount at the main CP, which in our case included battalion attachments from our slice units.

Even if the first sergeant is extremely competent, as ours was, a field trains officer in charge is still needed to coordinate effectively with the support elements in the rear. I recommend selecting the S-1, providing, of course, that his NCO assistant demonstrates the responsibility and initiative to monitor the personnel situation from the combat trains.

The battalion commander has to consider many variables in determining his HHC commander's field role. The following are some of the lessons we learned at the JRTC about using the HHC commander at the main CP.

- The HHC commander should not be used as an "ad hoc" commander. Putting the HHC commander in charge of a counter-reconnaissance team or a tank killer team just does not work. For instance, if he is in charge of a team composed of the antitank platoon, four Dragon teams, and a rifle platoon and is ordered to conduct counter-reconnaissance during a battalion defense, whose SOP do they use? And how

does he communicate? He doesn't have an assigned radio or operator. While the HHC commander is trying to establish communications, an effective chain of command, and an SOP, he is losing precious time that he could be using for troop leading procedures (TLPs).

- All battalion staff and slice elements must know the main CP defense plan. This is a challenge. In a rifle company, everyone generally executes the same TLP at the same time. At the main CP, some soldiers are fighting the current battle, some are planning the future battle, and some are on their rest shift. Drawing all the fighting positions, sectors of fire, minefields, and the like, on butcher paper is one way to familiarize these soldiers with their defense plan.

I quizzed all the soldiers, before the breakfast and dinner meals, on all aspects of the defense. I then inspected their ammunition status, the zero on their MILES devices, and the challenge and password procedures. Then, after coordinating for the least disruptive time with the battalion XO and S-3, I conducted defense rehearsals until all the soldiers knew their responsibilities.

- Be prepared to manage limited assets. (Finding transportation to the battalion commander's location or the main CP for a battalion meeting challenges most rifle company commanders.) A good solution is for the HHC commander to find out from the battalion commander when he wants to talk to all the commanders, then coordinate a link-up with the rifle company commanders using one of the available company vehicles. This not only saves time but allows the company commanders to share experiences and build teamwork.

As a side note, many of the lessons suggest the need for modifications to the TOEs (tables of organization and equipment). For instance, an assigned vehicle, a communication system, and a radio telephone operator and driver would help the HHC commander coordinate link-ups with his fellow commanders for battalion meetings. Additionally, if the battalion commander still elected to have his headquarters commander in charge of an ad hoc team, this equipment would be essential for command and control.

Maintenance

In a rifle company, the executive officer serves primarily as the logistics coordinator, but my XO was also the battalion maintenance officer (BMO). Since HHC has all the battalion's vehicles, and a light infantry battalion does not have a TOE slot for a BMO, I didn't have much choice. In the field, he was located at the combat trains where he supervised the battalion's maintenance and recovery efforts. He also helped the S-1 run the combat trains—security, displacement, and the like.

I generally paid three visits a week to the motor pool—one during command motor stables on the first day of the week and two more to hold people to the standards the rest of the week. The program included drivers, supervisors, platoon sergeants, and platoon leaders.

As with PT, accountability proved critical. Command motor stables started off with a formation and a task and purpose briefing by the company XO. Taking an idea from the battalion XO, I had the communication platoon rig up a speaker system, and we conducted preventive maintenance checks and services by the numbers.

I originally used a decentralized approach to motor stables that was similar to my PT program in that it allowed the platoon leaders to design the training. Unlike PT, though, too many deficiencies went unreported, and I had to revert to the centralized mode.

We also conducted motor stables during FTX recovery periods. Often we encountered problems getting the staff personnel down to the motor pool because of other duties they had to complete in the staff area. These conflicts are best settled between the HHC commander and the principal staff officer.

Administration

My first sergeant screened immense quantities of paperwork before I saw it and wrote notations or highlighted signature blocks. And, of course, many soldiers with problems saw him first. If he couldn't solve a problem, it was my turn. These procedures saved precious time for a commander with more than 170 soldiers.

When we were not in the field, the first sergeant and I met in the orderly room at 0500, drank our coffee, and discussed the upcoming day's events. At 0530, he held a meeting with all the platoon sergeants, an NCO representing the S-2 and S-3 sections, the S-4 NCOIC, and the PAC supervisor. The first sergeant passed out notes, reminders, taskings, and other details that were important for that day.

I found this meeting critical in setting the proper tone for the day. It was the only time we had the NCO leaders together in this type of forum. Additionally, the meeting promoted cohesion, since the NCOs from diverse sections and platoons shared common problems and successes.

My biggest headaches were the mountains of paperwork I needed to complete, even after the first sergeant had screened it. Preparing as many pre-fabricated forms as possible was a lifesaver. For instance, with more than 170 soldiers assigned to the company, I found myself processing a soldier for separation at least once a month. I therefore had on hand all the forms for Chapters 5, 13, and 14 filled out except for the soldier's name and his problem. Additionally, soldiers in Hawaii often sent their families home early, and my first early-return-of-dependents case turned into a paperwork nightmare. After that, I had all the necessary forms instantly available.

Although my XO's primary duty was maintenance, he still

helped administratively by supervising the awards program and monitoring the additional duties of the specialty platoon leaders.

Our battalion had an outstanding quarterly battalion command inspection (BCI) program that kept our areas of supply, arms room, NBC, maintenance, fire control, publications, and safety in excellent shape. I think the BCI program helped build the trust that developed between the company and the battalion staff, especially since the battalion XO was in charge of the program. None of the results went to the battalion commander, but the battalion XO expected us to fix deficiencies immediately. Consequently, my company knew there was no need to hide weaknesses and always accepted and acted upon any feedback from the inspectors on how to improve our standards. I believe this program directly caused our battalion to win the DA Supply Excellence Award that year.

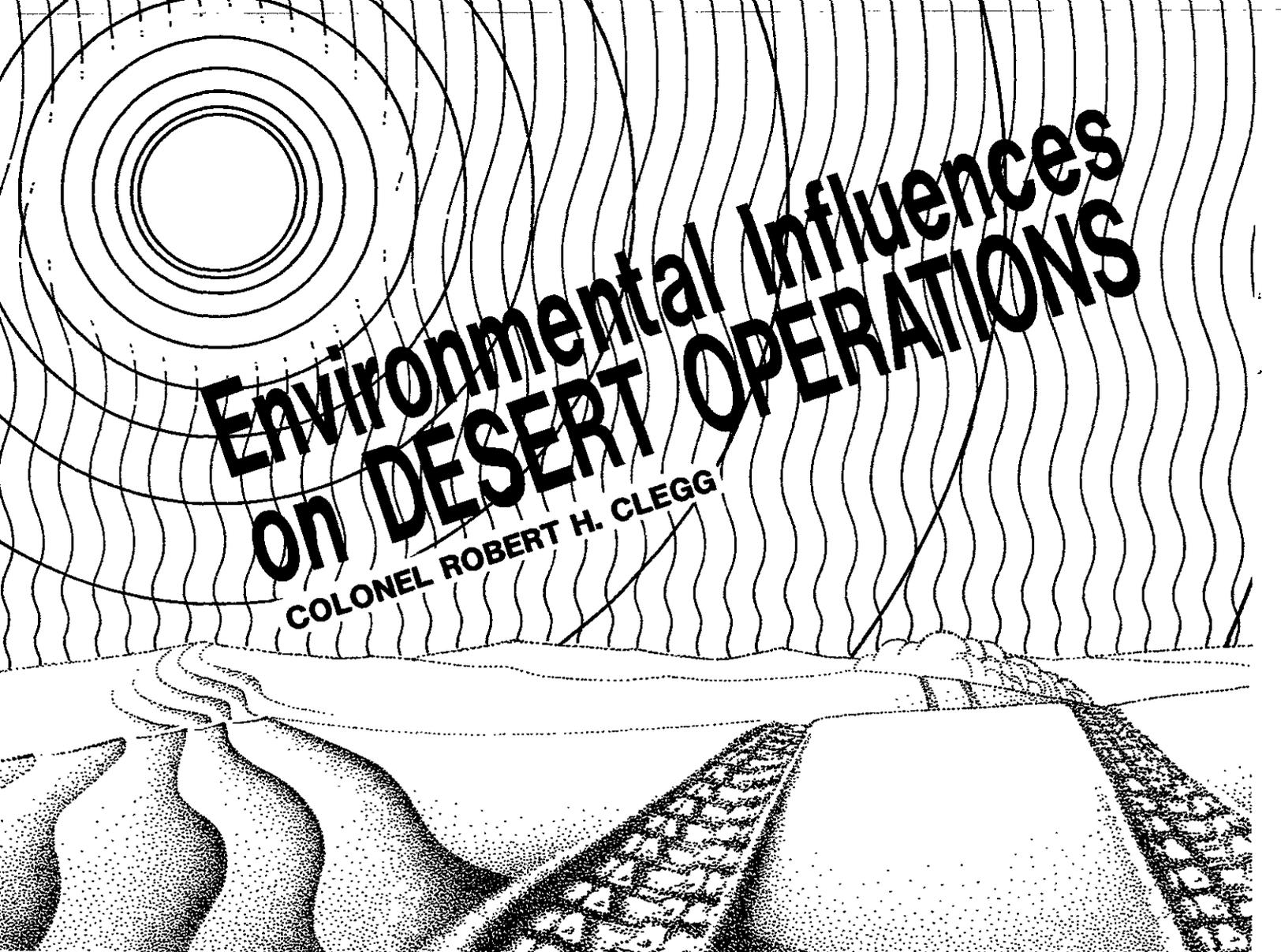
Property Accountability

Every HHC commander I know who got into trouble over property accountability did so because he only went through the motions during a 10 percent inventory. Take your 10 percent monthly inventories seriously. Put them on your training schedule and hold the platoons and sections accountable. And if the staff is involved with the inventory, warn the battalion XO and S-3 in advance so they can emphasize it.

Work closely with the supply sergeant. Do not assign a lieutenant as a supply officer. This only adds an unnecessary buffer between you and the supply sergeant. Act as your own supply officer, and develop an open and honest relationship with the supply sergeant. Along with your 10 percent monthly inventories, audit your property book hand receipts and your sub-hand receipts. If they don't equal each other, fix the problem immediately. If you wait until the end of your command tenure, be ready for a massive report of survey and a month's less pay.

In summary, decentralize training; centralize administration and maintenance. Find out from your battalion commander where he wants you in the field, and then train on the tactical skills you will need to excel there. And work on a mutually supportive relationship with the battalion staff. If you do all this, you can expect to succeed as a headquarters company commander.

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Environmental Influences on DESERT OPERATIONS

COLONEL ROBERT H. CLEGG

Arid regions make up about one-third of the earth's land surface, a higher percentage than that of any other type of climate. Some of these regions—because of diverse and conflicting cultures, strategic importance, and natural resources—have become centers of conflict, as we have seen in the recent past.

U.S. Army leaders recognized early the potential for U.S. involvement in conflicts in these regions. About a decade ago, such exercises as BRIGHT STAR, which involved deployments by the 101st Airborne Division (Air Assault), paved the way for a renewed appreciation for combat in an arid setting.

At about the same time, the National Training Center at Fort Irwin, California, provided an opportunity for all U.S.-based forces to conduct exercises under desert conditions. After ten years, this training has paid off. The success of Operation DESERT STORM can be directly attributed to this realistic training experience.

All professional soldiers must continue to evaluate the restraints imposed by climate and terrain, particularly concerning desert operations. An appreciation of the effect of

arid conditions on soldiers (both physically and psychologically), on equipment and facilities, on combat operations, and on support will lead to success.

Climatic and Meteorological Conditions

Arid regions occur in response to specific climatic controls—latitude, land barriers, ocean currents, and land-water contrasts—which influence both moisture and temperature.

In arid regions, temperatures range from around 140 to -50 degrees Fahrenheit. The incoming solar radiation is intense. The absence of clouds allows higher energy absorption levels at the surface. As the sun's energy is absorbed, the surface heats up. The absence of vegetation increases the solar effect. The glare of the sun's rays is also intense because of the stability of the atmosphere. With nightfall, the absorbed energy is quickly released back into the air, causing relatively significant drops in temperature.

The actual principle that defines a desert is the low level of relative humidity, which is dependent on high temperature

or low moisture. Deserts have an annual average rainfall of ten inches or less, and evaporation exceeds precipitation. Rainfall results from convectional thunderstorm or frontal activity, and may be either seasonal or evenly distributed throughout the year.

It is important to realize that it does rain in deserts, as it did during the ground campaign of DESERT STORM, and it can be violent and cause flash floods. Runoff is exaggerated because of steep slopes and sparse vegetation.

Early morning fog can also exist in arid regions, especially along the coasts. As information from DESERT STORM indicates, the fog can be even thicker than that in Germany, and it caused movement concerns in some areas during the ground campaign. Although this type of condensation can provide water for consumption, it can also adversely affect equipment.

Infrequent but intense thunderstorm activity and frequent windstorms are the major disturbances associated with climate in arid regions. These events are dangerous for both soldiers and equipment and can totally disrupt military operations. During DESERT STORM, however, units were able to overcome the effects of these disturbances.

Terrain Analysis

Arid regions have three characteristic types of topography—basin and range, mesa and scarp, and flat sandy desert.

- Basin and range landscapes include mountains formed by folding and faulting or volcanos, and flat basin floors consisting of dry lake beds and salt flats.

- Mesa and scarp terrain is characterized by severe changes in slope, alternating between steep cliffs and more gently sloped debris cones. This topography ranges from plateaus to canyons, mesas and buttes, and finally to flat desert floors.

- Flat sandy deserts have a variety of sand dunes that are shifted across the desert floor by wind action.

The primary erosive agent in a desert is running water. Even though rain is infrequent, the water easily cuts the relatively soft surface material and, because of the lack of vegetation, creates deep channels. These channels, called *wadis* or *arroyos*, are dry until it rains and then can be filled with water.

Wind action is an obvious erosive agent, but its actual destructive work is less significant than that of water. Weathering also deteriorates rock material, causing dangerous rockfalls and landslides and resulting in talus slopes. Because of the ongoing erosion and lack of vegetation, slopes are generally much steeper in arid regions than in more humid areas.

The rock types in arid regions create a solid bedrock and serve as parent material for both coarse-grain thin soils and huge sand deposits. Finer clays may be found in dried lake beds. The fine texture material found in the DESERT STORM areas of operation created a dust that was particularly annoying.

The vegetation is generally sparse in arid regions and its

type, stem thickness, spacing, canopy, and height are important variations. Some deserts have widely spaced shrubs and cacti, while others have no plant growth except at oases and along wadis, where short, thin broadleaf deciduous shrubs grow about three feet tall.

During World War II, the 60th Infantry Regiment, 9th Infantry Division, described desert shrub in the Bizerte area of Tunisia as amazingly thick. Soldiers actually had to crawl to penetrate the shrub thickets. Other areas may have grasses and small bushes growing in patches, especially during the wetter season. Soldiers in DESERT STORM witnessed such "greening," which provides grazing for camels and sheep. But vast parts of the area of operation had absolutely no vegetation.

The wadis are the drainage features. They can be ten or more feet deep and tens of feet wide. With basin and range topography, channels flow to the basin and into the lakes, which are dry most of the year. Some wadis in Iraq and Saudi Arabia are so shallow that it is hard to tell where they are.

With such inhospitable conditions, few man-made features are found in the deserts. People concentrate in a major center, while small villages may exist near water sources. Roads are few, and great distances separate any settlements.

Military Aspects of the Terrain

Observation and fields of fire are excellent in most desert areas, since one can often see for tens of miles. The atmosphere is stable and dry, allowing unrestricted views over vast distances, but this can also be a problem. Range estimation by "gut feeling" is subject to error. The effective ranges of weapons can be easily reached, and a correct estimation of maximum range is critical for all weapons, especially for wire guided antitank missiles.

Things look closer than they really are. Problems may also result because observation is distorted by surface heat waves that create mirages. The wave distortion is especially accentuated when using optics for observation, range determination, or weapon siting. Heat haze can distort a target so that, depending on its size, it cannot be identified, or even seen, as close as 200 meters. Sensors are also affected by heat shimmer.

Frequently, in desert regions, especially in the DESERT STORM area of operation, there are no landmarks to use. This presents problems for land navigation. A compass and a vehicle odometer must be used to get to the desired location. Another concern is dead space. Even though the landscape appears flat, upon closer inspection it can be undulating with relatively deep wadis and depressions, and these areas must be covered by indirect fire. Additionally, sand dunes and hilly terrain limit observation and fields of fire, and the frequent dust storms can reduce visibility for periods of as little as a few hours, or for several days.

Key terrain in the desert can be almost any man-made feature, a mountain pass, or a source of water, and, of course, high ground. Because there are few man-made features

throughout the expanse of the desert, those that do exist can become important, perhaps even key.

Settlements (where a logistics base may be established), road junctions, shelters, airfields, all become important, simply because they are so few in number. In areas involved with DESERT STORM, paved and even dirt roads were considered key terrain for both high-speed movement and clearly defined direction and location.

Passes through steep topography are also likely to be key, again because they are so few. The North African campaigns of World War II focused on the control of passes, specifically the Sollum and Halfaya. In the Sinai Wars between Egypt and Israel, the Mitla, Giddi, and Sudar passes were key. In Afghanistan, control of the mountain passes provided the Mujahideen safe haven from the Soviets. The oases, where wells exist, become important for water resupply. Units in DESERT STORM found these wells a great source of water. The high ground is always a sure bet for key terrain. The relative flatness and great distances of some deserts, such as in Iraq, make even a large sand dune a dominant feature.

Natural obstacles do exist in the desert, and arid regions are well suited for man-made obstacles. The wadis and steep slopes of escarpments, mountains, hills, and dunes hinder cross country movement. Sand dunes may stretch for miles and prevent direct movement across their length. These sand dunes are often more than 100 feet in elevation and consist of loose sand with high, steep downwind faces that make vehicular traversing next to impossible. In the DESERT STORM area, the salt marshes have crusts on the top that can deceive a vehicle driver. These dry lake beds can become obstacles, especially in the wetter season when the water table is higher. A top crust forms on the surface, but below this crust the soil is moist, similar to marsh conditions. The surface looks like it will have good trafficability, but the crust collapses with the weight of a vehicle and it becomes mired. The high premium on fuel and time makes it costly to go around these natural obstacles. Aerial reconnaissance, immediately before any large movement, is highly advisable, because sand dunes migrate with shifting winds and they may not be where the maps or even photos show them.

Sandy deserts are ideal for employing minefields. Although windstorms can reveal previously buried mines, these mines can still channel movement and deny access to certain areas. The battles of the Bi'R Hacheim Line and El Alamein were influenced by minefields. Other obstacles include ditches, revetments, and barriers, such as the Bar-Lev Line along the Suez Canal, made by bulldozing sand into mounds or by blasting in rocky, mountainous areas to close passes. The Iraqi engineers were superb in their obstacle emplacement. Fire trenches, wire, and minefields stretched across the entire border.

Cover and concealment can be limited in desert regions. The flat sandy deserts provide little, if any, natural cover or concealment, especially from aerial attack or reconnaissance. Ground concealment and protection from fire can be found behind the dunes or in the wadis. When using wadis for

ground concealment, soldiers must be aware of the potential for flash floods.

Some arid regions have vegetation that can provide limited concealment from ground observation. In rocky, mountainous deserts, cover and concealment are best behind large boulders and in crevasses. Daytime vehicular movement eliminates nearly any possibility of concealment or surprise, as dust trails created by the traffic can be spotted for miles. At night, noise and light discipline is critical, as both sounds (from generators and other equipment) and light travel great distances because of the unobstructed flatness and the atmospheric stability. Camouflage can be very effectively employed to improve on natural concealment. Experience in DESERT STORM indicated that desert camouflage nets work well in the more rugged terrain, because they blend in nicely with the color of the soil and rock.

Avenues of approach are not clearly defined in arid regions. The vast, relatively flat areas permit maneuver from virtually any direction. This point became obvious to units establishing defensive positions in DESERT SHIELD. Wide envelopments are possible, as demonstrated in the DESERT STORM ground campaign. Modern sensor technology, limited natural concealment, and improved observation make the element of surprise a challenge. Yet, surprise was achieved in DESERT STORM. Iraqi commanders were shocked when they discovered U.S. tanks in their perimeters.

The major limitation with respect to avenues of approach may be fuel. The great distances a unit must travel to outflank enemy positions require huge amounts of fuel and complicate resupply. This was a concern during DESERT STORM, but logistics and transportation units successfully met the challenge. In mountainous and canyon topography, avenues of approach are much more limited, and the wadis and valleys are likely to be the only possible access routes. Any roads that do exist are probably in the valleys. Nevertheless, none of the considerations outlined above are reasons to preclude the use of such tactics.

Effect on Soldiers

Conditions in arid regions are hazardous to the safety of soldiers and also affect their performance, both physically and psychologically. High temperatures, dryness, and wind can wear them down if they are not properly acclimated and trained to respond to these physical conditions.

Although it is not always feasible, the soldiers may need to live in arid conditions for two to four weeks before they are ready to endure the rigors of the desert. If they know the way desert conditions affect the human body, they can take precautions, and they gain this knowledge through training. Part of training is learning to conserve energy and working wisely—for instance, at night during cooler periods. During the initial deployment period of DESERT SHIELD, units started their day in the early morning, took a break from 1100 until 1500, and then worked until sunset or sometimes well into the night.

Helicopters of 82d Aviation Brigade in Saudi Arabia during Operation DESERT SHIELD.



The intensity of solar radiation can cause severe sunburn, and the glare can injure eyes. The precautions are simple. The soldiers should wear sunglasses, and their clothing should be lightweight and loose fitting, and should cover as much of the body as possible. Wearing clothes properly and developing a suntan gradually (five minutes a day) will prevent burning. Soldiers can also be burned when they touch hot metal; tools and vehicles left in the sun can reach 170 degrees Fahrenheit.

Soldiers learned in Saudi Arabia just how cold desert temperatures can be at night. Temperatures drop significantly as the absorbed solar radiation is re-radiated into the atmosphere. The body needs to be completely covered to maintain warmth. The extreme daily temperature changes can subject soldiers to colds and other respiratory conditions.

Evaporation occurs continuously because of the high temperature and the dry atmosphere. Water is evaporated through sweating and must constantly be replaced. A soldier may lose six quarts of liquid per day doing light work or 13 quarts doing heavy work. A two-quart loss of body fluid can decrease performance by 25 percent while a 12-quart loss can be fatal. To prevent heat-related injuries, soldiers should drink about two gallons of water daily in small amounts, especially in the hot summer.

Being fully clothed helps a soldier retain the cooling moisture on his skin. This is another reason to make sure the uniform is worn correctly. Commanders in DESERT SHIELD and DESERT STORM concur with this point. The hot dry air causes high perspiration rates; skin may appear dry and allow evaporation to go unnoticed. Urine should be checked and if it is particularly dark, it is an indication of dehydration.

Soldiers who do not monitor their water intake may be subject to injuries from excessive loss of body fluid. These injuries include heat exhaustion (which causes dizziness and confusion), salt deficiency (resulting in fatigue, nausea, and cramps), and heat stroke (in which the body's cooling system breaks down and can lead to death). Alcohol and smoking can compound the effects of dehydration.

Because of the constant wind, blowing sand, and dust, protective goggles and ointments may be required to protect the eyes, especially for soldiers riding in open vehicles. Bandannas should be worn to cover the mouth and nose. In DESERT SHIELD and DESERT STORM, soldiers experienced the effect of being constantly sand-blasted.

Because of water shortages, sanitation and personal hygiene are often difficult in arid regions. But if sanitation and hygiene are neglected, disease may cripple units. Diseases transmitted by flies and mosquitoes should also be a major concern of all soldiers. Dengue fever, dysentery, cholera, typhoid, diarrhea, fungus infection, and prickly heat plague soldiers in arid regions. When a soldier gets diarrhea, for example, his body dries out quickly and medics must administer intravenous fluids. To reduce the effects of illness in DESERT SHIELD and DESERT STORM, the chain of command placed great emphasis on sanitation and hygiene.

The "critters" of the desert are another potential risk. It is wise to be alert for scorpions, centipedes, spiders, and snakes in the comfort of cool places, because they seek shade just as humans do. Comments from commanders in DESERT SHIELD-STORM indicated these "critters" were around but had not been nearly the problem they expected.

Twisted ankles or cuts from jagged rocks can result in minor injuries that can incapacitate a soldier and also require another soldier to care for his injury and carry his load. Rockfalls are dangerous, and soldiers should be on alert for cliff instability in mountains and canyons. Even the vegetation can cause injury. Cactus needles and shrub thorns can tear clothing and skin, and the danger of infection is real.

From the psychological perspective, the monotony of the desert, its emptiness, and the fear of isolation or possible physical harm can all affect soldiers eventually. DESERT SHIELD and DESERT STORM commanders indicated that the first weeks of the deployment were especially tough in this regard. Nearly everyone simply hated the Saudi desert.

The relatively constant climatic conditions add to this monotony, and boredom lowers morale. These effects must

be attacked; if a soldier's psychological condition becomes weak, physical dangers can overcome him. To reduce boredom during DESERT SHIELD, commanders made good use of the training opportunity to prepare for hostilities, and the intensive training also kept morale high.

Effect on Equipment and Facilities

Conditions in an arid environment can damage military equipment and facilities. Temperature and dryness are major causes of equipment failure, and wind action lifts and spreads sand and dust, clogging and jamming anything that has moving parts. Vehicles, aircraft, sensors, and weapons are all affected. Rubber components such as gaskets and seals become brittle, and oil leaks are more frequent.

As commanders in DESERT SHIELD and DESERT STORM have often said, the desert takes a particularly heavy toll on tires. Tires absorb the surface heat, their structure is weakened, and jagged rocks or even cactus vegetation can cause punctures. Tire pressure must be constantly checked and adjusted. The large temperature variations between day and night change the density of the air in them; they will deflate at night and inflate during the day. The same is true of any inflatable containers. If they are full at night, expansion during the day can burst them. The same phenomenon applies to liquids. Fuel tanks or water containers that are filled to capacity at night can overflow during the heat of the day.

Vehicle engines are subject to greater strain because of heat. With each ten-degree rise in temperature above 60 degrees Fahrenheit, a one percent loss in vehicle power can be expected. In the heat of the day, that means a loss of six to seven percent. Frequently, lower gears must be used to negotiate the loose sandy soil, and this also strains engines and transmission systems.

Cooling systems must be constantly checked to reduce overheating. Glass is also affected by intense radiation. It can actually crack or glaze over. And batteries are not likely

to hold their charge, especially if too much of the electrolyte evaporates.

Today's Army relies heavily on the electronics in computers, radios, sensors, and weapon systems. The intense heat only adds to the inherent heat that electrical equipment generates. Even in temperate regions, air conditioning is often required for much of our equipment to function properly. Radio operators in DESERT SHIELD and DESERT STORM found that their radios heated up faster; they covered the equipment with damp rags or provided some sort of shade to cool it. Obviously, in the desert environment, air conditioning is needed but it adds another fuel burden.

Heat must also be considered with respect to weapon effectiveness, not just from the components' operation but also in target acquisition and engagement. Sensors and scopes only magnify the heat shimmer or mirage. Targets become distorted, precise locations can't be determined, and gunners miss their targets. Automatic weapons and rapid-firing tank and artillery guns overheat faster, increasing barrel wear and the potential for malfunctions. Rounds may cook off more frequently. The dryness of the soil makes grounding electronic equipment a challenge. In DESERT SHIELD and DESERT STORM, it was difficult to hammer a grounding rod into the soil, and to get a good ground, water and salt had to be poured onto the grounding rod constantly.

The winds blow sand into engines, fuel, moving parts of weapons, electronics, and everything else, and this can reduce equipment life by up to 80 percent. Soldiers must continuously clean and check their equipment. Within jet engines, the sand particles can actually melt into glass, dead-lining the equipment. The rotors of helicopters, turbines, and engine fans are sand blasted, again causing major maintenance and supply demands. This sandblasting also affects optical glass and windshields and distorts the view through them. Protective paints and camouflage become worn quickly. Shelters, tents, and ropes are also subject to increased wear.

In addition to these effects, such natural hazards as flash



Soldiers and HMMWVs in the desert sand heading toward the tent city during Operation DESERT SHIELD.

floods, thunder and lightning storms, landslides and rockfalls, and windstorms can destroy equipment and facilities. (The windstorm that damaged more than 100 helicopters at Fort Hood in 1989 is an example of this potential force.) Storage sites and cantonment areas should be located on the higher ground away from a wadi, but should not silhouette equipment on the horizon. During the rainy season, lightning rods need to be in place. In canyon-like topography, the stability of cliffs needs to be evaluated. Rockfalls and landslides are especially dangerous for equipment and facilities that may be located at the base of slopes.

Effect on Combat Operations

The key to success in desert operations is mobility, and this was clearly evident in ground operations of DESERT STORM. The tactics employed to achieve victory over Iraq were the wide, rapid flanking movements Rommel and Montgomery demonstrated in North Africa.

Trafficability and cross country movement then become critical to the tactics of desert operations. Trafficability is generally a "go" in the desert and cross country movement a lesser problem, but not always. As previously mentioned, salt marshes can create "no go" conditions during the wetter season. Sand can also bog down traffic and make foot movement slow and exhausting. The steep slopes of dunes and rocky mountains can make vehicular movement a "no go." The wadis can create cross-compartmented terrain. The banks of these dry streams can be steep and unconsolidated. Then when it rains, the wadi becomes a torrent of dangerously rushing water, leading to flat lake beds that can create "no-go" mud conditions. In rocky areas, tires can easily be punctured by sharp angular debris. But, overall, movement is mostly uninhibited. And given ample fuel and water resources, units can go around natural and man-made obstacles.

With the loose surface material, movement can easily be detected because of the sand and dust it kicks up. In an actual engagement, this may not be all that bad because a unit is obscured from *direct fire while advancing*, but the element of surprise is probably lost. Moving at night becomes the logical choice. The dust is still there, and vehicles (which should be widely spaced) can get separated. But at night, there is no worry about the reflection of the sun's rays from glass, mirrors, or metal, which can give away movement and positions at distances up to 20 kilometers.

Using the ability to make fast wide flanking movements, a unit can encircle and cut off enemy forces. The Israeli forces under General Ariel Sharon did just that to the Egyptian Third Army in the 1973 War, and the British did the same to the Italians in North Africa in January 1941. In DESERT STORM, the night-fighting AH-64 helicopters combined with field artillery fires made for an unbeatable team in this regard. An armored force raced to the Euphrates River and to static Republican Guard positions, cutting off and destroying Iraqi divisions.

During movement in the wide expanses of many arid regions, land navigation is a challenge. There are few landmarks to key on, and maps and even photos can become outdated quickly, especially in the sandy deserts where dunes migrate. The Global Positioning System (GPS), with the Small Lightweight GPS Receivers (SLGRs), is a major aid for desert operations. Commanders in DESERT SHIELD and DESERT STORM were especially pleased with this equipment. The use of imagery gave the commander up-to-date and timely intelligence and mapping products.

Refuel and resupply operations require periods in which forces assume the defense, but only temporarily. The flat sandy desert topography that is characteristic of Saudi Arabia is not conducive to defense, compared to basin and range or mesa and scarp topography. In mountains and canyons, a defensive posture can be more favorable. Controlling the passes, as mentioned earlier, can essentially close off vast areas to an attacker and make it extremely costly for him.

While a unit is in the defense, it needs both ground and air reconnaissance to detect movements at long range and as early as possible. Obstacles must be emplaced in all types of topography, primarily to slow advances and channel columns. Neglecting these security measures in the flat sandy regions can lead to disaster.

Commanders in DESERT STORM indicate that the enemy was engaged early and at the maximum ranges of weapon systems. They felt that observed fires had to be used because the enemy could move so quickly. OH-58 helicopters, used with AH-64s and long range artillery systems, were the means to this end. But the Iraqis did not really move that much, and unobserved fires, using imagery intelligence, resulted in major kills.

Logistical support becomes more critical in arid regions because of the few man-made features and the lack of resources available from the terrain. Although the influence of logistics weighs heavily on operations, it cannot be allowed to dictate the plan. The plan, whether in the offense or the defense, must consider fuel and water much more seriously, and the logistician must specify the support requirements and plan to meet them. The commander must give the logistician what is needed to keep operations from bogging down.

Combat units may become isolated, which creates intolerable situations for these units and the rest of the theater. The DESERT STORM experience demonstrated the success of logistical planning and execution, and the balance of operations and logistical support.

Effect on Combat Service Support

Support is always a challenge, and an arid environment burdens all types—supply, aviation, communications, and maintenance. Commanders must be sensitive to the constraints, and those providing support must work to overcome them.

Support in desert regions is dependent on a base. A base should be a major transportation-communications hub with a deep water port, major runways, pipelines, road and rail access, storage areas and facilities, and a source for fresh water. The dispersal of the base components is critical, however, and air defense assets must be allocated to reduce the air attack threat.

Such is the ideal, and the ideal is available for most desert regions, but there may be only one such support base, and lines of communication (LOCs) may be 1,500 miles long, as they were in the North African campaigns of World War II. Dhahran, Saudi Arabia, served as the logistics base for DESERT SHIELD and DESERT STORM, and it met the criteria.

Long LOCs require convoys from the support base to the combat forces, and convoys are subject to air attacks (as learned during World War II when convoys from Casablanca to Al Guettar, Tunisia, were frequently targeted by Luftwaffe raids). Night movements appear to be the solution. The Global Positioning System will reduce the major problem, which has always been land navigation. Road networks are limited in arid regions and often channel convoys, and engineers must be devoted to road construction and maintenance. Experience in DESERT SHIELD and DESERT STORM confirms that heavy traffic and prevailing winds raise havoc with roads. The two-lane Tapline Road (MSR Dodge) running from north of Dhahran all along the border between Saudi Arabia and Iraq was the life line of DESERT SHIELD and DESERT STORM and carried a continuous flow of trucks, day and night.

The supply base obviously becomes an enemy objective. Commanders who plan wide envelopments must always have both ground and air forces available to protect the base and the road network. (Dhahran was a major Iraqi Scud target.)

The support element must have facilities for storage and issue, and the few existing facilities may need augmentation. Warehouses, refrigeration units, fuel and water bladders, and maintenance facilities will have to be constructed. Transportation nodes, road, rail, pipeline, port, and air facilities will have to be upgraded.

Aviation support is critical because of the limited road resupply, but both helicopters and fixed winged aircraft are handicapped in arid regions. In addition to excessive wear on parts from wind and sand action, an additional concern is reduced performance, especially with increased temperatures. The hot air is less dense, and this reduces aircraft lift capabilities. The reduction in lift capability hampers the movement of artillery, the delivery of supplies, and the evacuation of units in trouble. Again, night and early morning are the ideal times to conduct airlift operations. Commanders in DESERT SHIELD and DESERT STORM had experienced the lift problems and had made adjustments.

Communications support is also adversely affected by high temperature. The heat causes anomalies in radio and other electrical transmissions, and radio battery life is reduced in the hot temperatures. Radio range is shorter during the day than at night. FM communications range can be reduced by as much as 50 percent because of high temperatures. HF ground wave propagation over the dry sandy soil is reduced. At night, range improves but static electricity may cause interference.

Night communications, with longer ranges, make communication security a concern, as it always should be. Experience in DESERT SHIELD and DESERT STORM indicates vastly expanded ranges with FM radios. Communication between units 40 to 50 kilometers apart was not unusual. Communications obviously affect command and control as well as intelligence collection and dissemination, and their importance must not be underestimated.

Maintenance is a critical sustaining function for military operations. Repairs are dependent on the soldiers and the facilities. The arid conditions affect the soldiers' performance, and the likelihood of fewer hardstands, wash racks, and shelters adds to the challenge of maintenance operations. The biggest irritant is probably wind that blows sand and dust on component parts and into exposed valves. Creating shelters that are free from these effects is difficult, to say the least. In short, repairs take longer, and preventive maintenance at all echelons requires continued command emphasis.

DESERT SHIELD and DESERT STORM commanders have said that even simple operations such as changing wheel bearings were difficult. Maintaining helicopter operational readiness rates required significant innovative techniques, and tentage was a must for nearly all maintenance operations. Yet throughout the war, combat aircraft maintained an amazing 94 percent combat ready rate.

As in all climatic regions, an arid region imposes both opportunities and restraints on soldiers at all levels. The Army has once again successfully fought battles in an arid region; these opportunities and restraints are no longer new. The effects on soldiers, equipment and facilities, operations, and support were understood and addressed. In conducting operations in the future, professional soldiers need only to review these effects and again emphasize them to reduce casualties and to use the environment to advantage.

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TRAINING NOTES



Fire Support Wedge Formation in DESERT STORM

CAPTAIN RONALD A. HOSKINSON

When the 3d Battalion, 82d Field Artillery, 1st Cavalry Division, first deployed to Southwest Asia for Operation DESERT SHIELD, it became apparent that the factors of mission, enemy, terrain, troops, and time (METT-T) would force us to modify our field artillery tactics and techniques. The offensive nature of our mission, and the unique problems encountered in certain areas (command, control, and communications; reconnaissance, selection, and occupation of position; mobility; land navigation; survey; survivability; logistics; and recovery) would require us to develop new tactics and techniques to defeat our numerically superior Iraqi foe.

One of the simplest but most helpful techniques we developed was the battalion wedge formation. It enabled us to deliver timely, accurate, and devastating fire during fast-paced offensive operations without slowing the brigade's momentum. At the same time, we conducted refuel and rearm operations as well as recovering, consolidating, and repairing damaged vehicles.

The Mission

Throughout the deployment, the missions that the 1st Cavalry Division was called upon to perform were almost

exclusively offensive. During DESERT SHIELD, when the United States Central Command mission was to defend Saudi Arabia against an Iraqi attack, the division's role was to serve as the XVIII Airborne Corps' counterattack force.

The division's mission was to conduct a feint up the Wadi Al Batin to fix the Iraqi Republican Guards' attention on that avenue of approach. Its follow-on mission was to join the VII Corps attack once that element had outflanked the Republican Guards. Consequently, it was clear that the division would have to focus its planning and training on the movement to contact, meeting engagement, and hasty attack; raids (artillery, aviation, and armor); and exploitation and pursuit.

The 2d Brigade commander decided to use a brigade wedge formation (Figure 1) with a balanced task force in the lead and two tank-heavy task forces to the right and left rear. This formation was structured so that, in a meeting engagement, only one of the task forces would come into initial contact with the enemy, thereby allowing the other two to maneuver with little disruption. The brigade commander envisioned a fast-paced, non-stop, free-flowing combat operation and placed great emphasis on standardized formations and battle drills

to ensure synchronized execution despite limited time for planning and rehearsing.

To ensure that fire support was adequate and synchronized with the brigade battle drill, the brigade commander and his fire support coordinator (FSCoord)—the commander of the 3d Battalion, 82d Field Artillery—determined that the battalion would have to be able to do the following:

- Emplace the battalion on common survey and deliver accurate, predicted fire support within 15 minutes without the benefit of advance party preparation.
- Emplace close enough to the lead task force to allow the brigade commander the flexibility to develop the situation as he saw fit without having to worry about outrunning his artillery support.
- Disperse the battalion on line and in depth for survivability, without forfeiting the ability to transfer survey control rapidly.
- Maintain the ability to displace rapidly.
- Consolidate combat service support (CSS) assets (both battery and battalion level) to the rear of the formation for easier resupply and recovery without restricting the mobility of the firing batteries.

TRAINING NOTES

- Maintain a steady speed of 20 kilometers per hour.
- Maintain the agility to change directions and orient quickly to either flank with little guidance.

To artillerymen accustomed to adequate planning time, detailed movement orders, advance parties, and column formations, this was a tall order indeed.

Combat Elements

The 3d Battalion, 82d Field Artillery, as the primary direct support field artillery unit for a heavy maneuver brigade, is equipped with 24 M109A3 howitzers organized into three firing batteries of eight howitzers each. (The M109A3 is a 155mm, tracked, self-propelled, nuclear-capable howitzer with a maximum effective range of 18,100 meters when firing conventional separate-loading ammunition, and 23,500 meters when firing rocket-assisted projectiles.) The battalion also has a headquarters and headquarters battery (HHB) and a service battery to provide command, control, and communications and combat service support.

The basic formation we used was battalion in wedge (Figure 2), platoon in wedge, and battery in column (Figure 3). Battery B spearheaded the battalion wedge, with Battery C one kilometer to the right and one kilometer to the rear, and Battery A one kilometer to the left and one kilometer to the rear. The tactical command post (TAC-CP), consisting of the S-3's and the signal officer's HMMWVs (high mobility multipurpose wheeled vehicles) and an M113-series vehicle, was sandwiched between Batteries A and C. The main tactical operations center (TOC), minus the TAC-FIRE trucks (which traveled with the combat trains to prevent them from inhibiting the mobility of the tracked vehicles and HMMWVs), traveled about 500 meters behind the TAC-CP. Overall, the combat element portion of the battalion wedge formation occupied approximately seven square kilometers.

This formation greatly facilitated command and control, flexibility, land navigation, security, and maneuver sup-

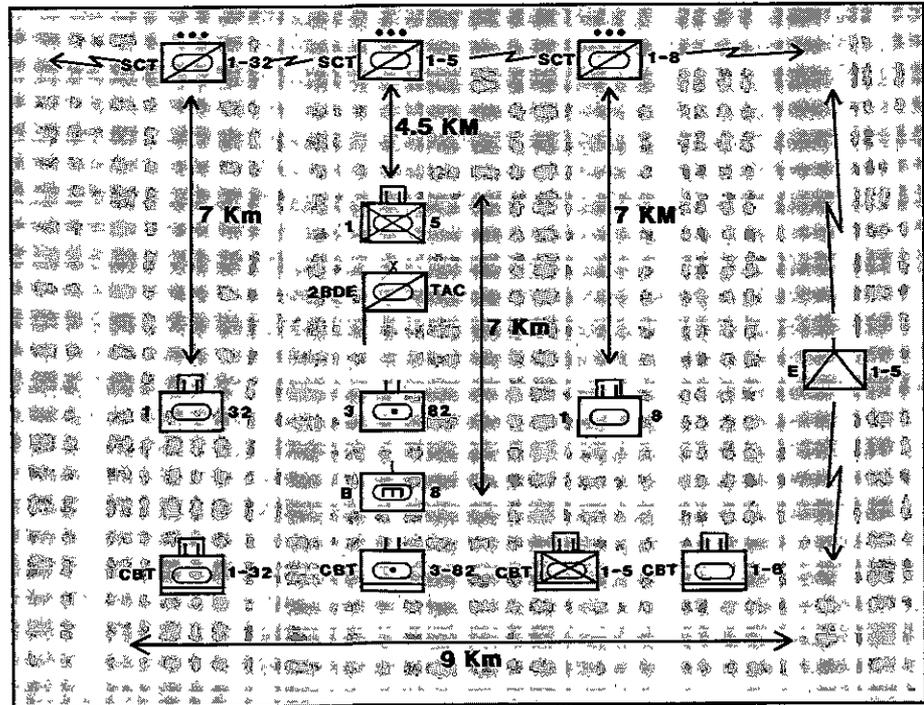


Figure 1. Brigade Wedge

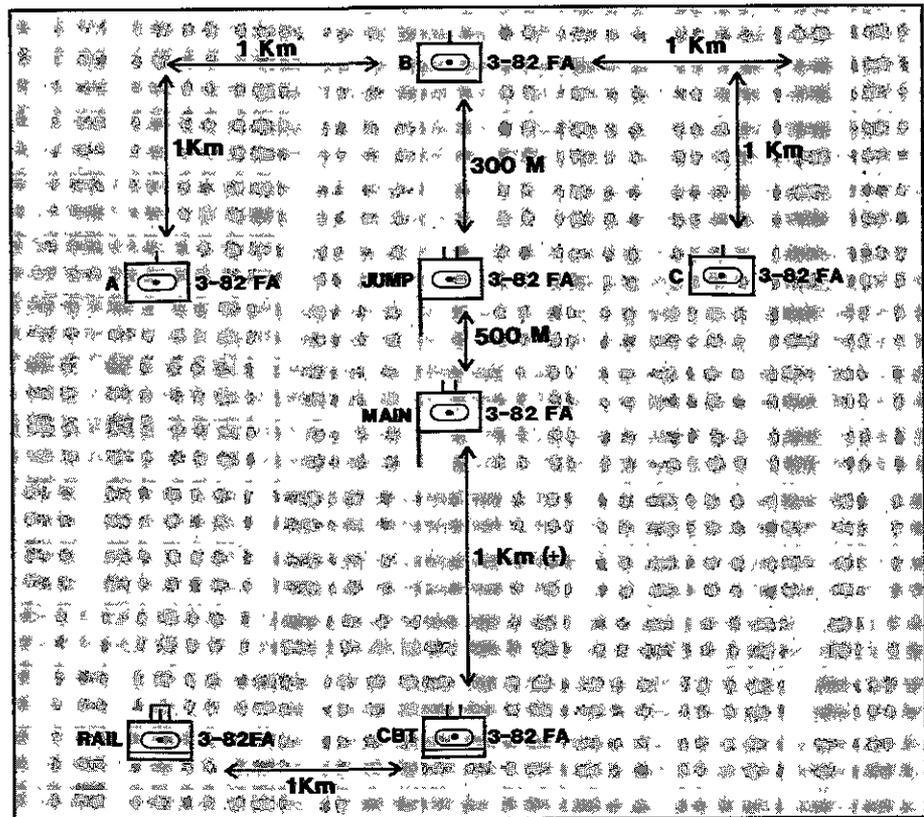


Figure 2. Battalion Wedge

port during movement. As Battery B was the lead element, all other units would move in relation to that battery to ensure that they kept their place in the formation.

The S-3 controlled this formation from the center of the battalion wedge. From this position, the S-3 could normally see all the subordinate elements from his vantage point and—because of

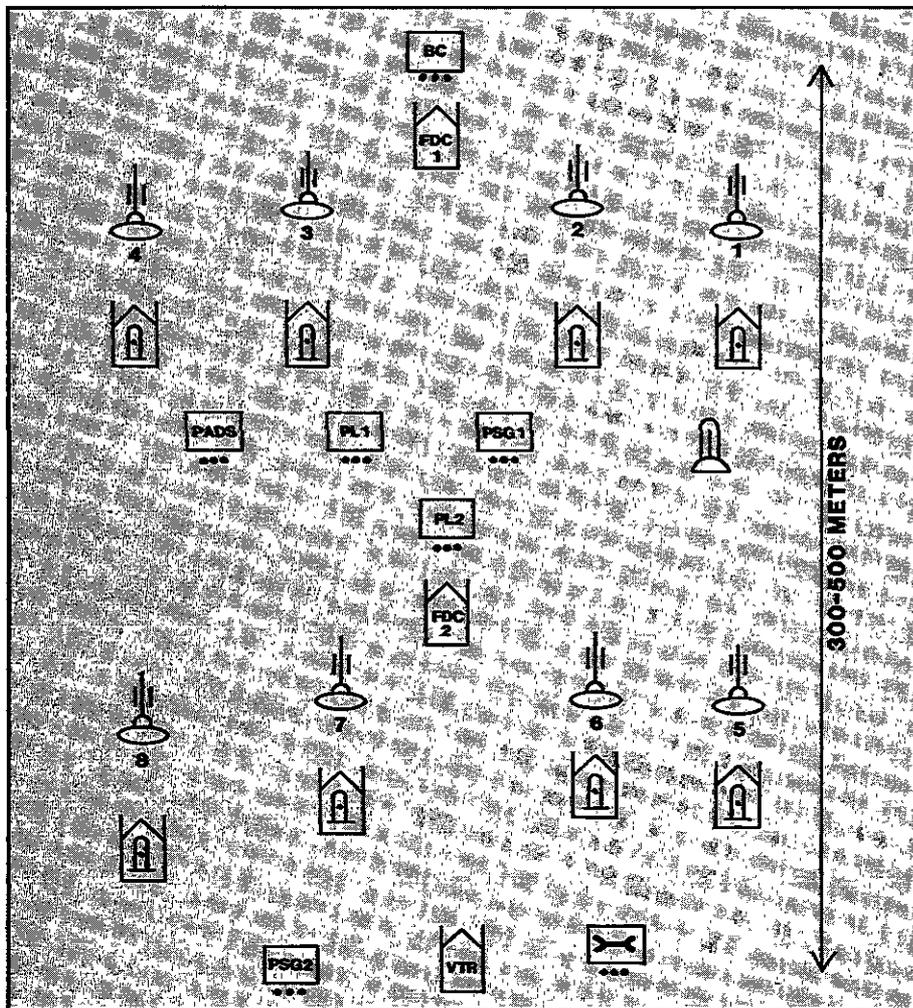


Figure 3. Battery Wedge

the relatively short distances involved and his central location—had excellent FM communications with the firing batteries. If there was a problem, or if an adjustment was needed, the S-3 would see it almost immediately and notify the appropriate battery commander. If the tactical situation dictated an abrupt change in direction of movement, the S-3 only had to issue the appropriate orders to the Battery B commander, and the other two battery commanders would automatically adjust their headings to stay in formation. This enabled us to react to rapidly changing tactical situations without a lengthy orders process or multiple FM transmissions.

The battalion wedge formation also enabled us to make the most of our limited number of navigation aids, specifically the Global Positioning System (GPS) Satellite Lightweight Global Receiver (SLGR), and the LORAN C

receiver. During autonomous operations (such as artillery raids), the Battery B commander was responsible for the entire battalion's navigations. His primary means of navigation was the GPS SLGR, with a LORAN as back-up during periods of limited satellite coverage. To provide redundancy, the other battery commanders and the S-3 would track the battalion's progress with their navigation aids. The battalion wedge formation also allowed us to make navigation a consolidated effort; if a leader lost his bearings, there was always another who could cover for him. Throughout six weeks of combat operations, no battalion element was ever lost in the desert.

The battalion wedge also increased our survivability on the march, as well as our ability to support the maneuver units. During brigade operations, the battalion had two maneuver task forces

on one side and one on the other, which provided excellent security. Any enemy force would have to fight its way through considerable combat power before it got to us. It also gave us maximum range coverage of the main battle area, since the battalion stayed right behind TF 1-5 Cavalry during movement. Of course, the M1A1 tanks and the M2 Bradleys could easily have outrun our M109A3s and FAASVs if the brigade commander had not set the rate of march at a speed that we could maintain.

The biggest advantage the battalion wedge gave us during occupation may have been the ability to transfer survey control rapidly and accurately. Once the brigade made contact and the brigade commander determined that he would need fire support, the firing battery commanders would be directed to emplace along a certain azimuth of fire (using the code word *red dog*). Normally, each firing battery had its own position and azimuth determining system (PADS). (Two of these were organic to the battalion and one was on loan from the division artillery.) If a PADS was not mission capable, or had missed an update, we would use conventional survey techniques to meet the requirement to mass the battalion within 15 minutes of receiving the order to occupy. Our wedge configuration, which maintained line of sight between batteries, made this particularly easy to execute. In fact, we became so proficient in transferring survey and executing hasty occupations that this time standard had dropped to 10 minutes by the end of the war, and 8 minutes was not unusual.

CSS Elements

Our battalion wedge formation facilitated the command and control of resupply, recovery, and medical evacuation operations by consolidating all CSS assets (minus the field trains, which remained with the brigade support area) under the control of the battalion XO. These assets included the combat trains (under the HHB comman-

TRAINING NOTES

der) and the firing battery trail party (under the senior firing battery first sergeant).

The combat trains consisted of the battalion combat trains command post, ammunition platoon, battalion maintenance, POL section, TACFIRE vehicles, and the battalion aid station. It traveled approximately one kilometer behind the battalion TOC, although the tracked combat vehicles, with their superior off-road mobility, often outran it during sustained operations.

The firing battery trail party, consisting of the firing battery supply and tool trucks, traveled about one kilometer to the left of the combat trains. Trailing everybody was the battalion XO, with the battalion mortar officer and the forward support battalion maintenance contact team.

The XO, by consolidating the CSS assets—most of which used two-and-one-half-ton and five-ton trucks and HEMTTs (heavy expanded-mobility tactical trucks)—was able to spend his time conducting logistics operations instead of tracking down lost or disabled trucks. Heavy wheeled vehicles just could not keep up with the tracked vehicles during off-road desert movements. We accepted that from the beginning and decided that it was better to keep them in a group with communications and navigation aids.

Another advantage our battalion wedge formation offered for CSS oper-

ations was that the standard layout of the formation, and the limited distances involved, eliminated any problems with navigation. Since the combat trains and the firing batteries could normally see each other, we could send fuel and ammunition HEMTTs back and forth between the batteries and the trains, without having to devote leaders and navigation aids to the task and worrying that they might get lost. Conversely, the firing batteries could easily find the battalion aid station if they had casualties to evacuate.

The battalion wedge formation also eased maintenance and recovery operations. From this vantage point, the battalion XO and battalion motor officer could see most (if not all) of the vehicles that broke down. This, coupled with the fact that they retained control over most of the battalion's maintenance and recovery assets, allowed them to "police up the battlefield" quickly and effectively.

As useful as we found the centralized approach to CSS operations, it sometimes made more sense to decentralize it to some extent. This was particularly true during exploitation and pursuit operations; the combat vehicles would leave the trains so far behind that timely resupply could not be expected. In such cases, the combat vehicles would take their CSS with them.

For example, the firing batteries used their organic M332 ammunition trailers

to carry five-day Class I basic loads (both rations and potable water). Three or four ammunition HEMTTs would normally accompany the TOC to give the firing batteries ammunition they could get to easily if they needed a quick reload. Occasionally, depending on the tempo of the battle, we would have one or two HEMTTs accompany each firing battery so they could reload as they fired. HEMTTs, with their superior off-road mobility, had no problem keeping up with the tracked vehicles. Our fuel tanker HEMTTs gave us similar flexibility with Class III resupply.

We found that the tactics and techniques we had practiced in Central Europe, Korea, and the United States were not always relevant to mobile armored warfare over the flat, empty deserts of the Arabian peninsula. Consequently, we adapted to the environment and the tactical situation. The result was the battalion's wedge formation and battle drill, which proved their worth in combat.

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Combat Lifesaver Training

LIEUTENANT KYLE C. CAMPBELL

The modern battlefield poses the challenge of continuous casualty treatment and evacuation, and there are too few soldiers in medical military occupational specialties (MOSs) in units to

provide that care. By doctrine, infantry and other combat arms companies have one medic per platoon and one senior medic at the company aid post or the company casualty collection point. A

combat arms battalion has an organic medical platoon consisting of 24 to 32 medics.

Realizing these limitations, the U.S. Army Academy of Health Sciences

developed the Combat Lifesaver Course as part of its continuing effort to provide health service support to forces operating on the AirLand Battlefield. Combat lifesavers, if they are used properly, will greatly increase both the quality and the promptness of treatment given to both battlefield and non-battlefield casualties.

Combat lifesaver training forms a bridge between the self-aid and buddy-aid training given to all soldiers during their basic training and the training given to medical specialists (MOS 91A).

A combat lifesaver is a non-medical soldier who has been trained to provide emergency care as a secondary mission. He provides care to the members of his squad, team, or crew as his combat mission permits. When there is a combat mission to perform, the combat lifesaver helps the medic provide care to injured soldiers and evacuates casualties.

Since many units conduct multiple squad-sized missions, combat lifesavers may provide initial triage and emergency medical care while the platoon medic is enroute. It was in this situation that the 4th Battalion, 9th Infantry, designed its combat lifesaver course and sustainment training.

As the medical platoon leader, I had a number of objectives to accomplish as the training outline began to develop: Provide quality training for the soldiers in non-medical MOSs; make the best possible use of our training resources and training areas; and provide challenging and realistic training.

With these objectives in mind, I then identified the major training support requirements—obtain combat lifesaver course manuals for the students and the instructor; have enough Class VIII medical supplies on hand to support the training; request enough supplies in Classes I, IV, and V to support the four phases of training; and schedule training areas and equipment for instructor rehearsals and the actual course instruction.

In Phase I of the course, 64 soldiers were enrolled as a group in the ISO824 and ISO825 combat lifesaver correspondence course program. Upon com-

pletion of this course, each soldier had earned 40 hours of correspondence course credit and eight promotion points. This first phase consisted of classroom instruction covering medical self-aid and buddy-aid tasks.

Phase II consisted of two written tests and hands-on testing of the Phase I tasks. To graduate, a student had to pass each written examination with a score of 75 percent or better and receive a "go" on all hands-on tests.

Phase III consisted of the following:

- Basic communication tasks (operate an FM radio (AN/PRC-77); enter a radio net and authenticate; send a radio message, including a nine-line medical evacuation request; and operate a field telephone).

- A land navigation course.

- Water obstacle and survival training, construction of a rope bridge and poncho rafts.

- Evacuation of casualties; one-man and two-man carries; construction of improvised litters; loading and unloading a front-line ambulance, a two-and-one-half-ton cargo truck, and a medical evacuation (MEDEVAC) helicopter.

- Basic pathfinder and air assault techniques, including the establishment of landing and pickup zones, arm and hand signals, and calling in helicopters.

In Phase IV each soldier was required to negotiate a trauma lane under simulated battlefield conditions. The students were given a scenario that included three to five casualties, each of whom had any two of the following injuries: head wound, chest wound, fractured limb, abdominal wound, sucking chest wound, amputation, hypovolemic shock, and requiring an intravenous infusion.

The students were also required to conduct triage and treat the casualties within 30 to 45 minutes, depending upon the number and type of casualties they were treating. Each student was evaluated by medics who had been selected after going through similar casualty trauma lanes as part of earning their Expert Field Medical Badges.

The battalion's combat lifesaver sustainment program includes annual medical modules such as general subjects,

airway management, application of special dressings, splints, and fractures, intravenous therapy, environmental injuries, chemical agent casualties, and transportation of the sick and wounded.

In addition to these required modules, we have incorporated a number of additional tasks including evacuation of casualties using wheeled and tracked vehicles and aircraft, triage and treatment of multiple casualties and injuries, casualty treatment and evacuation in an urban environment, evacuation of casualties over a litter obstacle course (high wall, low wall, uphill, downhill, wire, and trench), and a high angle evacuation confidence course.

Any soldier can be a combat lifesaver, regardless of his MOS, but I recommend that personnel who are not mission essential be selected. This frees leaders and operators of critical weapons to continue the mission. In combat service support units, equipment and vehicle operators and track commanders, as well as personnel in each section, should be selected as combat lifesavers.

The quality of combat lifesaver instruction depends upon the realism of the training, the knowledge of the instructors, the supplies and equipment available, and the desire of the soldiers. Our course was designed and presented with great enthusiasm. The battalion trained 64 soldiers, with 56 graduating, and currently has 94 combat lifesavers, with at least two per squad or section or six to eight per platoon.

With a limited number of medical personnel, the addition of combat lifesavers to the battlefield helps units fill the void. The Health Services Command continues to review medical support doctrine, capabilities, and training to maintain its commitment "to conserve the fighting strength."

Lieutenant Kyle C. Campbell, Medical Service Corps, is medical platoon leader in the 4th Battalion, 9th Infantry, in Alaska. He is a 1988 ROTC graduate of Boise State University.

Mortar Employment in Korea

LIEUTENANT CHADWICK W. STORLIE

The 4.2-inch mortar platoon in a mechanized infantry battalion, when correctly employed, provides the commander with an invaluable fire support asset. As part of his organization, it is responsive and potentially effective. But all the battalion level maneuver and fire support planning and coordination are wasted if the mortar platoon leader fails to maneuver and employ his platoon properly.

The following elements are critical to the platoon's tactical operation:

Platoon SOP. A comprehensive, organized, and well-thought-out SOP is the cornerstone of a combat-ready mortar platoon. The SOP should cover vehicle load plans, maintenance, packing lists, actions on enemy contact, assembly area procedures, preparing for combat, local security, hipshoots, day and night occupation of a firing position, battalion alert procedures, blank operations orders, and fire direction center operations.

The SOP has three major functions: To serve as an instant source of reference for all members of the platoon; to speed the integration of new personnel; and to ensure that critical combat tasks, such as boresighting and maintenance of all weapons, are considered.

The SOP should not be considered a rigid guideline. It should be combined with common sense and considerations of METT-T (mission, enemy, terrain, troops, and time) to form the basic system under which the platoon operates while in the field.

Battle Drills. A battle drill is any mission essential drill that the platoon or

section does. Some examples are tactical road marches, day and night occupations of both hasty and prepared positions, hipshoots, firing position reconnaissances, reaction to enemy ground attack, reaction to indirect fire, reaction to aerial attack, and reaction to nuclear, biological and chemical (NBC) attack.

In a fast-paced battle where there is little or no time to give complex orders, simple, workable battle drills are essential. If these drills are rehearsed to a high standard of proficiency, the mortar platoon will be ready for immediate employment. The SOP plays a key part in successful battle drills; even when key leaders are absent, the next soldier in the chain of command can execute a drill with little loss of mission performance.

Terrain and Weather. The Korean terrain, combined with the bone-numbing cold and sweltering heat, make the country itself a formidable opponent.

Korea is composed mainly of steeply graded hills and rice paddies. The ideal position—at the base of a hill on the reverse slope that protects the platoon or section from direct and indirect fire—is rarely possible. Too often, steep paddy dikes, uneven slopes, and maneuver damage considerations prevent reverse slope employment. River beds, untilled fields, and terrain mortar positioning (TMP) offer the best positioning solutions.

TMP uses non-standard formations of fitting the platoon or section to the terrain available and then uses the M23 mortar ballistic computer (MBC) to correct for differences in individual mortar

carrier positioning. This may mean that a platoon or section is zigzagged around an area, but the MBC takes this into account and still allows the mortars to fire parallel sheafs.

The rugged and compartmented terrain in Korea—along with the lack of dedicated maneuver areas and the conscious decision to limit maneuver damage—often confines movement to roads. In addition, the surface conditions of the rice paddies require a thorough reconnaissance. A vehicle can become mired on a seemingly firm piece of ground, even in winter.

As for the weather, the winter cold will freeze the grease in standards and turntables, sap the energy of batteries in hours, and dampen the morale of the soldiers. The summer heat will make soldiers listless, and humidity or moisture will fog the M53 mortar sights.

The best defenses against the terrain and weather are strong leadership and a comprehensive maintenance program. Strong leaders can form tactically sound solutions and motivate soldiers to perform well regardless of the conditions. Good maintenance can help ensure that equipment is ready to perform even under grueling conditions.

Platoon or Section Operation. The pace of mechanized infantry operations and the large maneuver area covered usually dictate split section operations as the standard maneuver method. Split section operations ensure full coverage of the task force sector, provide continuous indirect fire support, offer increased survivability for the platoon, and allow the platoon to react better to

changes in the tactical situation.

A disadvantage is that split section operations put an added strain on the platoon's leaders. The platoon leader must stay in contact with both section leaders and keep up with the entire tactical situation so he can position the sections properly. In addition, he must communicate with the fire support officer to make sure the fire support plan is being carried out correctly, reconnoiter advance positions, and anticipate the way changes in the tactical situation will affect mortar employment.

The platoon sergeant must also keep informed of the tactical situation in case the platoon leader becomes a casualty. In addition, he must track the positions of both sections and respond to their requests for maintenance and resupply.

Despite these demands, split section employment usually meets the task force commander's requirement for mortar support better than platoon positioning or three two-gun "sections."

Platoon positioning offers easier command and control and logistical support, but there is little terrain on which an entire platoon can position and have sound tactical security. Without that security, the entire platoon can easily be destroyed by either enemy counterbattery fire or enemy infantry.

The use of the platoon leader's vehicle as another FDC allows three two-gun sections to be employed, which permits greater coverage of a wide area, provides three viable indirect fire support assets, and can decentralize fire support control directly to the mortar section or company team level. But it also significantly increases command and control and logistics and reduces the effects of the mortar fires on separate targets.

A key question in positioning a mortar platoon is how far forward to place the sections. A good guideline in the offense is one-half to two-thirds of the maximum range of the M329A2 high explosive round (6,840 meters) forward of the FLOT (forward line of own troops). But this distance needs to be adjusted to the task force commander's maneuver concept.

During movement, unless the maneu-

ver plan dictates otherwise, the mortar platoon needs to be 300 to 400 meters directly behind the lead element. One reason for this is the increased tempo of operations for units with Bradley infantry fighting vehicles. Another is the long train of rear fighting units and logistical vehicles that can clog the narrow roads (often one-lane with steep drop-offs on either side) and prevent the mortars from getting to the fight. Following closely behind the lead elements also requires the mortar platoon to pay close attention to local security and the battle immediately ahead.

The *one-half to two-thirds guideline* also works well in the defense, but contingencies must be anticipated and multiple positions planned that will enable the platoon to provide the most responsive and effective fire support.

Local Security. Mortar platoons and sections often neglect local security and with grave consequences. Security always needs to be 360 degrees and 24 hours a day, no matter what friendly units may be in the area.

Reconnaissance parties must use clearing techniques to ensure that no enemy personnel are present. They must also use NBC detection measures (M256 kits, M8 paper, M8 alarm) to avoid chemical contamination. At night, all members of the reconnaissance party need to have night observation devices (NODs), and the unit's M2 .50 caliber machinegun must have the night sight mounted on it with the flash suppressor attached to the barrel. Finally, vigilant security must be maintained during quartering party operations to prevent an enemy ambush.

Any available cover and concealment must be used in positioning. Mortar carriers need to be positioned so that they are protected by berms or concealed among weeds and small trees; or they can use tank and artillery firing positions of the Republic of Korea Army that offer good protection from both direct and indirect fire. The section must still have unobstructed mask and overhead clearance so it can fire to its full capabilities.

Camouflage is another important consideration because of the potentially

devastating effects of enemy attack helicopters and indirect fire. Camouflage nets need to be erected immediately in the defense and whenever possible in the offense. Using available concealment to the greatest extent possible is often the best solution during quick offensive movement.

The next step is to develop a local security plan that emphasizes the use of observation, automatic weapons, and individual fighting positions. An observation post (OP) needs to be placed out at once, usually on the side or top of a hill for the best observation. The OP should have communication (either wire or radio) back to the firing position, binoculars for observation, and the M60 machinegun—with tripod, traversing and elevating mechanism, and AN/PVS-4—for firepower.

The soldiers in the OP dig hasty fighting positions for protection against enemy ground attack. The section leader orients his three M2 machineguns along the most likely mounted and dismounted avenues of approach. Next, he gives each squad a sector of fire to ensure all-around coverage. The squad leaders have their soldiers begin digging hasty fighting positions, at least two per mortar carrier.

Once the digging has begun, each squad leader prepares two copies of each range card for the machinegun and each of the squad sector sketches. The section leader then assembles all the squad range cards and makes two copies of a section sector sketch. During limited visibility, the section leaders need to be reminded often to make the best use of observation devices (including NODs), automatic weapons, and individual fighting positions.

Time permitting, obstacles can be constructed, local security patrols sent out, and fighting positions further improved. Every member of the platoon or section must know the location of the rally point in case the unit is attacked in position and must disperse. Local security is an inherent task for all operations, but one that no leader can afford to neglect or take for granted.

Communications. The mortar platoon should monitor a variety of radio

nets. The platoon leader needs to monitor the battalion command net and the mortar FDC voice net. The platoon sergeant should monitor the mortar FDC voice net to stay abreast of the fire support situation and then move over to the battalion administration and logistics (A/L) net whenever necessary to coordinate logistics. The FDCs should monitor the battalion command net, the mortar FDC voice net, and the platoon internal net.

Absent from this list is the battalion fire support element (FSE) digital net. There are only three potential solutions to this problem: Have the FSE tell the mortar FDC when a digital message is coming so the FDC can turn to the digital net; have the FDC monitor the FSE digital net instead of the platoon internal net; or outfit the FDC with an additional radio system.

Each of these solutions has its drawbacks. Having the FDC switch channels to the digital net interrupts digital communication, and not having the FDC monitor the platoon internal net can be catastrophic to a platoon leader's maneuver plan when he needs to contact the section FDCs. It is difficult for the mortar platoon to find two extra radio systems in the battalion to place in the FDCs. But the best solution is to have the FDC monitor four radios to ensure instant digital communication between the FSE digital message device (DMD) and the MBC.

The SINCGARS radio system, combined with the KY-57 Vinson device, is the best tactical radio system in use today. Its ability to hop frequencies prevents enemy jamming and radio detection finding. If the SINCGARS is to function properly, however, all soldiers and leaders must be trained on it and experienced in using it. Losing the correct frequency-hop time on the SINCGARS can be devastating to a task force's fire support plan and to the platoon leader's employment plan.

Logistics. There is rarely an area more troublesome to the successful tactical employment of a mortar platoon than logistics. Broken-down vehicles, lack of fuel and equipment, late rations, and lost ammunition resupply trucks are

only a few of the logistical challenges.

The mortar platoon sergeant is the primary coordinator and logistician for the mortar sections, but the process begins with the section leaders. A section leader identifies any maintenance problems (on DA Forms 2404), fuel and ammunition status, or any parts needed. He then informs the platoon sergeant over the platoon internal net of the section's status and the logistical support it needs to continue the mission. The platoon sergeant can either request the necessary support over the battalion A/L net or go directly to the combat trains to coordinate for it. The platoon sergeant gives the section's position to the appropriate maintenance section and is usually responsible for leading the maintenance team, fuel truck, or ammunition resupply truck to it.

The fuel truck is brought along with the evening meal, and feeding and refueling are accomplished at the same time. Refueling in the dark prevents a compromise of the section's position. In-position refueling allows the section to continue providing fire support, prevents disturbing the lay of the mortars, retains the position of the automatic weapons, and eliminates unnecessary noise from tracked vehicles. The section leader must manage his personnel carefully to ensure efficient feeding and refueling, as well as security.

Vehicle breakdowns are another area of concern for the platoon sergeant. Each section's M577A2 is equipped with a tow bar and shackles that enable the section to recover one of its own vehicles in the position. Vehicles almost always break down, however, while the platoon is maneuvering to a new firing position. In such cases, the section leader immediately calls an eight-digit grid coordinate of the disabled vehicle's location to the platoon sergeant on the platoon internal net. The section continues to its next firing position, and the platoon sergeant takes over the recovery and repair of the disabled vehicle. The platoon sergeant communicates with the vehicle crew over the platoon internal net and receives a damage assessment from the

squad leader. He then contacts the combat trains maintenance team, which dispatches either a team with parts or an M88 recovery vehicle. The platoon sergeant receives an updated damage assessment from the maintenance team, informs the platoon leader, and either takes the repaired vehicle to its next firing position or plans to pick it up later at the combat trains after it has been repaired.

For ammunition resupply, a five-ton truck is brought from the field trains to the section positions under the supervision of the support platoon leader. The platoon sergeant coordinates with the support platoon leader (using the battalion A/L net) on section positions and the amount of ammunition needed. The FDC chief computer is responsible for tracking ammunition status and informing the platoon sergeant when each section has expended half of its basic load. It is critical that the platoon sergeant be informed when a resupply of ammunition is needed.

The practice of using the platoon sergeant as the primary logistician places strain on him, especially since he has only one M998 HMMWV. If two vehicles break down at two different positions, the platoon sergeant must quickly decide which task can be handled directly by maintenance and which requires his direct attention. Employment by section doubles the platoon sergeant's logistical tasks, and employment by three two-gun "sections" triples them. Whenever it is necessary to use three sections, the platoon sergeant and platoon leader must coordinate in advance with the combat trains so they will be prepared to help with maintenance, refuel, and feeding operations without the platoon sergeant's direct assistance. The platoon sergeant should still be in charge of the platoon's logistical operations, but his role should be that of a coordinator so he can maintain overall logistical control and then determine which section's logistical tasks require his presence.

The platoon sergeant's role as logistician removes him from the tactical play of the battlefield, and the section lead-

ers must be trained and experienced enough to operate independently. The platoon leader coordinates tactical decisions directly with the section leaders and contacts the platoon sergeant to discuss both the tactical and the logistical situations.

Maintenance. A mortar platoon lives or dies by its maintenance practices. The M106A2 mortar carrier and M577A2 command post vehicle are aging pieces of equipment that require special care. In addition to these vehicles, there are the M30 mortar system, M53 sight, M2 .50 caliber machinegun, SINCGARS radio system, M23 MBC, M2 aiming circle, night observation devices, individual weapons, and protective masks.

None of these items is more important than the other. All of them must have weekly preventive maintenance checks and services to operations manu-

al standards with status written up on 2404s. The equipment must also be cleaned, repaired, and serviced. In the field, at least one 2404 on each vehicle usually must be written up daily and given to the platoon sergeant to take to the combat trains. All other items must be checked to standards and any deadline defects recorded on 2404s.

A good maintenance program should be an integral part of the mortar platoon's operation, and quarterly services must be a period of high intensity maintenance, with the sole objective of improving the platoon's equipment readiness status. Services must be coordinated not only with the company maintenance officer, but also with the communications repair shop, the armorer, and the direct support weapons repair shops. These services must include protective masks, NBC equipment, and TA-50 equipment, all of

which must be thoroughly cleaned and inspected.

Platoon SOPs, battle drills, the Korean terrain and weather, platoon and section operations, local security, communications, and logistics and maintenance are the essential elements of the successful tactical employment of a 4.2-inch mortar platoon. These building blocks should not be restricted to the platoon's immediate chain of command. They should also have the attention of company commanders, battalion commanders, and battalion S-3s as a part of planning and executing mortar platoon training and operations.

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Scouts

Engagement and Risk Assessment Criteria

CAPTAIN KEVIN J. DOUGHERTY

Stealth is a key element of all reconnaissance operations. In a textbook reconnaissance, the scout platoon moves undetected to its objective, gains whatever information is required, and reports that information without the enemy ever knowing it was there.

Of course, this is all easy to say and hard to do, and it does not address all battlefield situations. For this reason, standing operating procedures (SOPs) and orders for scout platoons (and other units that conduct reconnaissance) should include instructions for two key criteria—target engagement and risk

acceptance.

It is almost universally accepted that the scouts are the "hunters" as opposed to the "killers" on the battlefield. As far as direct fire goes, the scout platoon's limited size and its lack of automatic weapons make this pretty much a foregone conclusion. But the scouts' ability to call for and adjust indirect fire does provide a tremendous potential for destruction.

During a rotation at the Joint Readiness Training Center (JRTC), for example, a scout squad pinpointed the opposing force's battalion supply point and

destroyed most of the site. The mission was performed without a single friendly casualty. Such success is rarely achieved by entire battalions during deliberate attacks against similar objectives. Obviously, then, there are times when it is appropriate for scouts to be "killers." The question is, "When?"

It is too late to begin answering this question when a scout observer finds himself frozen behind marginal concealment with an enemy platoon on a direct azimuth to his location. His actions must be guided by what he has already learned from SOPs, the opera-

TRAINING NOTES

tions order (OPORD), and the commander's intent. Before he ever passes through friendly lines, his leaders must check his knowledge of this information. This is best accomplished by a series of "What if?" backbriefs: "What if you find yourself in Situation X? What will your actions be?"

The scout leader must train this soldier on at least four contingencies that will affect a decision to engage a target:

- The need for self defense.
- The availability of combat forces in the area.
- The effect of the engagement on future operations.
- The importance of the target.

The cases involving self defense are the most clear-cut. All scouts must be able to engage the enemy to protect themselves. Usually these situations involve using short-range direct fire and breaking contact as soon as possible after an engagement.

If self defense is not the issue, the next question the scout must ask himself is whether there are combat forces in the area that can destroy the enemy better than he can. He must remember that he is trained and equipped to locate, observe, and report the enemy, while the soldiers in the rifle companies are trained and equipped to close with and destroy the enemy. If a combat force is in a position to destroy the enemy, the scout should report his observation and leave the killing to the better-equipped force.

If no combat forces are in the region, he must ask himself the next question. What effect will the engagement have on future operations? These future operations include both the scout's reconnaissance effort and the battalion's overall mission.

Engaging the enemy with direct fire will probably disclose the scout's position and affect his ability to continue his reconnaissance. It may also cause the battalion to forfeit surprise by alerting the enemy to its interest in the area. Indirect fire is less likely to disclose the scout's position, and he may be able to continue operating in the area without being detected. But even indirect fire will increase the enemy's alertness and,

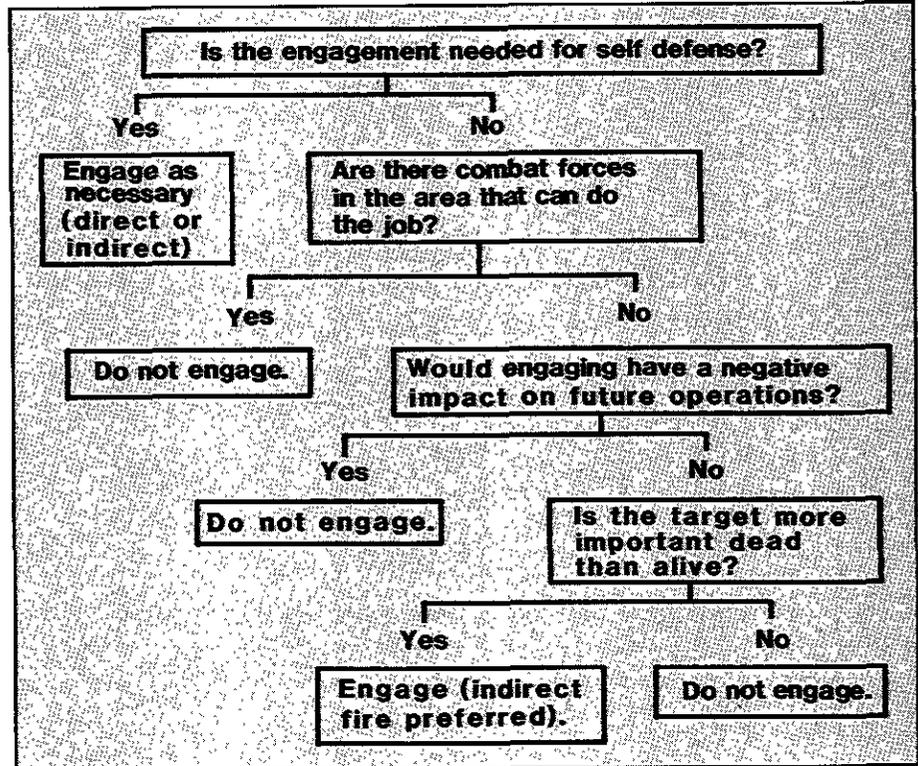


Figure 1. Engagement Criteria

if surprise is critical to success, may hinder the battalion's mission.

The next question the scout must ask himself is whether the target is worth more dead or alive. The battalion commander should tell the scout which targets are so threatening to the mission that they must be destroyed, no matter how or by whom. Depending on the conditions of METT-T (mission, enemy, terrain, troops, and time), such targets might be tactical operations centers, air defense positions, or indirect fire weapons.

Other targets, because of their intelligence potential, may be more valuable alive. For example, a team of soldiers moving with empty rucksacks may lead the scouts to the enemy's supply point. Obviously, the value of this information outweighs the value of killing the team. But once the team has led the scouts to

the supply point, the supply point itself may be one of the targets the battalion commander wants destroyed by any possible means.

While a scout has little organic firepower, he does have the ability to summon the great firepower of the artillery, the mortars, and close air support. Whenever he chooses to engage, his preferred method should be indirect fire. A decision tree such as the one shown in Figure 1 may help scouts learn when to engage and when not to engage.

The other criterion that scouts need to know about is risk acceptance, and this is also closely tied to the commander's intent. If left to his own devices, the average scout will continue to get closer and closer to the objective, seeking more and more information, until he is eventually compromised. In the pro-

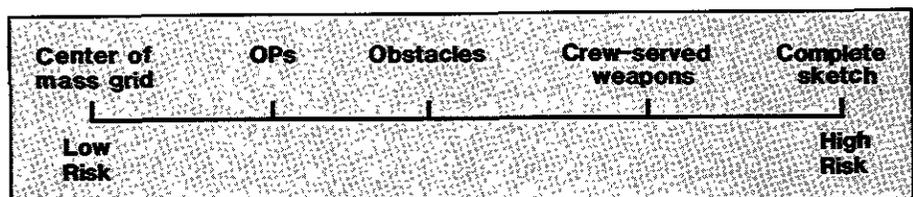


Figure 2. Risk Assessment

cess, he may get a complete sector sketch of the objective, but the loss of a scout patrol or the element of surprise may be a higher price than the commander is willing to pay, even for such detailed information. The scout may also find himself in the ineffective position of having gained valuable information that he cannot relay to anyone because he has been compromised or lacks freedom to maneuver.

Thus, the commander must tell his scouts when they should be satisfied with their efforts. He must realize that if he is not willing to accept much risk, he is not going to get much information either (Figure 2). At this end of the spectrum, he might task the scouts only with determining a center of mass grid to the objective. The scouts can do this easily by merely locating the enemy's exterior defensive positions in each cardinal direction and then extrapolating the grid in the middle. In fact, they may be able to get a good estimate based solely on the noise from generators, vehicles, or radios without ever actually seeing anything.

Exchanging minimum risk for minimum information may be appropriate if

the commander wants to engage the enemy only with area weapons such as artillery or close air support, or if he is not interested in attacking at all but needs to know the enemy's location in order to bypass it during an infiltration to another objective.

At the other end of the spectrum is a case in which the commander is willing to accept maximum risk in exchange for a complete sector sketch of the objective. This is hard work, and the commander must realize that the scouts stand a greater chance of being compromised. But if he is planning a non-illuminated night attack of a fortified position, for example, he may need this degree of detail and be willing to accept more risk to get it.

In between these two extremes are various degrees of information and risk. Locating observation posts is not too difficult, because it can be done from positions well outside the enemy's perimeter. Bypassing observation posts to locate obstacles and possible breach points is more difficult. These posts are closer to the main defensive positions and are usually covered by observation and fire.

Pinpointing crew-served weapons requires reconnaissance even closer in, and it is more difficult because these weapons are almost always manned by alert gunners. Gaining information about crew-served weapons by probing or by trying to draw fire is an example of accepting more risk to get more information. (The Chinese communists became very adept at this technique during the Korean War.)

A scout has a tough job, and the success or failure of a battalion's mission often depends on his actions. If the engagement and risk acceptance criteria are clearly specified in SOPs, orders, and the commander's intent, a scout has a better chance of acting in accordance with his commander's wishes when he has to make tough decisions on his own.

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Training Management Tips

CAPTAIN DAVID H. JOHNSON

As a new company commander, you may find training management frustrating, in spite of the clear and specific guidance in Field Manual 25-101, Battle Focused Training. Two sources of this frustration are the newness of the process and the method you use in applying the guidance.

I would like to share a method of managing training that proved effective for me. I learned it through trial and

error, and I hope it will save you time and give you some insight into managing training at company level. This method is not intended as a substitute for the methods found in the manual but as a supplement.

Begin the process by transferring the battalion long-range training plan into company training weeks. I preferred a format that gave seven days and listed resources (Figure 1). Breaking the plan

into weeks gives you a manageable time period for two reasons: Training schedules are done by weeks, and most weeks will have central training themes.

Once you have transferred the battalion training plan to your weekly calendars, check other calendars for events you may have missed or put on the wrong days. Some examples include holidays, paydays, division and brigade compensatory days, leader training, and

TRAINING NOTES

the like. If you find a conflict, get with the battalion S-3 to resolve it.

Next, list the training you must conduct, as specified in the battalion commander's training guidance. Be sure to include ranges, road marches, officer professional development (OPD), non-commissioned officer professional development (NCOPD), mission essential task list (METL) tasks, and collective and individual tasks. Then go see your training clerk and get a list of all the mandatory training due the following quarter. Some examples include physical training (PT) tests, weapon qualifications, NBC (nuclear, biological, chemical) team training, and security briefs. Next, check with your executive officer (XO) for a list of services due and any upcoming inspections by the provost marshal office or the inspector general.

The next step is to get the company leaders together so you can assess the company's training status. Look at your METL tasks and the individual tasks that support them, and don't forget your squad leaders. They are the ones who should know the most about the state of training in their squads, and their input is valuable. You should be able to develop a list of METL tasks and individual supporting tasks that need to be trained, either because the soldiers received poor or unsatisfactory ratings the last time they were assessed, or because those tasks have not been trained in a long time and you are not sure of their training status. (Assessments for METL, collective, and individual tasks must be a continuing process.)

The next step is to look at the professional and leader development training you want to conduct. Get with the first sergeant and discuss his NCOPD program. How many sessions does he want next quarter, and does he want to do garrison or field sessions? And do the same with your OPD program.

Now comes the task of making all your training fit into the 13 weekly calendars for the next quarter. One helpful technique is to use multi-echelon training. If the battalion is conducting a defensive field training exercise (FTX),

use specific collective tasks from the ARTEP mission training plan (MTP) manuals to train your soldiers on tasks that support the company METL. This will also work for the individual tasks you want to train on.

Once you have everything on the weekly calendars, see that all your leaders get copies. Have them review your work and give you any additional training they want to see for the next quarter. You should always try to schedule training time for your platoons and sections. Let them know that they have specific days or periods for training, or certain parts of FTXs or ranges.

When you have received all the input from your leaders, evaluate their calendars and see what fits, what doesn't fit, and what you want to make room for on the schedule. If a battalion-level event needs to be adjusted, check with the S-3 to see if a change is possible.

Once you have locked in the training you want for the quarter, you must work on resources. (The battalion S-3 should have indicated earlier what he would resource at battalion level and what you would have to resource.) Get with your XO and explain your plan. Tell him where you would prefer to do the training and which alternatives will still work. (Ammunition and training

areas usually must be requisitioned three to six months in advance.)

To stay six months ahead, I developed the initial six-month plan and then added another month as the first month ended. Planning farther than six months ahead can be frustrating because of possible changes in long-range plans from a higher headquarters.

Company near-term planning covers the time period for written training schedules—for most units, six to eight weeks ahead. You should be conducting weekly training meetings to coordinate all training events, activities, and resources. You should prepare your specific training evaluation outlines (TEOs) for all exercises, along with detailed, written training schedules.

I found a training schedule shell (Figure 2) the best way to prepare training schedules when working with a systems approach to training. My training clerk would bring me the shell for a specific week. It would contain all the routine, repetitive things for the week—first call, PT, formations, meals, personal hygiene, safety briefs, and the like. I would then take the weekly training calendar from my long-range plan and put the most critical elements of it onto a form I called my training input form, a blank form with the same headings as

	SUN	MON	TUE	WED	THU	FRI	SAT
AM							
PM							
CYCLE							
LAND/RANGE							
AMMO							
COORD							
TRANS							
RATIONS							

Figure 1. Company Training Week

the shell. I then made pen and ink changes to the shell and gave it, along with my input form, to the training clerk for typing. I then gave a copy of the typed schedule to the XO so he

could arrange for the specific logistical support. Since the XO had already forecast needs or requested everything on the basis of the long-range plan, all he had to do now was confirm specific

dates, times, and amounts with various support agencies.

It is a good idea to hold a company training meeting weekly on a regular schedule. The meeting should not last more than an hour. I found the second day of the week the best. The first day of the week usually has too many other events competing for attention. The best time of day is hard to decide. If you hold the meeting in the morning before PT, you are forced to keep it short, but you may not have time to cover all the important information. Conversely, if you hold it at the end of the day, you have plenty of time, but it may drag on too long. The manual says to follow a set agenda, and it gives a good agenda format. I put this format on a computer so I could add the seventh week out and drop the previous week without having to rewrite the weeks in between.

These processes continue in a cycle and are interdependent. With your weekly plans developed six months in advance, you will have a good idea of the resources you will need early enough to request them. Thinking about your company's training that far in advance and in this much detail also makes it much easier for you to prepare quarterly training briefs because you are not just relying on the battalion's plans. Finally, the entire management process is easier on you because you are adding only one month at a time to the end of the six-month plan.

This is not the only solution. It is just one method of managing training. I present it hoping to save you the time and effort of learning from mistakes. Take the points you like and add them to your own method or technique, then add your specific unit requirements, and you should have a successful method of managing training.

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TIME/DATE	WHO	TRAINING OR ACTIVITY	TRAINER	LOCATION	REFERENCE	UNIFORM CODE
MON (DATE)						
0530-0615	ALL	First Call/Bks Maint	PLT SGTS	CO Area	CO SOP	A
0615-0630	ALL	Formation/Stretching	CO 1SG	CO Area	CO SOP	A
0630-0730	ALL	CO PT/Group Run	PLT SGTS	PT Field	PT SOP	A
0730-0845	ALL	Pers Hygiene/Breakfast	SQD LDRS	CO Area	CO SOP	C
0845-0900	ALL	Formation	CO 1SG	CO Area	CO SOP	C
1130-1245	ALL	Lunch	PLT SGTS	Mess Hall	BN SOP	C
1245-1300	ALL	Formation	CO 1SG	CO Area	CO SOP	C
1500-1530	PSGs	1SG Meeting	CO 1SG	1SG Office	CO SOP	C
1630-1645	ALL	Formation	CO 1SG	CO Area	CO SOP	C
TUE (DATE)						
0530-0615	ALL	First Call/Bks Maint	PLT SGTS	CO Area	CO SOP	A
0615-0630	ALL	Formation/Stretching	CO 1SG	CO Area	CO SOP	A
0630-0730	ALL	CO Roadmarch	PLT SGTS	Route 1	CO SOP	R
0730-0845	ALL	Pers Hygiene/Breakfast	SQD LDRS	CO Area	CO SOP	C
0845-0900	ALL	Formation	CO 1SG	CO Area	CO SOP	C
1130-1245	ALL	Lunch	PLT SGTS	Mess Hall	BN SOP	C
1245-1300	ALL	Formation	CO 1SG	CO Area	CO SOP	C
1300-1400	LDRs	CO Training Meeting	CO CMDR	CO's Office	CO SOP	C
1630-1645	ALL	Formation	CO 1SG	CO Area	CO SOP	C
WED (DATE)						
0530-0615	ALL	First Call/Bks Maint	PLT SGTS	CO Area	CO SOP	A
0615-0630	ALL	Formation/Stretching	CO 1SG	CO Area	CO SOP	A
0630-0730	ALL	CO PT/Group Run	PLT SGTS	PT Field	DIV SOP	A
0730-0845	ALL	Pers Hygiene/Breakfast	SQD LDRS	CO Area	CO SOP	C
0845-0900	ALL	Formation	CO 1SG	CO Area	CO SOP	C
1130-1245	ALL	Lunch	PLT SGTS	Mess Hall	BN SOP	C
1245-1300	ALL	Formation	CO 1SG	CO Area	CO SOP	C
1500-1530	PSGs	1SG Meeting	CO 1SG	1SG Office	CO SOP	C
1630-1645	ALL	Formation	CO 1SG	CO Area	CO SOP	C
THU (DATE)						
0530-0615	ALL	First Call/Bks Maint	PLT SGTS	CO Area	CO SOP	A
0615-0630	ALL	Formation/Stretching	CO 1SG	CO Area	CO SOP	A
0630-0730	ALL	Platoon A/R	PLT SGTS	PT Field	CO SOP	A
0730-0845	ALL	Pers Hygiene/Breakfast	SQD LDRS	CO Area	CO SOP	C
0845-0900	ALL	Formation	CO 1SG	CO Area	CO SOP	C
1130-1245	ALL	Lunch	PLT SGTS	Mess Hall	BN SOP	C
1245-1300	ALL	Formation	CO 1SG	CO Area	CO SOP	C
1630-1645	ALL	Formation	CO 1SG	CO Area	CO SOP	C
FRI (DATE)						
0530-0615	ALL	First Call/Bks Maint	PLT SGTS	CO Area	CO SOP	A
0615-0630	ALL	Formation/Stretching	CO 1SG	CO Area	CO SOP	A
0630-0730	ALL	CO PT/Group Run	PLT SGTS	PT Field	DIV SOP	A
0730-0845	ALL	Pers Hygiene/Breakfast	SQD LDRS	CO Area	CO SOP	C
0845-0900	ALL	Formation	CO 1SG	CO Area	CO SOP	C
1130-1245	ALL	Lunch	PLT SGTS	Mess Hall	BN SOP	C
1245-1300	ALL	Formation	CO 1SG	CO Area	CO SOP	C
1500-1530	PSGs	1SG Meeting	CO 1SG	1SG Office	CO SOP	C
1630-1645	ALL	Formation/Safety Brief	CO 1SG	CO Area	CO SOP	C
SAT (DATE)						
0001-2400	ALL	Weekend Activities	Commander	Local Area	DIV SOP	C
SUN (DATE)						
0001-2400	ALL	Weekend Activities	Commander	Local Area	DIV SOP	C

Figure 2. Training Schedule Shell

OFFICERS CAREER NOTES



CHOOSING A FUNCTIONAL AREA

An officer's functional area (FA) is vital to his professional development. It is therefore important for him to choose the right area, seek schooling and experience in it, and make it a path to promotion and higher levels of responsibility.

The following are some rules of thumb that will help you pick your functional area:

- First, read DA Pamphlet 600-3.
- Some FAs (41, 50, 51, 54, 39, 46) require less formal schooling, fewer gates, and more flexible timeline management.
- Others (45, 48, 49, 52, 53) require more schooling. Once you are branch qualified, you will need to move quickly into your functional area development. With these functional areas, you will be less likely to find time for a second company command tour or an observer-controller job.
- Choose an area you like and think you will be able to do well.
- If you don't like the functional area you initially select, ask to change it. A simple DA Form 4187 to PERSCOM will initiate the process. If the request is denied, keep trying.
- Get recommendations from senior officers in your chain of command or from other mentors. Since they know you and the system, they can help make the best match.

Keep in mind that when you select a functional area, you may also be sowing the seeds for a productive second career after you leave the Army.

COMBINED ARMS AND SERVICES STAFF SCHOOL

Infantry officers are falling behind in attending the Combined Arms and Services Staff School (CAS³). Specifically, Infantry officers in Year Groups 1981 to 1986 show below-average CAS³ qualification rates compared to officers of other branches.

The individual officer is primarily responsible for remedying this problem. Any captain who has not attended CAS³ should do his best to get into a class. He should plan a time to attend on the basis of his unit's long-term training plans. Then he should finish Phase I of the course as soon as possible and ask his commander for a slot to attend the course.

A unit may find it difficult to have a captain away for three months, but this difficulty will be more than offset by the long-term development of the officer and the unit. The CAS³ learning payoff in the officer's improved writing, speaking, and thinking skills. The sooner he gains this experience, the sooner he can apply it to accomplishing the unit's mission.

Early attendance at CAS³ is good for an officer's individual professional development and good for the unit and for the Infantry in the long run.

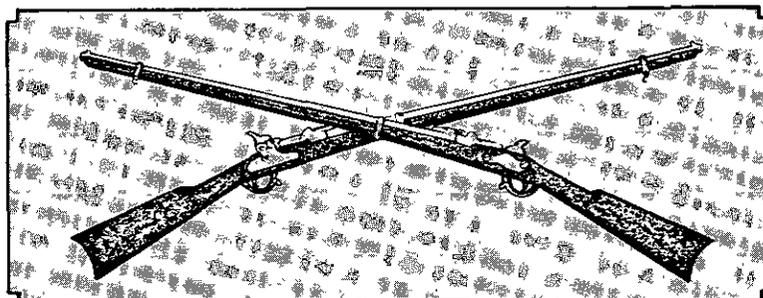
IOBC PLATOON TRAINERS

About 15 officers annually are hand-picked from graduating Infantry Officer Advanced Course (IOAC) classes to train, coach, mentor, and lead new infantry lieutenants in the Infantry Officer Basic Course (IOBC). The commandant of the Infantry School views these platoon trainer assignments as top priority for IOAC graduates, and only the very best officers are selected.

To qualify, an officer must have had an above-average manner of performance as a lieutenant; must be recommended by his former chain of command; and must demonstrate the character and fitness to serve as a role model for second lieutenants.

Upon completion of a two-year tour, a platoon trainer is given assignment preference (subject to Army requirements) as he goes to a branch-qualifying company command assignment.

Any officer who is interested in this program should contact Infantry Branch at the Total Army Personnel Command (PERSCOM) or write to Commander, 2d Battalion, 11th Infantry Regiment, Fort Benning, GA 31905.



BOOK REVIEWS



We again have a number of interesting publications to bring to your attention:

THUNDER IN THE DESERT: THE STRATEGY AND TACTICS OF THE PERSIAN GULF WAR. By James Blackwell. Bantam Books, 1991. 252 Pages. \$12.50, Softbound. The author is a 1974 West Point graduate who served 13 years on active duty as an Armor officer before accepting medical retirement. He is now a senior fellow at the Center for Strategic and International Studies (CSIS) in Washington, D.C.

During the Gulf War, he served as a military affairs analyst for the Cable News Network (CNN). Drawing on those experiences, along with CSIS material, a trip to the Gulf area with the then Army Chief of Staff, and official but unclassified documents, he has put together a readable account of the war. He calls his book "a first draft of history . . . not the final word on what happened . . ." And it is just that, but it is still one of the better overall accounts we have seen, though we would have appreciated more on the ground forces and their preparations for combat.

Infantrymen will find the two chapters on the ground war itself of particular interest. The final chapter, too, with its suggestions for future U.S. policies in the Middle East, should also be noted, although we admit the writing is couched in typical think-tank language.

AN HISTORICAL GUIDE TO ARMS AND ARMOR. By Stephen Bull. Edited by Terry North. Facts on File, 1992. 224 Pages. \$35.00. This is a big, beautiful, fascinating book, especially for a collector, a military buff, or anyone interested in the history of weaponry. It has 300 photographs (more than 200 of them in color), a bibliography, an index, a very fine foreword, and a nicely done introduction.

The author's principal task was to describe portable arms and armor from the time of the Greeks and Romans to the early 19th Century. He did this in an outstanding manner, using five chronological chapters, each covering one major period of western history, plus two more chapters to provide an introduction to oriental arms and armor.

U.S. ARMY UNIFORMS OF WORLD

WAR II. By Shelby L. Stanton. Stackpole Books, 1991. 288 Pages. \$32.45.

Two years ago this same author—noted for his order-of-battle books and other publications—brought out his book on the Army's uniforms of the Vietnam War era. In the present book, he documents the clothing and individual equipment items the U.S. Army developed for and issued to its soldiers during World War II, from helmets to protective clothing and equipment and footwear.

He focuses on the combat uniform, its evolution over time and its use in battle. He includes detailed information about a number of items, and also includes information on clothing issued to the women who served in the Army during the war.

The book contains more than 400 photographs, test results from various Army boards, and a brief section on the Army's pre-war uniforms. Most of the photographs have not been published previously.

EPITOMA REI MILITARIS. By Flavius Vegetius Renatus. Edited with an English translation by Leo F. Stelten. American University Studies, Series XVII, Classical Languages and Literature, Volume 11. Peter Lang, 1990. 334 Pages. \$53.95. This is a new study—with the Latin text on one side of a page and its English translation on the other—of a military classic originally written around 400 A.D. In his introduction, the editor tells us in shortened form something about the writer—who was probably not a soldier but "a collector and compiler of what the ancients said and wrote on"—and the writer's influence on later ages.

In fact, as Stelten points out, this "work was regarded almost as a military Bible during the Middle Ages." Is there anything here for the "modern" soldier and leader? Try these quotations:

- The selected recruit should not be immediately registered with the mark of military service before he has really been tested by training. . . the less useful must be rejected and in their place the most valiant must be substituted. For in every battle the advantage lies not so much in numbers as in courage.

- *It is equally important that during the*

summer months every recruit be taught to swim.

- *Also the recruits must be forced very frequently to make marches using the military step and at the same time to carry loads weighing up to sixty pounds.*

- *An army profits from work but grows weak through leisure.*

- *Let him who trusts in his infantry troops seek places suitable for the infantry and carry the action more through the infantry.*

Professional infantrymen should not overlook this last one.

GUIDE TO MILITARY INSTALLATIONS. 3d Edition. By Dan Cragg. Stackpole Books, 1991. 496 Pages. \$17.95, Softbound. The author realizes, of course, the changes that are taking place today as the nation's armed forces are drawn down and posts and bases around the world are closed.

In this edition of what has become the standard work on the subject, Dan Cragg has incorporated only those changes that had taken place by the fall of 1990. The guide itself is divided into two major sections, domestic and overseas. A smaller third section contains maps showing the location of each installation, at home and abroad, by service. It is an extremely useful reference.

We have received four more interesting publications from the Osprey Publishing Company in England, and we believe you will enjoy each one.

KAISERSCHLACHT 1918—THE FINAL GERMAN OFFENSIVE. By Randal Gray. 1991. 96 Pages. Campaign Series Number 11, Softbound.

CULLODEN 1746—THE HIGHLAND CLANS' LAST CHARGE. By Peter Harrington. 1991. 96 Pages. Campaign Series Number 12. Softbound.

AFRIKAKORPS, 1941-43. Text by Gordon Williamson, color plates by Ron Volstad. 1991. 64 Pages. Elite Series Number 34. Softbound.

THE TEXAS RANGERS. Text by Stephen Hardin, color plates by Richard Hook. 1991. 64 Pages. Elite Series Number 35. Softbound.

Now here are some of our longer reviews:

THE DRIFT TO WAR, 1922-1939. By Richard Lamb. St. Martin's Press, 1989. 372 Pages. \$24.95. Reviewed by Lieutenant Colonel Cole C. Kingseed, United States Army.

In recent years, an increasing number of revisionist historians have examined the causes of World War II. British author Richard Lamb contributes to this growing historiography in this insightful analysis of British foreign policy. What is surprising about Lamb's account is that he casts his own country in such an unfavorable light. According to him, British diplomacy was a sad tale from which few in high places emerged with credit.

Drawing upon previously unpublished primary sources, Lamb notes the irony in British policy in that it was particularly harsh on democratic German governments over the subjects of reparations and rearmament, but extraordinarily lenient on Adolf Hitler. The author argues, not always convincingly, that it was the ineptitude of British statesmen that paved the way for the Nazis' rise to power in the 1932 German elections, then drove Mussolini into Hitler's camp during the Abyssinian crisis, and finally scared Stalin into signing the Soviet-German nonaggression pact and secret protocol in August 1939.

Lamb reserves his sharpest criticism for Neville Chamberlain, whose very name has become synonymous with "appeasement." The diplomatic archives now reveal that Hitler completely bluffed Chamberlain at Munich as to German military potential. If Chamberlain had formed an alliance with France and declared war against Germany in 1938, the Soviet Union might have joined the western allies and eliminated the Nazi threat once and for all. The years of peace that Chamberlain purchased at the expense of Czechoslovakia were far more beneficial to Germany's war production than to Britain's.

The chief fault of this book, and it is a major one, is that the author may give too much credit to Great Britain as the principal actor on the European diplomatic stage of the 1930s. It was Hitler—rather than Stanley Baldwin, J.R. MacDonald, and Chamberlain—who exerted the most influence and dominated European politics after 1933. To a degree, British statesmen simply reflected the pacifist mood of their country, and the unity that characterized the British after 1940 did not exist before the onset of the war.

Still, this book is a valuable contribution

to our understanding of how and why nations go to war. This is definitely revisionist history at its provocative best.

SILENT WARFARE: UNDERSTANDING THE WORLD OF INTELLIGENCE. By Abram N. Shulsky. Brassey's (US), 1991. 222 Pages. \$19.95. Reviewed by Captain Richard Ugino, United States Army National Guard.

It is rare when a book about intelligence is entertaining, informative, and educational all at the same time. In this book, Abram Shulsky, a senior fellow at the National Strategy and Information Center in Washington, draws on his vast background in the field and provides one of the best intelligence "primers" I have seen in the past ten years. What Shulsky does best is to demystify intelligence and offer a thoughtful, serious view of the subject.

Although the book is theoretical, it includes a good overview of the basics. Thus, there is a good section on the definition of the terms "HUMINT" and "TECHINT," another on such "transnational" threats as narcotics trafficking and international terrorism. There is another excellent section titled "Democracy and Secrecy" in which the author examines the checks and balances that control intelligence agencies in democratic societies.

This is a fine book for its price, and it is recommended to readers who have little real knowledge of the intelligence field and community.

SWORDS AROUND A THRONE: NAPOLEON'S GRANDE ARMEE. By John R. Elting. The Free Press, 1988. 769 Pages. \$35.00. Reviewed by Lieutenant Colonel John C. Spence, III, United States Army Reserve.

Retired Army Colonel John R. Elting has previously written impressive volumes on military history and strategy, but this latest book may be his best. In fact, this highly detailed analysis of the Grande Armee may become the definitive encyclopedia of the Napoleonic era.

Elting has meticulously researched the entire period as well as the preceding periods of royalist and revolutionary France. He devotes individual chapters to specific subject areas, and addresses virtually every subject. Comparisons and contrasts are drawn between the prerevolutionary armies of the Bourbon dynasty and the army that became increasingly professionalized when

Napoleon assumed duties as Consul. The book contains a detailed treatment of strategy and tactics, force structure, use of allied troops, and the incorporation of foreign mercenaries into the French forces.

The book is filled with illuminating examples of the way Napoleon, the soldier, commanded the respect and devotion of countless other soldiers. These soldiers of the Grande Armee followed their emperor to the snowy wastes of Russia and to final defeat at Waterloo. Most significantly, Napoleon always identified with his soldiers. When one of them died in battle and left an infant child, Napoleon would personally adopt the child as his own.

A student of contemporary military organization will find many antecedents in Napoleon's military philosophy and concept of organization. His Chief of Staff, Marshal Louis Alexandre Berthier, issued operational instructions to subordinate staff officers—staff principles now embodied in Field Manual 101-5, Staff Organization and Operations. One of Napoleon's permanent legacies to the modern-day commander was the requirement that each unit submit a daily status report to its next higher headquarters. Matters to be covered included unit strength, casualties, supplies available, and the enemy situation.

This book is a fitting addition to the literature on the French Revolution.

HITLER'S GLADIATOR: THE LIFE AND TIMES OF OBERSTGRUPPENFUEHRER AND PANZERGENERAL-OBERST DER WAFFEN-SS SEPP DIETRICH. By Charles Messenger. Brassey's, 1988. 245 Pages. \$26.95. Reviewed by Captain Stephen A. Johnson, United States Army.

Charles Messenger, a noted military historian, has given us the most comprehensive biography available on Josef "Sepp" Dietrich, one of Germany's most controversial Waffen-SS field commanders in World War II.

Dietrich entered World War I in 1914 as an enlisted man in an artillery unit sent to fight in France. In 1915 he became a non-commissioned officer and the following year became involved with the German "Storm Troops." In early 1918 he joined the German tank units fighting in France and was still with them when the war ended.

During the years between the wars, Dietrich fought with the paramilitary "Freikorps" units. In 1928 he joined the Nazi Party and then the SS. He was noticed early

by Hitler and was increasingly used as Hitler's personal bodyguard.

In 1930, Dietrich won a seat in the governmental body (Reichstag) and was given charge of all SS activities in southern Germany. He had become part of Hitler's inner circle.

Hitler's trust in Dietrich was indicated by two actions. First, Dietrich was ordered to form a special company-sized guard unit to be known as *Leibstandarte* for the protection of the Reich Chancellory in 1933 after Hitler became Chancellor. Next, in 1934, Hitler personally selected Dietrich to organize the execution of the leaders of the SA, which became known as the "Night of the Long Knives."

When Germany invaded Poland and then France, Dietrich led the *Leibstandarte SS Adolf Hitler*, which had grown from a ceremonial guard unit to a motorized rifle regiment, into combat in both campaigns. In 1941, he led this unit, now brigade size, during the Balkan campaign. The *Leibstandarte* entered the Russian campaign as a motorized rifle division, where it fought until July 1942. At this time, it was reorganized, in France, into an SS Panzergrenadier Division. Dietrich returned to Russia with the division and stayed until June 1943.

Dietrich then became the commander of the I SS Panzer Corps in France and commanded it during the Allied invasion at Normandy in 1944. He then commanded the 6th Panzer Army during the Battle of the Bulge against the Allies and in Hungary against the Russians. (After the war, Dietrich was tried and convicted as a war criminal for the massacre of U.S. soldiers at Malmedy during the Battle of the Bulge.)

Messenger covers several areas of particular interest. He examines Dietrich's relationship with Hitler and his rise in rank and responsibility, along with his strengths and weaknesses as a commander during World War II.

Messenger's intent is to tell Dietrich's story according to the facts available, not to whitewash or excuse him, and he has done an admirable job.

Much of the book deals with Dietrich's times rather than his life. This is largely due to the lack of diaries, personal papers, and other first-hand accounts on Dietrich. I recommend this book only to serious students of military history.

GREAT BATTLES OF THE BRITISH ARMY, AS COMMEMORATED IN THE SANDHURST COMPANIES. Edit-

ed by David G. Chandler. University of North Carolina Press, 1991. 288 Pages. \$34.95. Reviewed by Major Harold E. Raugh, Jr., United States Army.

The pride and spirit of the British Army and its magnificent battle victories continue to fascinate soldiers and other military enthusiasts. To celebrate the 250th Anniversary of the foundation of Royal Military Academy Woolwich, eminent military historian David G. Chandler assembled a first-rate team of subject matter experts to write narratives and objective assessments of the 16 battles for which the current Sandhurst cadet companies were named. (It is worth noting that the Royal Military Academy Woolwich, which trained engineers, was amalgamated with the Royal Military College Sandhurst in 1947 to form the Royal Military Academy Sandhurst.)

The first battle chronicled is Blenheim, 1704 (written by Chandler). Others are from the Napoleonic era and other eras, with five battles from World War I and six from World War II. All chapters are of uniformly high quality, but those by Chandler (who also wrote on Salamanca, 1812), Jeffrey Grey (Gaza, 1917), and Lord Carver (First and Second Battles of Alamein, 1942) stand out.

One of the many great strengths of this work is that each chapter includes two well-drawn maps, one in color depicting the relevant battle and another in monochrome of the larger campaign area. The orders of battle of the opposing forces are also given, and each chapter is extensively illustrated and contains a short annotated bibliography for that particular battle. Twelve detailed appendixes provide information on the evolution of the cadet companies and list the awards and honors made to former cadets.

Chandler, in his general introduction, explains the criteria used to select the cadet company names and concludes that many battles—"seen as triumphs of individual human courage, moral as well as physical, over fear of death, wounds and the unexpected"—could have been representative of the various eras and wars. Indeed, the aim of this excellent book is "to commemorate the valour of the sons of Woolwich and Sandhurst, of the men they led, [and] the Allies they fought alongside." There is no doubt that this goal has been achieved.

STONEWALL JACKSON: PORTRAIT OF A SOLDIER. By John Bowers. William Morrow and Company, 1989. 367 Pages. \$19.95. Reviewed by

Major Don Rightmyer, United States Air Force.

"Stonewall"—the name by which Thomas J. Jackson was best known after the July 1861 battle of First Manassas—seemed to convey a larger-than-life image that no mortal deserves. Barnard Bee, the general who gave Jackson that nickname at Bull Run, was himself mortally wounded only moments later on that battlefield. But Jackson's military career lasted another two years until he was tragically shot by some of his own troops while returning from an evening reconnaissance of the battlefield at Chancellorsville. The intervening months in Jackson's life quickly became the stuff of legend. In truth, though, he was only a human being who answered the call to duty, served as he felt led to serve, and poured his life into the cause for which he stood. That is the story of this book.

John Bowers has taken an approach somewhat different from that of others in the past in preparing this biography. His narrative not only provides a new accounting of this military man's experiences and performance, but it also provides more insight into the truly human and mortal aspects of Jackson's service under fire.

For example, while the author discusses the general's strategy and decision-making, he also points out some of the places where his human nature took a heavy toll. There was a price to pay for the reputation his Stonewall Brigade had earned as "foot cavalry," and it really showed as Jackson and his men quickly left the Shenandoah Valley and went to Robert E. Lee's assistance in the defense of Richmond. Jackson's apparent failure to follow the campaign plan as agreed upon can be directly attributed to the fact that he was exhausted and basically asleep on his feet.

Overall, Bowers has provided a highly readable story of a military leader whose life has attracted the study and attention of military students over the years. He provides some valuable insights into Jackson's ability to instill into his fighting men a tremendously strong sense of loyalty. Jackson not only generated the loyalty of those below him, but his actions earned him an immeasurable sense of worth in General Lee's eyes as well.

This book is highly recommended for its lively coverage of Jackson's Shenandoah campaign and for its thoroughly interesting analysis of his service in the Confederacy. It will prove worthwhile to the professional military student and the general reader alike.

WAR BY OTHER MEANS: SOVIET POWER, WEST GERMAN RESISTANCE, AND THE BATTLE OF THE EUROMISSILES. By Jeffrey Herf. The Free Press, 1991. 233 Pages. \$27.95. Reviewed by Lieutenant Colonel Donald C. Snedeker, United States Army.

In the late 1970s and early 1980s, the Soviet Union went to war with NATO—war, that is, by other means. In a paraphrase of Clausewitz's often-misquoted dictum that war is the extension of political power by other means, the author believes the Soviet Union conducted a war against the United States and Western Europe—but especially against the Germans—by means other than military.

The battlefield was Europe—more precisely, the European public forum—and the reason was Euromissiles, the deployed Soviet SS-20s and the U.S. Pershing IIs and GLCMs that were to be deployed in response. The war was brutal, no holds barred. It was winner take all, and loser lose all.

Jeffrey Herf, who now teaches European politics at Emory University, presents a clean, logically organized, well-researched review and analysis of the public debate surrounding the Euromissiles, from the time German Chancellor Helmut Schmidt first raised the issue in public in 1977 to the final governmental decisions and deployment in 1983. He does so in language that will appeal to followers of the principles of practical politics. His yardstick for measuring the policies and decisions of various public and political figures is their ability to balance peace and freedom, diplomacy and power, as elements of one whole.

But the book is more than just a recounting of the names, places, and events. The author has researched his topic well, and he provides considerable detail on the social trends within the academic and intellectual communities in Germany that provided the unique context for the Euromissile debate. The evolution of post-World War II West German policy, within the political parties as well as within the public itself, is what made the debate play out like the best Agatha Christie thriller. The Bonn Government's decision on deployment was never absolutely certain until the final vote was cast—as well as whether that vote would be cast in the Bundestag or on the streets.

One might ask if it is worth the effort to read such "ancient" history, now that the Wall has fallen and confrontation has been replaced by cooperation. Indeed it is, for the reader will come away with a better

understanding of the evolution of German political thinking from post-World War II through the "war by other means" up to the end of the Cold War. As Herf writes, "It is hard to imagine the political transformation of 1989 without the deployments of 1983."

VALLEY OF DECISION: THE SIEGE OF KHE SANH. By John Prados and Ray W. Stubbe. Houghton Mifflin, 1991. 551 Pages. \$29.95. Reviewed by Dr. Joe P. Dunn, Converse College.

Khe Sanh was General William Westmoreland's battle, a large-scale, conventional engagement that produced massive enemy body counts. He contended that it was one of the most damaging blows inflicted upon North Vietnam and that it discredited "the myth of General Giap's military genius." Westmoreland claimed that, of all the decisions he made in Vietnam, he was proudest of the commitment to hold Khe Sanh.

Other commentators believe that it was Westmoreland who was discredited. General Earle Wheeler stated that Khe Sanh had served Hanoi's purpose, and British analyst Sir Robert Thompson remarked that "the absurdity of Khe Sanh will rate a book by itself."

This complete account of the controversial battle, its origins, and its aftermath is a good blend of document research and personal experience drawn from interviews. John Prados (an authority on intelligence and clandestine activity) and Ray Stubbe (whose extensive diary as Navy chaplain during the siege and whose indefatigable interviews establish him as the student of the Khe Sanh experience) provide a balanced interpretation that is somewhat critical of Westmoreland's perspective.

The book is superior to two interesting previous works—Robert Pisor's *The End of the Line: The Siege of Khe Sanh* (1982) and Eric Hammel's *Khe Sanh: Siege in the Clouds, an Oral History* (1989). It includes new material on Military Assistance Command Vietnam Special Operations Group (MACVSOG) and other intelligence activity in the Khe Sanh area before the siege. It also has a good bibliography and good photographs and maps.

RECENT AND RECOMMENDED
OUR MAN IN PANAMA: THE SHREWD RISE AND BRUTAL FALL OF MANUEL NORIEGA. By John Dinges. Revised and Updated. Originally published in hardcover in 1990. Times Books. Random House, 1991. 432 Pages. \$13.00, Softbound.

THE ILLUSTRATED HISTORY OF WEST POINT. By Theodore J. Crackel. Original photography by Ted Spiegel. Abrams (100 Fifth Avenue, New York, NY 10011), 1991. 320 Pages. \$75.00.

NEVER GET LOST: THE GREEN BERET'S COMPASS COURSE. By Don Paul. New Edition. First published in 1983. Pathfinder Publications (Hamakua Center, Suite 401, 150 Hamakua Drive, Kailua, Oahu, Hawaii 96734), 1991. 118 Pages. \$9.95, Softbound.

BATTLE OF THE BISMARCK SEA. By Lex McAulay. St. Martin's Press, 1991. 226 Pages. \$19.95.

WITHOUT QUARTER: THE WICHITA EXPEDITION AND THE FIGHT ON CROOKED CREEK. By William Y. Chalfant. University of Oklahoma Press, 1991. 192 Pages. \$19.95.

ALMANAC OF MODERN TERRORISM. By Jay M. Shafritz, E.F. Gibbons, Jr., and Gregory E.J. Scott. Facts on File, 1991. 290 Pages. \$29.95.

THE BATTLES OF CORAL SEA AND MIDWAY, 1942: A SELECTED BIBLIOGRAPHY. By Myron J. Smith, Jr. Bibliographies of Battles and Leaders Number 5. Greenwood Press, 1991. 184 Pages. \$55.00.

AMERICA AND THE WAR WITH IRAQ: A BIBLIOGRAPHY FOR INSTRUCTORS. By Patrick D. Reagan. D.C. Heath, 1991. 24 Pages, Softbound.

TOY SOLDIERS: MEMOIR OF A COMBAT PLATOON LEADER IN KOREA. By John A. Sullivan. McFarland, 1991. 172 Pages. \$21.95.

LOW-APTITUDE MEN IN THE MILITARY: WHO PROFITS, WHO PAYS? By Janice H. Laurence and Peter F. Ramsberger. Praeger, 1991. 200 Pages. \$42.95.

STALIN: A TIME FOR JUDGEMENT. By Jonathan Lewis and Philip Whitehead. Michelin House (81 Fulham Road, London SW3 6RB, England), 1991. First published in hardcover in 1990. A Thames Mandarin Paperback. 189 Pages.

FRONT AND CENTER: HEROES, WAR STORIES, AND ARMY LIFE. Edited by L. James Binder. An AUSA Book. Brassey's (US), 1991. 250 Pages. \$15.95, Softcover.

THE NEW STATE OF WAR AND PEACE: AN INTERNATIONAL ATLAS. By Michael Kidron and Dan Smith. Touchstone Books. Simon and Schuster, 1991. 127 Pages. \$14.95, Softbound.

THE CHANCY WAR: WINNING IN CHINA, BURMA, AND INDIA IN WORLD WAR II. By Edward Fischer. Orion Books. Crown Publishers, 1991. 250 Pages. \$23.00.

NEVER LOOK BACK: A HISTORY OF WORLD WAR II IN THE PACIFIC. By William A. Renzi and Mark D. Roehrs. M.E. Sharpe, Inc. (80 Business Park Drive, Armonk, NY 10504), 1991. 224 Pages.



From the Editor

Now that the commemoration of World War II is well under way, we will have opportunity to recall those campaigns and actions which culminated in victory. For the professional soldier, it requires little reflection to realize that a good many of the challenges that confronted leaders during those days are as relevant today as they were 50 years ago.

During the preparations for Operations DESERT SHIELD and DESERT STORM, planners turned to the experiences of both Allied and Axis forces in desert operations. Likewise, the experience of the Buna Campaign of 1942-43 contributed to the training, medical support, and logistical systems that later supported our forces in Korea and Vietnam. Perhaps the most precious of the lessons to be gleaned from World War II was the revelation of those tactics and operating procedures which had led to disproportionate casualties as at Buna.

In the coming months, we will be drawing upon sources in our archives to provide you with the historical perspectives that are essential to the professional development of the force. Prominent among these will be the accounts of night operations—successful and unsuccessful—that made the difference between victory and defeat. Owning the night is no longer a luxury; it is an imperative if we are to continue to dominate the battlefield. INFANTRY will keep you up to date on the latest doctrinal, training, and materiel developments that affect this dimension of combat.

We've told you what INFANTRY will do in the coming issues; now here's what you can do. Write to us. Tell us what you like. Tell us what you think needs to be improved. Most of all, write and submit material for publication. The submissions need not be long; INFANTRY has a diverse format that will accommodate everything from short training tips and Swap Shop pieces to long feature articles. While we cannot promise that every submission will be published, we can assure you that we will read every one and provide feedback. What we want are your ideas and input, not necessarily flawlessly written papers. If you have something innovative, useful, or relevant to say, we want to help you get it into print.

This is your branch bulletin; let's work together to keep it the single best source of information for Infantrymen around the world.

RAE

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