

Field Artillery Journal



May-June 1984



ZOOMING TO MEET OUR THUNDER



Field Artillery Journal



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In 1943, when combat aviation was still very young, pilots sang of "coming in on a wing and a prayer." The *Field Artillery Journal* suggested that "flyers as well as artillerymen can benefit by comparing the new arm [combat aviation] with the old one [field artillery]." Forty-one years later, the Redlegs and fly-boys are still at it — comparing notes and developing the best techniques to minimize the risks to close air support aircraft and friendly troops and maximize the damage to the target. "A Fly Paper" is a fresh look, from the perspective of a pilot, at the coordination measures he finds when he is zooming to meet our thunder.

Change is zooming too, as you can clearly see in this issue. The National Guard Redlegs can see it as they experience the ARTEP/TVI program for the first time. The 2d Infantry Division Redlegs can see it in their new weapon systems. Indian gunners can see it as they meet the challenges of fire support system modernization. The members of the 29th Regiment can see it in their regiment's recent reorganization. Tacticians can see it as they contemplate the arrival of precision-guided munitions like Copperhead. And every field artillery commander can see it as he welcomes a changing enlisted population.

One thing that hasn't changed is your importance as an individual. Your ideas can have an impact on the way our mission is accomplished. After all, you are the King of Battle; and the King commands attention. Catch the spirit!



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Field Artillery Journal

On the Move

MG JOHN S. CROSBY

The future belongs to the field artillery — believe it!

We are in the business of supporting the maneuver arms — not just today, but tomorrow as well. So we need to prepare for tomorrow's battlefield. We need an azimuth which is parallel to that of the maneuver forces. As their training, doctrine, force structure, and materiel evolve, we must ensure compatible evolution on our part. For over a year now, with advice from you in the field, the School has been determining that parallel azimuth. We recently briefed this azimuth to General Thurman, the Vice Chief of Staff; and I want to tell you about some of the key decisions. I am certain you will come to share the view expressed to me recently by our French comrades-in-arms — the future belongs to the field artillery.

MLRS

General Thurman agreed to add more MLRSs to our force in fiscal year 1986. There is no doubt that the addition of nine MLRS battalions — one to each field artillery brigade aligned with a heavy division — is the right way to go. We think we need more. The Legal Mix VI study will help us determine the correct number. We are also now funded to pursue the research which will lead to an increase in the MLRS range from 30 to 70 kilometers.

Terminally homing munitions

The field artillery must play a major role in killing enemy armor. We must slow the enemy's presentation rate at the FLOT so that maneuver can fight and win the close-in battle. And terminally homing munitions — "smart" technology — can help us do the job. No force multiplier is more important to us. We are going to speed up the development of these exceptionally lethal munitions for both our cannon and rocket systems. In conjunction with Picatinny Arsenal, we are pinning down precisely what the civilian contractors can do for us.

Light artillery

We simply must increase the range and lethality of the 105-mm howitzers which support our light forces. In the short term, we will improve the M102 and will investigate the technology of the British L118/119 guns; but in the long term we will exploit composite-material technology and develop a lightweight 155-mm howitzer to replace the 105s completely. The Army's bottom line is that we will not permit ourselves to be outranged by enemy artillery.

Target acquisition

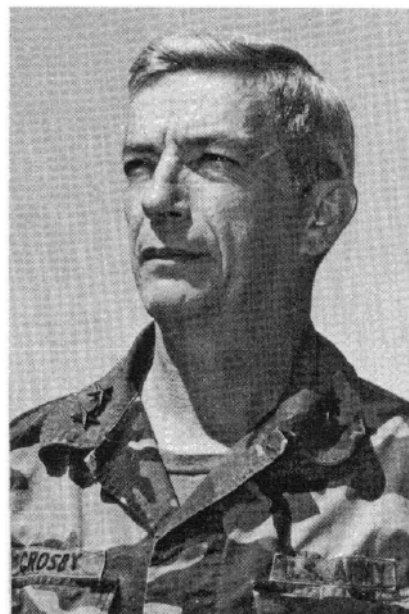
We now have two Firefinder radars — the AN/TPQ-36 and AN/TPQ-37. General Thurman charged us to develop a single radar with the size of the Q-36, but with the capabilities of both radars. Such a radar could be pulled on a small trailer by the HMMWV. And we intend to exploit the joint surveillance target acquisition radar system (JSTARS) as a way of extending the remotely piloted vehicle's (RPV's) range. By using JSTARS as a communications relay link, we can extend the RPV's range from 30 to 100 kilometers. When we can see deeper and better, we can attack deeper and disrupt the enemy beyond the FLOT as well as at the FLOT.

Survey

No single piece of equipment expands our capability to shoot whenever and wherever we are needed as much as PADS, the position and azimuth determining system. We won a commitment to continue the production of PADS — even if funds must be transferred from some other Army program.

Command and control

We have all been concerned with the size of TACFIRE and its primary orientation to field artillery command and control. We all want a smaller product which addresses the entire spectrum of fire support command and control — some system to bridge the gap between TACFIRE and the advanced field artillery tactical data system (AFATDS). If we are to have such a system, it will not be a completely new system. We will modify TACFIRE as best we can and get into



AFATDS as early as possible by building it a block at a time.

FIST

We continue to wrestle with FIST mobility. The fire support team vehicle (FISTV) is a quantum step ahead for our FISTs. But it is only a modified M113, its hammerhead presents a distinctive visual signature, and it lacks the speed of the maneuver vehicles in M1/Bradley divisions. We will continue to procure the RISE (reliability improvement of selected equipment) package to upgrade the FISTV's mobility. We are also looking seriously at a high/low mix — that is, providing Bradleys for FISTs and FSOs in divisions equipped with the Abrams tank and the Bradley and providing improved FISTVs for FISTs and FSOs in the other heavy divisions. We are receiving useful feedback from FISTs and FSOs in the field and from the ongoing FIST FDTE II. I intend to convene a group of maneuver and fire support experts to refine our doctrine on the function of the FISTs and FSOs.

Conclusion

We are building an Army of Excellence. The Field Artillery Branch is moving along the right azimuth to that goal. Our fire support system will be ready for tomorrow's battlefield. The future belongs to the field artillery — believe it!



Incoming

LETTERS TO THE EDITOR

Speak Out

The *Journal* welcomes and encourages letters from our readers. Of particular interest are opinions, ideas, and innovations pertinent to the betterment of the Field Artillery and the total force. Also welcomed are thoughts on how to improve the magazine. — *Ed.*

Command and control of a direct support battalion

In recent years, many words have been spoken and written about the importance of the field artillery battalion in the conduct of the deep battle. We have refined our fire support doctrine to accommodate the needs of the maneuver arms and have reorganized our fire support specialists into fire support teams that are capable of supporting tank and infantry teams. Mounted in a tracked vehicle, the fire support team has the mobility and protection required to survive and to extend the effectiveness of the devastating power that the field artillery can bring to bear on the battlefield.

At the same time, our mechanized infantry and armor brothers have also given more thought to command and control on this battlefield. As a result, each commander up to brigade level has his own combat vehicle — not to provide him a platform from which to fight, but to provide him a mobile command post with mobility and survivability equivalent to that of the vehicles of his forces. Successful battlefield commanders position themselves where they can most influence the action (at the nebulous "decisive time and place"). In this respect, we in the field artillery have failed to keep stride with the maneuver commander: our doctrine, as articulated in FM 6-20, *Fire Support of Combined Arms Operations*, and FM 6-20-1, *Field Artillery Cannon Battalions*, fails to come to grips with the command and control of a direct support battalion. We need to take a fresh look at this subject.

Our doctrine requires the direct support battalion commander to wear two hats: he commands a battalion, and he is the fire support coordinator for the supported brigade. As the battalion commander, he is responsible for those functions that place fires on the target from his own battalion and available

reinforcing artillery as well as for caring for his own soldiers and sustaining operations. He is ably assisted in executing these functions by the battalion executive officer, the battalion operations officer, and the battery commanders.

Wearing his fire support coordinator hat, the direct support battalion commander provides the supported brigade commander with his most responsive firepower and, as necessary, quickly brings in other assets available within the division. He is assisted in this role by the brigade assistant fire support coordinator and the battalion fire support officers. He must, however, have detailed knowledge and understanding of both the brigade commander's concept of the operation and the battlefield. He can gain that knowledge and understanding only by seeing the battlefield and by being located in close proximity to the brigade commander during the battle. But, while the direct support commander's needs are well understood, existing doctrine and the means of positioning him are inadequate to those needs.

Figure 1 depicts the location and functions of each of the principal subordinates of the direct support field artillery battalion commander. Given that these functions are assigned to these individuals, the battalion commander should be free to move about the battlefield. The only issue is where he should be. During the critical planning phase, the battalion commander should take an active role in the brigade planning process. During the actual

battle, he should be at the point which the brigade commander considers critical in order to bring maximum firepower to bear. In short he should be positioned with or near the brigade commander, but should *not* be tied to the brigade commander for transportation.

For the direct support field artillery battalion commander to achieve this positioning, he requires a combat command post that provides him with communications, mobility, and survivability — a combat vehicle that can keep up with the brigade commander's command vehicle and enable him to move forward where he can best see the battlefield, control moves of fire units to support the brigade, and rapidly shift fires and priorities of fire as desired by the brigade commander. Our suggestion for the near term is that the direct support field artillery battalion commander be provided with an M113, configured with the same radios presently authorized the battalion commander in his 1/4-ton vehicle (one AN/VRC-46 and one AN/VRC-47), except that he would receive a kit to permit him to use a CVC helmet. The crew would consist of a driver and a reconnaissance sergeant/track commander, both with the 13F MOS and both trained to shoot. For TACFIRE, the track should also carry two digital message devices so that the commander can speak with the computer and so that the reconnaissance sergeant can shoot, if necessary. Future refinements should include developing a command and control station for TACFIRE

A functional view of the position and role of each of the principal subordinates to the commander.

Subordinate	Location	Functions
XO	Combat trains	Supervises the administration and logistics of the battalion and ensures that there is a link between the firing batteries and the field trains located in the brigade support area.
S3	Battalion tactical operations center/fire direction center	Exercises tactical/technical fire direction and prepares to control the movement of batteries to support the operation.
Brigade assistant fire support coordinator	Brigade tactical operations center (can be positioned with the brigade S3 if necessary)	Serves as the link with the brigade staff, prepares fire plans, and exercises the details of fire support coordination.

Figure 1.

interface from the command track. (The fire support officer station under development may suffice.)

The maneuver task force commander's fire support coordinator is the battalion fire support officer provided by the direct support battalion. Although the fire support officer works directly for the task force commander on an equal footing with the maneuver S3, he is also an extension of the direct support battalion commander's command and control system. Though the maneuver S3 may be in the tactical operations center or at a forward location, the fire support officer must accompany the task force commander as he assumes vantage points overlooking his company teams. To leave the fire support officer in the tactical operations center where he is unable to respond immediately to his supported commander is to waste the fire support resource of the task force. The task force commander must habitually take his fire support officer with him in his command track or else provide him with a separate track for his own use. The fire support officer must also have two or more radios provided to him for his exclusive use. In TACFIRE units the fire support officer also needs a digital message device to interface with TACFIRE. (Our experience has shown that the battalion/task force fire support officer should be thoroughly familiar with FM 71-1 and FM 71-2. Knowledge of FM 6-20 and FM 6-30 is, of course, an inherent prerequisite.) The fire support sergeant remains with the fire support element at the task force tactical operations center.

The 3d Battalion, 19th Field Artillery, has used these command and control concepts in a division field training exercise and during two rotations to the National Training Center. In all instances, the command track afforded the battalion commander the means to influence the battle and to keep up with the rapidly moving armored and mechanized infantry forces. The battalion fire support officers were always able to bring to bear the firepower of the artillery and close air support. We feel that it is time to incorporate these command and control concepts into our doctrine and make the appropriate changes to tables of organization and equipment to enhance the direct support field artillery battalion commander's ability to fight.

R.S. Ballagh, Jr.
LTC, FA
Jerry Bagnell
MAJ, FA
3-19th FA
Fort Polk, LA

More on "The Nightfighters"

I am writing in reference to Lieutenant Colonel Robert E. Seger's article, "The Nightfighters," which appeared in the November-December 1983 *Field Artillery Journal*. The Chief of Staff of the Army tasked the 2d Armored Division to "develop tactics and train forces for night operations to exploit the capabilities of the M1/M2 family of vehicles." In essence, the 2d Armored Division was to be the Army's heavy division nightfighting expert. The mission given to the Redlegs of the 2d Armored Division by their commanding general was succinct: "... provide quick and accurate fire support to the maneuver forces at night and even from moving batteries."

Lieutenant Colonel Seger noted that the challenge put to his field artillery battalion was to attain the capability to conduct live-fire hipshoots at night — a most difficult task. Extensive training was obviously required to achieve this goal, and it appears that much of the available nighttime training was dedicated to this end. I submit that we as field artillerymen should be concentrating our nighttime training in other areas.

With the advent of split-battery operations, the need to conduct emergency occupations (hipshoots) should be drastically reduced. By properly integrating tactical survivability moves into the fire support plan, field artillery units should be capable of providing fire support to committed close combat units from stationary firing elements. This ability is the cornerstone of the split-battery doctrine. It may be true that units organized under H-series tables of organization and equipment do not possess all of the necessary equipment or personnel to accomplish this task completely; but, as early as 1980, the 3d Armored Division Artillery was training under split-battery conditions with favorable results.

I strongly agree with training trends which cause military units to conduct operations under limited visibility conditions. The majority of field artillery nighttime training, however, should focus on the reconnaissance, selection, and occupation of positions; road marches; resupply operations; maintenance activities; and the whole spectrum of battalion and battery operations required to support the maneuver arms. Noise and light discipline, as well as the additional time required to conduct successful night operations, dictates that even the most routine of tasks be constantly practiced so that soldier skills are honed to a point where soldiers

can achieve acceptable levels of performance.

I applaud the 1-3d FA for its ability to master this most difficult of nighttime procedures and to share with the field the lessons learned. I believe, however, that emphasis must be placed on those operations which field artillery units will most often be conducting. Nighttime training opportunities are at a premium, and we must use our time wisely. By training to identical standards during both daytime and nighttime operations, we in the field artillery will enhance our ability to provide dynamic support of the maneuver forces as we prepare to "Steal the Night Away."

Edward A. Smyth
LtCol, USMC
Fort Sill, OK

A concern worth attention

Captain R. Bruce Salisbury's article, "The Shadow Effect" (January-February 1984 *Field Artillery Journal*), is bound to arouse considerable comment — both pro and con. However, it is probably less important to argue the shadow effect's *actual* existence than it is to recognize the strong *perception* that it exists.

In my role as a leadership instructor at the Field Artillery School, I hear many students complain at length about oversupervision and lack of trust. These factors do have dysfunctional effects on the morale, efficiency, and development of junior officers and noncommissioned officers, especially if they want to acquire responsibility and use their initiative. The shadow effect is singularly frustrating to them.

However, junior leaders, in spite of their frustrations, need to recognize that many senior officers are often fettered by their own concerns. The US Army, and especially the Field Artillery, is undergoing a rapid and profound change. Just the technological breakthroughs alone have given us the Pershing II, Multiple Launch Rocket System, Copperhead, the battery computer system, and the remotely piloted vehicle to name a few. Each technological advance requires adjustments in funding, manning, and training. The AirLand Battle concept is still developing, and all of this is occurring during a time of severe resource constraints. None of these considerations excuse oversupervision, but they may explain some of it.

We now know that change is the only constant upon which to count. Unsupervised change is scary for leaders.

Simply telling senior leaders to stop oversupervising will not make it happen. At least two things must occur. First, senior leaders must use their skills to train subordinates. That statement assumes that the leader possesses the skills necessary to teach, coach, and/or counsel and that his subordinates are willing and capable of receiving training. The second requirement is for senior leaders to be willing to take the risks involved in allowing junior leaders the freedom to perform. That is a tall order at a time when large mistakes could lessen our readiness to defeat the enemy. When presented with those choices, there may be few senior leaders who would be willing to risk possible failure in order to advance junior leader development. This is the conundrum in the senior-junior leader faceoff. Trust, maturity, honesty, time, skill, and, most of all, a desire to make it work are some of the components required to piece together cohesive, senior-junior teams dedicated to the mission. Captain Salisbury has identified a concern that is worth considerable attention by all leaders.

Gary K. Richardson
MAJ, FA
Fort Sill, OK

Survey in the Southern Hemisphere

As part of the First Marine Brigade, my battery is involved in a continuous cycle of deployments to the western Pacific and Indian Oceans. These deployments frequently include operations in Australia and Africa — south of the Equator. Independent of the artillery battalion and part of an infantry-centered battalion landing team, the battery operates with only a rudimentary survey section attached. During our operations, we have often had difficulty in establishing direction. In Australia, especially, magnetic lay was almost impossible due to local variations; the needle kept trying to point straight down.

What, if any, celestial survey techniques have been developed for use in the Southern Hemisphere? Is this problem being addressed anywhere in the Field Artillery Community?

M.S. Murphy
2LT, USMC
C Btry, 1-12th Marines
FPO San Francisco

There are no hasty celestial survey techniques for the Southern Hemisphere. The Corps of Engineers is currently researching a method similar to the

Polaris hour-angle method which would use the star Sigma Octantis in the constellation Octans.

*There are, however, three survey methods for determining azimuth which can be used in the Southern Hemisphere. The astronomic azimuth by altitude method (sun or star), the astronomic azimuth by hour-angle method (sun), and the astronomic azimuth by hour-angle method (star) are all discussed in detail in FM 6-2, **Field Artillery Survey**. Additionally, if survey control is available, simultaneous observation of the sun, moon, or identifiable stars is another alternative. — Ed.*

Thoughts on the designated hitter

I want to address Sergeant First Class Stephen P. Duvall's letter "Designated hitter," (January-February 1984 *Field Artillery Journal*) which made some suggestions on the employment of the Hellfire missile system and separate observation lasing teams.

Three separate observation lasing teams will be assigned to each direct support field artillery battalion. They will be controlled by fire support coordinators from brigade to company level. The teams provide extra lasers to the brigade to attack targets with laser-guided munitions such as Copperhead, Hellfire, and Air Force laser-guided bombs. Pulse repetition frequency codes are assigned on a semipermanent basis to fire support and separate observation lasing teams to prevent laser-guided munitions from guiding in on the wrong reflected laser beam. Each team will receive two codes. The codes will be changed only for security or if units are placed on the division boundary; the only time they should be changed is during the delivery of Air Force laser-guided bombs, because the pilot cannot change the code on a bomb in flight.

Army aviation assets approved by the brigade and approved by the division will probably be placed under the operating control of the brigade. The aviation scouts will coordinate with the ground forces for information on the friendly situation, the enemy situation, fire support coordination measures, missions, available indirect fire assets, frequencies, call signs, and pulse repetition frequency codes. The scouts will then either acquire targets and hand them off to the attack helicopters or coordinate them with the separate observation lasing teams or fire support teams for the hand-off of targets to the attack helicopter. The use of the observation lasing team

would, as Sergeant Duvall states, facilitate protection of both the attack helicopter and the scout because neither would likely be acquired by enemy air defense systems.

One other aviation asset which will greatly enhance the scouts' capability to lase targets is the OH-58D helicopter, with its mast-mounted optical system. This system can lase targets for the attack helicopter; and neither aircraft will have to unmask, thus making them less vulnerable to enemy air defense systems.

The coordination problems that arise between the attack helicopters and separate observation lasing teams would be greatly reduced if they worked together on a regular basis, consistently placing the same helicopters in the same area of operations.

Given the capabilities of the separate observation lasing team and the attack helicopter, they can work as an effective team to engage enemy armor units and give maximum protection to friendly forces.

Jerry Lawrence
CPT, FA
Fort Sill, OK

Microcomputer fever

Captain Douglas M. Brown's letter "Taking a byte out of time" (January-February 1984 *Field Artillery Journal*) addresses an important subject. My job is the modeling and simulation of tactical data systems, but I am not qualified to say why the Army has not implemented a standard administrative/logistics computer network down to the company/battery level. However, there are two extremes concerning the standards to follow in producing any system: build a standardized, rigidly controlled hardware and software system, such as the current tactical data systems; or initiate a loosely organized microcomputer-at-every-desk system where software may be provided by the more talented users as well as the professional programmers. There are grey areas in the middle — controlled hardware and free software, for example. While there are advantages to allowing user-modification of programs, there can be rather disastrous disadvantages. A unit may spend a great deal of time trying to "patch up" their data base which they have accidentally destroyed through careless or ignorant modification of a program. User origination of new programs may well be encouraged as creative input to the system; these new programs should be considered at the program service facility for integration into the system, in much the same way

changes to publications are presently considered.

The Post Deployment Software Support Group at Fort Sill is analogous to Captain Brown's program service in some ways. One big difference is that the tactical automated systems arena is probably as close to the standardized, rigidly controlled hardware and software system end of the spectrum as we can get. Nevertheless, there is a great deal to be said for standardization of a system. First, it allows users from one portion of the system to operate in another, similar portion with a minimum of training. Next, it prevents the system from "thrashing" in a plethora of minute changes made by users throughout the system. Best of all, it permits the system to be just that: a system. Without standardization, the so-called system is just a collection of individual processing modules, few of which (if any) can communicate effectively. In the military community, the communication of data occupies a great deal of our time; after all, is that not the whole idea behind paperwork? It would indeed be a loss to own a system which was not coordinated enough to provide relief for this problem.

The upper echelon of an Army admin/log data system exists now; SIDPERS, DLOGS, and COMPASS are examples of parts of an overall system yet to be defined. One notes immediately that these parts are from a broader range of services than Captain Brown proposes. Local administration is important; and so are personnel, logistics, transportation, and quartermaster, for example. The advent of the inexpensive microcomputer has tempted us to use this cheap, readily available product in a haphazard way. But, if we allow a system to become personally tailored at the company and battalion levels, we will have a much greater transition problem later when the upper echelon subsystems are ready to interface at a lower echelon. Additionally, as the microcomputers proliferate, so does the BASIC language. This language, though simple to learn and use, is not structured. A structured language such as PASCAL, MODULA II, or ADA would allow structured programming, which greatly eases the software support and modification problem. Fewer users would have the technical knowledge to write software, but they would certainly be able to express their ideas to the software support group; and the professional programmers would be better equipped and trained to handle the not-so-trivial task of integrating a suggestion into the system.

With this viewpoint in mind, I appreciate Captain Brown's program

service as perhaps being an interim solution for those microcomputers presently in existence. It should certainly not provide any extension to the tactical data systems community; and it is hoped that the Army would replace it soon with a software support group for its admin/log system, whatever that system finally turns out to be.

Frank Bicknell
CPT, FA
Fort Sill, OK

On the use of personal computers

I found Captain Douglas M. Brown's letter entitled "Taking a byte out of time" (January-February 1984 *Field Artillery Journal*) very intriguing. Automatic data processing (ADP) certainly has its place in the military, but can it solve all our problems? The commander's ultimate goal is to streamline his administrative functions so that he will have more time to deal with other command problems. Yet, as the commander ponders the state-of-the-art systems, he may wonder whether electronic widgetry creates even more requirements to accomplish the same tasks. He may wonder if he should dive headlong into an automated data processing system in a force structure where "fix forward" and "make it workable at the lowest level" are recurring themes.

The usefulness of automated data processing is continuously being explored and debated. Until recently, there was little Army-wide coordination on applications of personal software. Now, there are many existing programs available to cover every major Army function (e.g., finance, personnel, and logistics). The Computer Systems Command operates a type of clearing house for software programs and provides a catalogue which lists available functions and subfunctions and the locations, hardware, and language of the programs. A plan called the Army ADP Resource and Performance Management System (ARPMIS) will update the service with a dial-up capability and will categorize all user functions for all systems so that members of the Army can better serve each other. This entire effort brings the Army one step closer to standardizing the total management of Army automated data processing.

Another type of individual clearing house, the Automated Command and Training Systems Group, is in operation at Fort Leavenworth, Kansas. It maintains a library of programs on discs for tactical,

special military, and general housekeeping routines. As of March 1983, the library had two tactical programs (one titled "Tube Arty Planner"), two special military programs, and 11 general housekeeping routines with titles such as "Target Locator," "Personnel Roster," and "Security Roster." In addition, the library has a current listing of 43 topics for which it is seeking formatted programs, including "Decision Making," "Personnel Estimate," and "Logistic Estimate." More specific information on clearing house services is available at these addresses: Commandant, US Army Command and General Staff College, ATTN: ATRL-SWH (ACTSUG), Fort Leavenworth, Kansas, 66027; and Logistics System Clearing House, ATTN: ACSC-TEA-R, Fort Belvoir, Virginia 22060.

The average military computer buff who has the correct hardware can, in several months, begin to approach the construction of a program that solves his problem; but, since he will be using his personal time or working on the program as an additional duty, there is a risk that his efforts will be overcome by unexpected events. Under the auspices of the Computer Systems Command (indirectly overseen by the Logistics System Clearing House), a user will not need to solve the same programs again and again; he merely checks his local data base, finds out what programs are available, and appropriates a compatible system to access it.

Here are my observations on the pros and cons of the use of personal computers:

- Automated data processing programs can generate more reports and make them available to more managers at different levels. Users, however, are spending the time they should have saved by acting on or reviewing more issues.

- Automated data processing increases the need for storage and for communicating reports and other data — actions which absorb valuable time.

- The control of automated data has created the need for an original type of management and a highly skilled operator to further simplify and disseminate reports so that all levels of command and management can effectively grasp the information provided.

- The applicability of automated data processing is nondebatable, but the end result might be that commanders get so involved with its possibilities that they expand existing systems to do tasks that are best left to manual techniques. The computer, for example, does not make a very good notebook, file, or ledger — the programs

available have not yet shown that they would serve a commander any better than the traditional, manual management aids.

- Exchanging information through listings of program hard copy requires translating and copying which is time-consuming and increases the probability of error.

- A computer cannot solve problems; it merely organizes them better so that they can be solved. As long as the programs generated can further improve how we comprehend the burden of information, then automated data processing with personal computers is justified; it is, however, a time-consuming process and does not always allow an individual to first explore the nature of a problem. Automated data processing is designed to complement a commander's own thought process with a network of terminals. Tied to a common data bank throughout a major command, a small unit commander's terminal can be a valuable asset as long as the commander ensures that it saves time rather than wastes time.

Gifford W. Slater
CPT, FA
Fort Sill, OK

Library for microcomputer software

Captain Douglas M. Brown's idea of a central repository or library for microcomputer software ("Taking a byte out of time," January-February 1984 *Field Artillery Journal*) is a good one, but it is not new. The Computer Systems Command was created to do just that. Unfortunately, the problem is so large and complex that it has yet to be implemented even at the centralized base operations software level.

The Command and Control Microcomputer Users' Group and the Automated Command and Training Systems Users' Group, both at Fort Leavenworth, Kansas, have been established to act as a repository for microcomputer software. Although they do not have a large inventory, they will make available any software in their catalog free of charge.

There has been a proliferation of microcomputers and user-written and commercial programs to run on the microcomputers. To date, there has been no official Army action to standardize either the hardware or software that is turning up in every office and field unit. There are, however, several commercially developed languages and operating systems which allow portability across a wide range of microcomputers. Examples

of operating systems are CP/M, CP/M-86, MS-DOS, and UNIX. Universal languages which can operate using these operating systems are UCSD-Pasca, "C", and FORTRAN. There are also several generic BASIC languages which are highly portable. The Army needs to cease ignoring the problem and hoping that it will go away. The first step would be for DoD or DA to approve one system and then grant blanket approval to all echelons to purchase equipment which is capable of running the chosen system. My personal choice would be the UNIX operating system and any software written in UCSD-Pascal or "C."

Philip W. Holden
MAJ, FA
Fort Sill, OK

More wrestling with FIST

I would like to address Staff Sergeant Welton's letter to the editor concerning the FIST ("Wrestling with FIST," November-December 1983 *Field Artillery Journal*). It is refreshing to see *FA Journal* correspondence from our noncommissioned officer ranks, for all too often this publication is perceived as a forum exclusively for the officers and DA civilians of our profession. I hope his example will encourage other NCOs to share their valuable opinions and experiences with the entire Field Artillery Community.

Personnel shortages in the FISTs, especially in the NCO grades, resulted in great part from the fact that 13F is a relatively new MOS. Improvement will come as junior personnel progress through the ranks — the trend is evident in the 1982 year-end statistics which showed the E1 to E4 grades at over 100 percent fill and the E7 fill at approximately 75 percent.

Staff Sergeant Welton's recommendation that the FIST be assigned to the maneuver units has received considerable Army-wide attention since the birth of the FIST concept in a Field Artillery School study in 1975. As a matter of fact, the study group agreed with him; but it was overruled by TRADOC with the unanimous concurrence of other major Army commands. In 1981 the issue was revisited when the Vice Chief of Staff of the Army directed a thorough review of the FIST concept. All 16 active divisions at that time supported the TOE assignment of FISTs to the FA battalions with attachment to the maneuver units at the outbreak of hostilities. The more salient points of the rationale behind this decision were:

- It emphasized the role of the direct

support artillery commander as fire support coordinator at the maneuver brigade — the assignment of FIST/FSE was consistent with this mission.

- Responsibility for fire support training would remain with the field artillery, which possessed the requisite assets and expertise to do this task best.

- It provided for the rotation of FA officers so that they could gain experience important to their individual professional development and bring broader FA experience to the FIST.

- Replacement of FIST/fire support officers due to combat losses or unsatisfactory performance would be facilitated since the FA commander has a ready base of skilled officers.

- There was a greater opportunity for FIST personnel to adjust fires through their participation in FA service practices, FTXs, and CPXs.

Recognized as disadvantages were the following points:

- It fostered a situation where the FA commander might place a high priority on filling battery slots at the expense of the FIST.

- There would be problems during emergency deployment of maneuver units which were geographically separated from their supporting artillery (a situation which prevails in the European environment).

- It would be incumbent on the field artillery battalion to provide observers to maneuver units for mortar service practice.

- Close coordination between the commanders of the maneuver and supporting FA units would be required to achieve effective combined arms training. Furthermore, the effectiveness of this coordination would be highly dependent on the personalities involved.

As indicated by Staff Sergeant Welton's experiences, the practical application of this decision in the field has varied greatly due to factors extant in the local situation; e.g., command priorities, quality and fill of personnel, and leadership. The FA Community agrees wholeheartedly that the FIST chief job requires expertise which can only be expected from a lieutenant well seasoned in battery procedures. Much of the above reasoning, however, would legislate against the assignment of warrant officers as FIST chiefs. Simply stated, all aspects of fire support are and must continue to be the responsibility of the Field Artillery commissioned officer corps.

Donald Kraft
DAC
Fort Sill, OK

Nuclear matrix management sheet

Under the total Army concept, the Active Component field artillery units find themselves more and more involved with Reserve Components field artillery units. I would like to share some observations and a management tool that is being used in the 49th Division Artillery, Texas Army National Guard.

Reserve Components field artillery units must have completed nuclear Army Training and Evaluation Programs (ARTEPs) by the summer of 1985. We all know the importance and criticality of training time, but training time is especially significant in the Reserve Components. In essence, National Guard units have 39 days during the year to prepare for nuclear ARTEPs. These days are divided over an 11-month period prior to the two weeks of summer camp. In such a situation, maintaining continuity of training, sustaining technical proficiency, and monitoring and understanding progress are difficult tasks. The nuclear requirements during and after the ARTEP take a good deal of time; but the 49th Division Artillery, in

conjunction with the US Army Readiness Group, has developed a nuclear matrix management sheet (shown below), which I believe can benefit Active Component units in the management of time as much as it has benefitted the 49th Division Artillery.

The matrix management sheet serves these purposes:

- Reduces time spent on looking up references.
- Fixes responsibility by functional area.
- Provides a means to apply vertical and horizontal management.
- Gives a summary by month.
- Is a commander/staff management tool.

The sheet is divided into four major functional areas (A through D) which in turn are subdivided into critical tasks. The name of the person responsible for a given nuclear task can be put in the area under the task. A "go" or "no go" can also be noted. Section E is a summary of progress by month for each major functional area.

In my opinion, the nuclear matrix management sheet is a means to save time; on one sheet are all of the requirements of the nuclear part of an ARTEP. The matrix

is not meant to give a detailed analysis of each critical task, but commanders and staff can use it as a management tool to fix responsibility and track progress in conjunction with the battalion training management system plan.

I hope Redlegs find this sheet beneficial for use at staff meetings and battery-level meetings, or simply as a means to remember nuclear ARTEP/Technical Validation Inspection requirements.

Abel White
LTC, FA
Combined Forces Command
APO SF 96301

I think you were smart to comment that your matrix was not meant to give a detailed analysis of each critical task. Subject matter experts at the School's Nuclear Weapons Employment Division advise me that errors are the inevitable result of relying completely on checklists rather than on the pertinent DA publications. Those units which create a matrix or checklist to take the place of the appropriate manual are mistakenly putting a derivative training aid before the approved base doctrine. — Ed.

NUCLEAR MATRIX MANAGEMENT CRITICAL TASK LIST									
A NUCLEAR PROFICIENCY	RECEIPT INSPECTION	UMPACKAGE/PACKAGE	PERMISSIVE ACTION LINK/PREFIRE CHECK	COMMAND DISABLEMENT	FIRE MISSION	NONVIOLENT DISABLEMENT	WEAPON TIEDOWN	EQUIPMENT MAINTENANCE	SAFETY
PERSONNEL RESPONSIBLE									
B PERSONNEL	STRENGTH	BACKGROUND INSPECTION							
PERSONNEL RESPONSIBLE									
C OPERATIONS/TRAINING	MISSION STATEMENT	PLANS/SOP	TRAINING	PUBLICATIONS	TACTICAL SOP	NUCLEAR ACCIDENT INCIDENT CONTROL PROCEDURES			
PERSONNEL RESPONSIBLE									
D LOGISTICS	TOOLS/TEST EQUIPMENT	TOE EQUIPMENT	CUSTODY	REPAIR PARTS	MODIFICATION WORK ORDERS	EMERGENCY RETURN PROCEDURES			
PERSONNEL RESPONSIBLE									
E. SUMMARY OF PROGRESS									
MONTH	NUCLEAR PROFICIENCY	PERSONNEL	OPERATIONS/TRAINING	LOGISTICS	REMARKS				
1.									
2.									
3.									
4.									
5.									
6.									
7.									
8.									
9.									
10.									
11.									
12.									

On "To sell or not to sell"

In his letter "To sell or not to sell" in the January-February 1984 *Field Artillery Journal*, Brigadier General (Retired) Roland P. Shugg criticizes the Field Artillery Community for not reacting to the *Armed Forces Journal* (January-February 1980) article on the Russian M1974 122-mm self-propelled howitzer — the thrust of the criticism being that the US light forces are being overlooked in the updating of their armament. The 122-mm howitzer which General Shugg cites as an example of modern weaponry is not light — it weighs approximately 19 tons, and the desired weight for a light direct support cannon system is 8,000 pounds. Even though the M198 155-mm truck-drawn howitzer weighs 15,800 pounds, it is the current direct support weapon for light infantry units. There are ongoing projects, however, to reduce the weight of the M198 to approximately 8,000 pounds all-up weight.

General Shugg also mentioned the Mobile Protected Gun System as a way of the future. The Mobile Protected Gun System is "relatively" light and offers some protection, but it is designed to be a surrogate tank which can defeat armor rather than a field artillery direct support weapon.

Douglas M. Converse
DAC
Fort Sill, OK

SEAD — Are we ready?

A few years ago at Fort Greely, Alaska, fire support team (FIST) personnel from the 1st Battalion, 37th Field Artillery, were practicing close air support procedures when an incoming pilot requested a target description. Caught without a prepared answer, the lieutenant directing the airstrike blurted out the first threat vehicle that came to his mind: "Two ZSU-23-4s in the open." "No thanks," the F4 pilot replied; "That's your job." Although that exchange provided a bit of humor that day, hindsight of the 20-20 variety provides us with an interesting question: If keeping the enemy's air defense off the backs of our aviators is the field artillery's job, are we prepared for it?

The four main functions of the field artillery are close support, interdiction, counterfire, and suppression of enemy air defenses (SEAD). In over two years as a FIST chief, I became well versed in the purpose and procedures concerning close support. Interdiction and counterfire are areas over which FISTs have no control;

but rocket-assisted projectiles, FASCAM, remotely piloted vehicles, and Firefinder radars all prove to me that the Field Artillery Community recognizes its responsibilities in those areas. They are key to the conduct of the AirLand Battle. But during all that time "on the hill," the employment of SEAD was never discussed; and very little time was spent on it during my attendance at the Field Artillery Officer Advanced Course. The joint suppression of enemy air defense manual prepared by the Training and Doctrine Command and the Tactical Air Command in April 1981 proclaims that the Army has the primary responsibility for suppressing enemy air defense artillery assets immediately in front of the forward edge of the battle area, with the Air Force assuming primary responsibility beyond the range of observed fire (in other words, beyond a forward observer's capabilities to acquire and engage targets). Furthermore, FM 17-50, *Attack Helicopter Operations*, says a pilot's use of field artillery is "primarily to suppress enemy air defenses, permitting the attack helicopter unit to employ its point target firepower against the enemy." Apparently we realize the need for SEAD but have done little to ensure that we can do it. This is an unfortunate situation because we are expected to handle SEAD by Air Force pilots.

I do not propose development of anti-radiation artillery projectiles — we already have enough problems carrying all the required ICM, smoke, FASCAM, and Copperhead projectiles. Because of the mobility of the threat's forward air defense artillery elements, planned fires upon them are practically useless; therefore, I suggest that the key link to providing timely and accurate SEAD fires is our FISTs. We can provide an invaluable service to our pilots by ensuring that FIST personnel have detailed training on threat air defense artillery assets and how to engage them. Our FIST chiefs and forward observers must know what the threat equipment looks like and, more importantly, where to look to find it. Here are some facts.

It is probably safe to assume that most FIST chiefs have heard of the infamous ZSU-23-4, and for good reason. Each of its four 23-mm guns can spit out 800 to 1,000 rounds a minute and has a maximum effective range of 2,500 meters with the on-carriage radar system. Mounted on a modified light tank chassis, the ZSU-23-4 can be found as far forward as the leading tank companies — the prime target for our own A-10s, Cobras, and Apaches. The ZSU-X system, a tracked 30- to 40-mm multibarrel cannon system with a range in

excess of 3,000 meters, is expected to replace the ZSU-23-4 soon.

The two missile systems that will probably be located within observation range of our FISTs will be the SA-9 and the new SA-13. The SA-9 consists of a quadruple cannister launcher mounted on a wheeled armored car, and it fires heat-seeking missiles to a maximum effective range of 6,000 meters. It can also be found as far forward as the leading companies. The SA-13 is in the process of replacing the SA-9. Mounted on a modified MT-LB chassis and sporting its own ranging radar, it has a range in excess of 7,000 meters.

Another weapon found well forward is the S-60. A towed weapon, its single 57-mm gun can fire 105 to 120 rounds a minute with a maximum effective range of 4,000 meters. Organic to many threat divisions, it will probably be located in a belt five to eight kilometers deep around division headquarters elements.

Other air defense artillery weapons that could be seen at battalion level, but less common than those mentioned above, are the ZPU-4 (a towed, 4-barrel 14.5-mm machinegun) and the ZU-23 (a towed, twin-barreled 23-mm machinegun used by airborne forces). The SA-7 Grail, similar to the Redeye, will be located down to platoon level; but a deliberate effort to suppress it is unreasonable to expect.

Definitive data on probable threat formations and signatures in a particular theater of operations is located in chapter 3, "Target Value Analysis," of the *Fire Support Mission Area Analysis* and in FM 100-2, *Soviet Army Operations*. Fire support officers should coordinate with the operations and intelligence element of their division artillery to obtain the information and train their FISTs on where to look for threat air defense artillery assets. However, some generalizations apply across the board.

A threat motorized rifle division could conduct a movement to contact in two echelons with two regiments abreast. Each of the regiments in the first echelons will send out an advance guard of battalion strength. Air defense artillery assets — specifically ZSU-23-4s, SA-9s, and SA-13s — will be located in that advance guard, only three to eight kilometers behind the lead tank. Therefore, when our aviation forces engage those lead elements, SEAD will be immediately important.

When the main body arrives on the scene, each motorized rifle battalion will have possibly two or more ZSU-23-4s, SA-9s, or SA-13s. A typical motorized rifle company participating in a deliberate attack will generally move with a row of four tanks in front, two

rows of four to five BMPs, and air defense artillery with the command vehicle immediately behind. The ZSU-23-4s will be only 500 meters behind the lead tank, with the SA-9s or SA-13s normally about 2,000 meters farther back.

An inherent characteristic of air defense artillery weapons is the need for open fields of fire to engage aircraft. Also, the mobility of the ZSU-23-4, SA-9, and SA-13 allows them to rely upon frequent movement for self-defense instead of using the terrain. Therefore, forward observers should examine open areas for SEAD targets. The SA-9 and SA-13 prefer high ground, if available.

When US joint air attack teams are operating in a unit's zone, the FIST teams should pay special attention to acquiring and engaging air defense artillery targets. If the concentration of aircraft is sufficient enough to warrant the creation of an airspace coordination area, a forward observer's ability to engage routine targets may be inhibited, giving him more time to look specifically for threat air defense artillery assets.

Most threat air defense artillery equipment can be effectively engaged using HE/VT and DPICM. The radar dishes of the ZSU-23-4 and SA-13, perched on top of the

vehicle, are vulnerable to flying shrapnel; and the crews of the ZPU-4 and ZU-23 are exposed. However, an airspace coordination area can restrict the use of most ammunition. The use of Copperhead projectiles could eliminate a large portion of that conflict. The "big sky, little bullet" theory is easier to accept when one is talking about individual projectiles instead of six at a time. Air defense artillery targets are projected to be second highest priority, behind tanks, for use of Copperhead; and commanders should ensure they stay there. A Copperhead can surgically remove a ZSU-23-4 with minimal disturbance to the airspace it flies through and will provide a high return for its use. Each Copperhead is good for no more than one tank when fired at armored formations; but given that an A-10 carries six Maverick missiles and 1,174 rounds of 30-mm ammunition (good for about 16 tanks), that an AH-1S Cobra gunship carries eight TOW missiles, and that an AH-64 Apache carries up to 16 Hellfire missiles, a Copperhead kill which ensures that one of these friendly aircraft lives to fight another day could be more effective than one kill that removes one T62 from the battlefield.

In the next war, FIST chiefs and fire support officers will be tasked with

numerous responsibilities, probably too many to perform correctly. Close support will certainly take highest priority with them. The division commander exercising the principles of the AirLand Battle will ensure that interdiction is practiced. It will not take long for an artillery battalion commander to realize the importance of counterfire. However, it will be up to the FISTs to ensure that SEAD is effective. I hope we will have prepared them for the job.

Ron Johnson
CPT, FA
Fort Sill, OK

8th FA Regiment history

I am preparing a history of the 8th Field Artillery Regiment for the *Field Artillery Journal*. If any *Journal* reader has photographs, art, articles, or memorabilia pertaining to the history of the 8th Field Artillery Regiment, I would ask that originals or copies be forwarded to me as soon as possible.

Robert C. Stillwell
MAJ, FA
HQ, 3-8th FA
Fort Bragg, NC 28307

Command Update

NEW REDLEG COMMANDERS

* COL Roger L. Bernardi
1st Armored Division Artillery

LTC Felix Peterson, Jr.
5th Battalion, 3d Field Artillery

MAJ (P) Louis J. Hansen
4th Battalion, 5th Field Artillery

LTC Michael L. Dodson
3d Battalion, 16th Field Artillery

LTC Roy E. Korkalo
2d Battalion, 17th Field Artillery

LTC Homer W. Baxley
2d Battalion, 21st Field Artillery

LTC Thurman R. Smith
1st Battalion, 27th Field Artillery

LTC Robert R. Hicks, Jr.
2d Battalion, 39th Field Artillery

MAJ (P) William N. Yerkes
1st Battalion, 40th Field Artillery

LTC Rufus H. Shumate, Jr.
2d Battalion, 78th Field Artillery

LTC Richard L. Bevington, Jr.
3d Battalion, 319th Field Artillery

LTC James R. Russell
512th US Army Artillery Group

* Listed in March-April 1984 — the middle initial should have been "L" instead of "A."

Hotline

QUESTIONS AND ANSWERS

Your "Redleg Hotline" is waiting around the clock to answer your questions or provide advice on problems. Call AUTOVON 639-4020 or commercial (405) 351-4020. Calls will be electronically recorded 24 hours a day and queries referred to the appropriate department for a quick response. Be sure to give name, rank, unit address, and telephone number.

Please do not use this system to order publications. Consult your FA Catalog of Instructional Material for this purpose.

Question: What are the stock numbers for all antenna and power cables on the radar chronograph M90? Also, is there a technical manual for this chronograph?

Answer: Cables and other components of this radar chronograph are not currently in the US Army supply system and thus do not have stock numbers. Repair and replacement of cables can only be performed above the organizational maintenance level; so contact the direct support maintenance facility for maintenance assistance in repairing the chronograph.

The radar chronograph M90 does not have a technical manual published by the US Army. There is a manual, TDM 2100 dated 1 October 1979, which is published by the manufacturer, Lear-Siegler. Copies of this TDM can be obtained by writing to Commander, HQ, US Army Armament Material Readiness Command, ATTN: DRSAR-MAS-T, Rock Island, Illinois 61299.

Question: Is there a new 155-mm projectile called a gas bleed-off round?

Answer: The XM864 155-mm projectile is an extended-range, dual-purpose improved conventional munition which will provide extended range by base-bleed technology. It is in advanced development at this time and is scheduled for type classification in the fourth quarter of fiscal year 1986. The XM864 projectile will fill the void in ranges of the M483 dual-purpose improved conventional munition and the M549 high-explosive rocket-assisted projectile.

The range of the XM864 payload will

extend to approximately 23 kilometers in the self-propelled M109-series howitzers and to 26 kilometers in the M198 towed howitzers. The range will be enhanced approximately 20 to 30 percent through the use of pyrophoric granules in the base of the projectile. The granules are ignited after leaving the tube, thereby creating a positive overpressure behind the base of the projectile. This overpressure reduces the drag on the projectile as it passes through the atmosphere, thus enhancing its range without introducing the instabilities that are found in the M549 rocket-assisted projectile. The submunitions are base-ejected in the same manner as those for the M483 projectile.

Question: Where can I obtain the rebuild criteria for the M110A2 howitzer? What echelon of maintenance should replace the rear idler arm on the M110A2?

Answer: The Maintenance Engineering Directorate of the Rock Island Arsenal (AV 793-4383/4261) can provide the rebuild criteria, and organizational maintenance should replace the rear idler arm (see pages 4-217 through 4-229 in TM 9-2350-304-20).

Question: Is there a chip for the TI-59 hand-held calculator which permits calculations for the Copperhead round?

Answer: The Field Artillery School's Gunnery Department has produced 250 provisional TI-59 chips for the Copperhead, and these chips are issued to units when they receive the Copperhead system. Additional requests for Copperhead chips must be justified in writing to the Gunnery Department.

Question: How does one know what items should be in the fire direction center section chest?

Answer: If you are referring to the Plotting Set, Artillery Fire Control, all items within the set and their national stock numbers are listed in supply catalog SC-6675-90-CL-NO2 dated 13 November 1981.

Question: Does the gunnery instruction at the Field Artillery School's Officer Basic Course still include manual gunnery and FADAC instruction?

Answer: Yes, on both counts. Manual gunnery instruction will continue through, and possibly beyond, the fielding of the backup computer system (BUCS). FADAC instruction is presented on an "as required" basis for National Guard and US Army Reserve Basic Course students and will continue as long as necessary.

Question: Is there any chance that Reserve Components field artillery units will receive the AN/PRC-68 radio set?

Answer: There have been significant reductions in the funding for the AN/PRC-68 for Active Army and Reserve Components field artillery units. While priorities for issues have not been reestablished, it is doubtful that Reserve Components units will be issued the AN/PRC-68 in the immediate future.

Question: Is there a video tape available which portrays the multiple launch rocket system (MLRS)?

Answer: The Fort Sill Training and Audiovisual Support Center (TASC) has a 13-minute video tape entitled "MLRS: Firepower for the 80s." You can obtain this tape on a two-week loan by coordinating with the TASC (Building 216, Fort Sill, OK, 73053; AV 639-5309).

Question: How does a unit replace a damaged or lost TI-59 calculator?

Answer: Although Texas Instruments no longer produces the handheld TI-59, the Army procured a large number of these calculators before they went out of production. They are currently available through normal supply channels. The complete computer set may be ordered using NSN 1220-01-082-1646. The NSN for the TI-59 only is 1220-01-106-9743.

Question: What is the reference for the effects of the M251A1 high-explosive round for Lance?

Answer: The M251A1 warhead effects are contained in Change 1 to FM 101-60-18(c), dated September 1978, "Nonnuclear Effects Table, Lance." This publication can be ordered from the US Army AG Publications Center, 2800 Eastern Boulevard, Baltimore, Maryland 21220 — use DA Form 4569 and be sure that you have an established classified account.

Question: I am in an M110A2 unit, and I am confused by the numerous sets of tabular firing tables (TFTs) and graphical firing tables (GFTs) that have been issued over the last couple of years. What are the correct TFTs and GFTs for the M110A2?

Answer: Here are the appropriate tabular firing tables and graphical equipment for the M110A2.

Tabular firing tables:

- FT 8-T-1 is for M509 (DPICM).
- FT 8-5-1 is for M650 (RAP).
- FT 8-Q-1 is for M106 (HE).

Graphical equipment:

- GFT (LA) 8-T-1: NSN 1220-01-067-7169.
- GFT (HA): NSN 1220-01-067-7170.
- GST: NSN 1220-01-067-7171.
- GFT (LA) 8-S-1: NSN 1220-01-070-8970.
- GFT (HA): NSN 1220-01-067-7172.
- GST: NSN 1220-01-067-7173.
- GFT (LA) 8-Q-1: NSN 1220-01-038-2410.
- GFT (HA): NSN 1220-01-021-7273.
- GST: NSN 1220-01-021-7273.
- Ballistic scale 8-Q-1: NSN 1220-01-102-4202.
- Plastic cursor for ballistic scale: NSN 5344-01-076-3554.

Question: Where can I obtain the NSNs (national stock numbers) for the graphical firing tables for the rocket-assisted projectile? They are not listed in CTA 50-970. Also, how can I obtain the provisional tabular firing tables for the same projectile?

Answer: The Army Master Data File microfiche lists these NSNs, and the Rock Island Arsenal will soon publish a change to CTA 50-970 which will list the NSNs. Continue to use CTA 50-970 as the requisitioning authority. You can obtain the provisional tabular firing tables by sending a letter of justification to Director, Ballistic Research Laboratory, ATTN: DRDAR-BLL-FT, Aberdeen Proving Ground, Maryland 21005.

Redleg Newsletter

ITEMS OF GENERAL INTEREST

Distribution of quality by MOS

In December 1982, the Department of the Army initiated a new program to distribute quality among MOSs at the accession level. This program gave each proponent the opportunity to recommend its percentage of accessions for each MOS in each mental category. (Mental categories are determined by a series of Armed Services Vocational Aptitude Battery tests which personnel take before entering military service.) The first soldiers to be accessed under this program entered the Army this year.

The Field Artillery School based the current mental-category mix on historical accession data from the previous six years, the current status of CMF 13 by mental category, and the demographic projections of the American population through 1990. Also considered were the current and projected systems and equipment and the varying demands they would make on soldiers and NCO leaders.

A very similar method was used for the FY85 projections. In addition to the FY84 projections and background, the School added to the equation the projected MOS requirements, reading grade levels, comparative levels of trainability, and updated accession data. The following breakdown shows the percentage of soldiers (by mental category) for each skill level 1 MOS as of December 1983 and also the percentages requested for FY85.

Percentages on hand in December 1983				Percentages requested for fiscal year 1985			
MOS	Mental category			MOS	Mental category		
	I-III A	IVB	IV		I-III A	IVB	IV
13B	34	30	36	13B	45	40	15
13C	63	25	12	13C	75	18	7
13E	69	22	9	13E	75	18	7
13F	67	22	11	13F	75	20	5
13M	75	19	6	13M	72	22	6
13R	75	22	3	13R	80	17	3
15D	64	23	13	15D	75	18	7
15E	69	21	10	15E	80	15	5
15J	73	18	9	15J	80	17	3
17B	60	30	10	17B	75	20	5
17C	54	32	14	17C	75	20	5
82C	65	23	12	82C	75	20	5
93F	58	22	20	93F	73	27	0

The continual refinement of this program promises to give the Army a higher quality enlisted force; a much higher quality NCO corps; and, most importantly, soldiers who are easily trained to operate, maintain, and lead in the Army of tomorrow. (SGM Thomas Kuhn, Field Artillery Propensity Office)

A Fly Paper

by Captain John L. Hensley, USAF

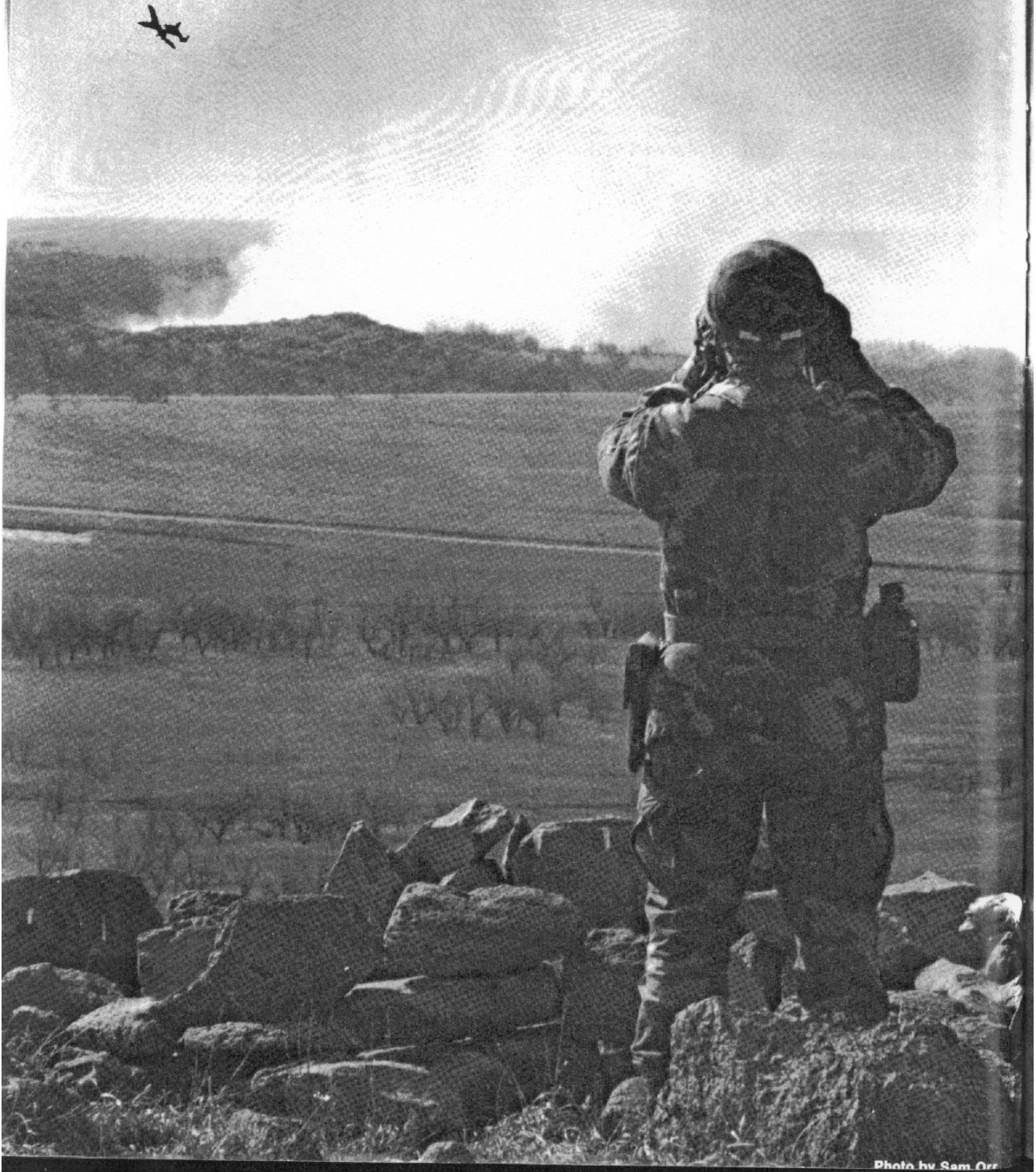


Photo by Sam Orr

This is a fly paper. It is not about maximized firepower, not about divided enemy defenses, not about the combined benefits of direct and indirect fires. After all, the reasons why the field artillery and the Air Force belong to the combined arms team seem obvious. Aircraft crews *can* locate enemy artillery and, if so equipped and armed, provide counterbattery fire. A forward air controller *can* adjust artillery fire. The field artillery units, with their indirect fires, *can* in turn mark targets for close air support (CAS) aircraft, provide smoke screens, "button-up" enemy gunners who would normally be firing at the aircraft, and, most importantly for the CAS pilot, destroy missiles and guns through suppression of enemy air defense (SEAD) fires. This fly paper is about none of the above. Rather, it is about the Air Force and the field artillery sticking together, while paradoxically keeping apart.

FM 100-42 and AFM 2-14 state the problem succinctly: The highest probability of conflict between aircraft and indirectly delivered supporting fires occurs at relatively low altitudes in the immediate vicinity of firing unit locations and target areas. With the exception of these two areas, the probability of aircraft and indirect fire conflict is relatively low.

But to avoid conflict in those two areas is no easy task. Again FM 100-42 and AFM 2-14:

. . . friendly fires . . . are not predictable. (2) The Army command and control system does not currently possess the capability to collect, categorize, and disseminate timely artillery information . . . throughout the entire tactical area of operation . . . (4) Indirect fires will not normally be interrupted because of potential conflict with aircraft traffic. (5) . . . tactical aircraft will avoid areas of high risk indirect fire conflict.

Though the problem of avoiding conflict between aircraft and indirect fires is well identified by FM 6-20, FM 100-42, and various other publications, the solution is a bit more elusive. These same manuals contain very few procedures relating to the "how to" of separating indirect fires and aircraft. Their ever-present "black hole" puts the responsibility for discovering those procedures at a very low level. FM 100-42 and AFM 2-14 contain this statement:

In order to reduce the potential conflict between indirect fires and tactical aircraft, the requirement exists for coordination of information

pertaining to indirect fire support activity at the lowest level having the capability to resolve the conflict.

In the Air Force, the Air Liaison Officer (ALO) is that lowest level; and I was an ALO for an infantry battalion. The solution, it seemed, was up to me, which was just as well — my interest in having aircraft avoid artillery runs rather deep since in my other life I fly the A-10 — the Warthog. It is one thing to be crawling around in the mud with the infantry when some other pilot accidentally gets shot down by US artillery; it is quite another to be the pilot who has to walk home.

The problem of aircraft and artillery separation presented itself during my work with the battalion fire support officer (FSO). During my first exercise with the battalion, my initial interaction with the FSO consisted of lessons in using a P-38 (I thought a P-38 was a great WWII fighter plane) and how to light a Yukon stove without burning myself. Our first effort at a timely, effective separation of artillery and A-10s consisted of the FSO raising his hands and saying "Let there be separation!" It was apparent that my future survival as an A-10 pilot was in doubt. When we got serious about coordinated fire support, we drew on our previous training, read the SOPs, and did a little common sense thinking. We played notional air and artillery scenarios and finally progressed to a live-fire demonstration. We learned a great deal from the experience; and I offer our lessons learned to the Redleg community to consolidate, clarify, and expand on existing coordination measures and Air Force and Army procedures, as well as to recommend techniques which worked.

The safe separation of indirect fires and close air support aircraft belongs in the hands of the battalion FSO and the battalion ALO. Close air support and indirect fire separation procedures fall into two areas of consideration: separate fires and simultaneous fires. Each requires its own forms of separation.

Separate fires

In separate fires, CAS and indirect fires are in the same target area but are attacking at different times or against separate targets. Avoiding conflict between the artillery fires and the aircraft is achieved through either time separation or lateral separation.

- Time separation represents the most certain means of separating aircraft and indirect fires. By allotting a specific time for artillery fires and another for CAS employment, the FSO and the ALO can be sure of safe separation even when it is necessary to employ both assets on the

same target. Time separation could involve either the use of time blocks (such as indirect fires 0900-0910 and CAS 0911-0920) or individual check fire/cancel check fire commands passed by the ALO to the close air support fighters and by the FSO to the firing unit.

Despite its benefit of positive separation, time sequencing has its drawbacks. Besides denying the total benefits of combined firepower, it allows the enemy the tactical advantage of employing the appropriate defense. Upon cessation of field artillery fires, enemy air defense gunners can unbutton and direct their efforts against the incoming aircraft or ground targets. Time separation also relies on the "old undependables" — time hacks and positive, real-time communications. Time sequencing also violates the previously stated field manual premise that "indirect fires will not normally be interrupted because of potential conflict with aircraft traffic."

- Lateral separation boils down to "You stay on your side of the line, and I'll stay on mine." Lateral separation may entail either a formal, preplanned Airspace Control Area (ACA) which covers a designated target area or else a quickly arranged, informal boundary which is passed to the firing unit as a set of UTM grids or to the fighter pilots as prominent landmarks (figure 1).

If their assessment of the tactical situation leads them to select this form of separation, the FSO and ALO must inform their respective players. The FSO might tell the field artillery firing units and fire support teams (FISTs) to "keep fires west of the 54 grid, fighters working east." The ALO, in turn, must talk either to the forward air controller or directly to the fighters and say "stay east of the 54 grid, artillery firing to the west." If there is a readily visible terrain feature that corresponds to the separation line, the ALO might say "stay east of the Delta River, artillery firing to the west." (This use of prominent terrain features is by far the best technique from the perspective of the fighter pilots.) By having the artillery units attack targets on one side of the separation line and the fighter pilots maneuvering and striking targets on the other side, the FSO and ALO can be reasonably certain of safe separation.

The problems associated with lateral separation include not only the lack of combined firepower on critical targets, but also difficulties of shifting fires across the separation line, the occasional inability of the pilots to find visual ground references corresponding to an assigned grid line, and the lack of indirect fire suppression of enemy air

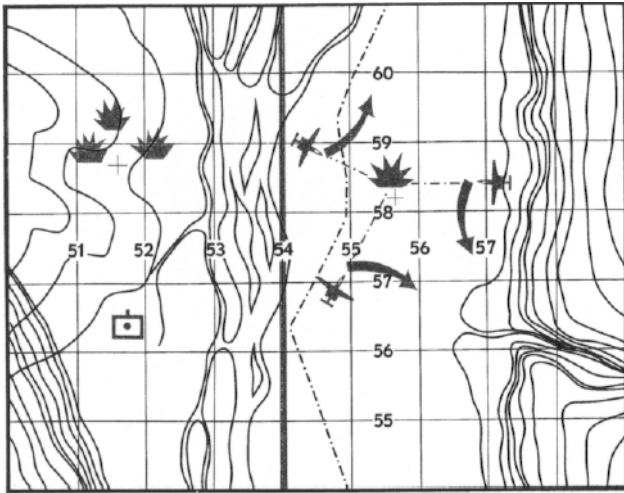


Figure 1. Lateral separation (separate fires). Selecting a separation line that corresponds to a major terrain feature makes the fighter pilot's job considerably easier.

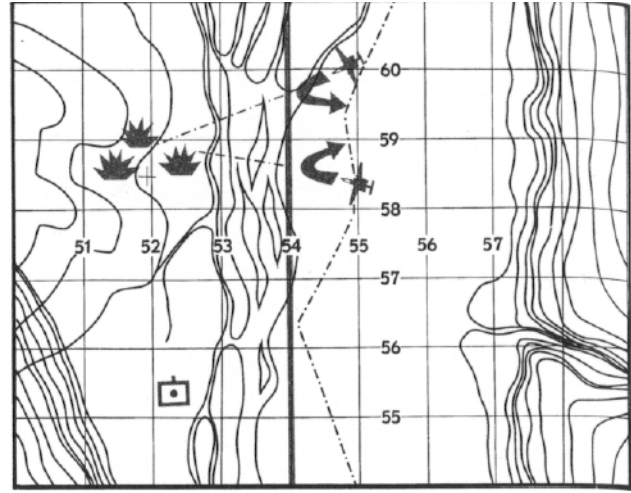


Figure 2. Lateral separation (simultaneous fires). Rather than firing on targets on their own side of the separation line, the fighters fire across the line into the artillery area.

defense systems and gunners in the fighters' target area.

Simultaneous fires

Despite the simplicity of coordinating CAS and indirect fires during separate fire operations, the tactical situation will in all likelihood dictate the use of simultaneous fires. That is, indirect fires and close air support will be in the same target area at the same time. The benefits of combined arms operations make the use of simultaneous fires a combat multiplier. The separation of close air support and indirect fires during simultaneous operations involves the use of any of four methods — lateral separation, altitude separation, gun-fire line avoidance, and the "big sky-little bullet" theory.

- As with separate fire operations, lateral separation during simultaneous operations involves the use of a grid line or terrain feature to keep the fighter pilots from overflying the target impact area. However, rather than having the indirect fires and CAS attacking separate targets on different sides of the separation line, this type of lateral separation permits the aircraft to employ its ordnance across the separation line onto the same target that the artillery is attacking and yet maneuver so as to avoid flying across the separation line (figure 2). The fighter pilots accomplish this feat by using long-range guided missiles or, in the case of high-speed aircraft such as the F-16, F-4, or the F-111, "tossing" or "lofting" their bombs across the separation line. (During this maneuver, the pilots release their bombs while they are going up instead of going down. It is possible to "loft" a bomb as much as 8 to 10 kilometers.) In the case of the A-10, it is also possible to strafe

across the separation line with the A-10's long-range 30-mm cannon; and its exceptionally high turn rate allows it to strafe and turn off without overflying the target area. Other fighter aircraft with 20-mm guns and higher speeds must overfly the target while strafing.

As with separate fire operations, the FSO and ALO must advise their firing elements of the method of separation selected and of the restrictions that apply. The ALO must, however, advise the fighter pilots that they will be attacking the same target as the field artillery units and thus will not have the same tactical flexibility as with lateral separation under separate fire operations.

In order to give the fighter pilots more flexibility in their tactics, the ALO might set up a no-fly target box which would allow aircraft to attack from any direction (figure 3). A target area "box" also provides increased flexibility for the employment of indirect fires while maintaining safe separation with the fighters. Here is how it works. Rather than simply telling the fighter pilots to stay on one side of a line, the ALO institutes a target box and tells the fighter pilots something like this: "Your target is an air defense site at WG55573. Artillery is currently firing on the target. Avoid overflight of the area bounded by WG5756, WG5356, WG5359, and WG5759." As long as the FSO ensures that the fires under his control impact in this target box, safe separation with the fighters is ensured. If it is necessary to shift fires outside the box, the FSO must inform the ALO as soon as possible.

In addition to sharing the same problems associated with separate fire operations, lateral separation during

simultaneous fires also includes the problem of target acquisition during periods of low in-flight visibility. In general, when fog, rain, smoke, or haze restrict visibility to less than three miles, the pilot may not be able to see the target, fire his weapons, and turn away before flying into the target box. (For instance, if the distance from the edge of the target box to the target is three miles and the in-flight visibility is two and a half miles, the pilot cannot even see the target until he is inside the target box, much less fire and turn away.) When the in-flight visibility is that low, the ALO must either make the no-fly box smaller or use a different form of separation. Also, it is important that the target box be no larger in width or length than the maximum range of the aircraft ordnance to be used. For instance, if the ordnance is the A-10's 30-mm gun, the no-fly target box should be no larger than the gun's maximum range (2,500 meters) from the center to any edge. This precaution ensures that a pilot can attack from any direction and still hit the target with his ordnance.

- Altitude separation, a form of lateral separation, is based on the maximum ordinate of the artillery or mortars firing into a particular area of operations. After getting the maximum ordinate from the FSO (say 6,000 feet), the ALO would tell the fighter pilots that the "target is a truck park at WG5558 and to remain above 6,000 feet for artillery separation." The FSO should advise the firing units that the fighters will be remaining above the maximum ordinate to preclude a needless "check fire" call for safety; thus, the firing units will know that they must notify the FSO of any changes in the maximum ordinate.

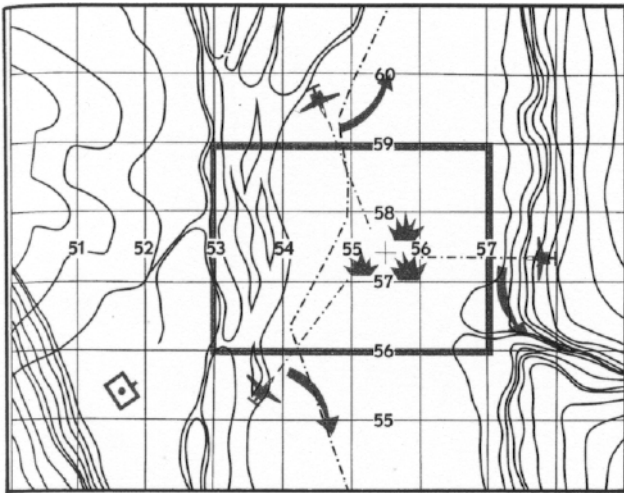


Figure 3. Lateral separation (simultaneous fires-target box). The use of a target "box" gives the pilots greater tactical flexibility.

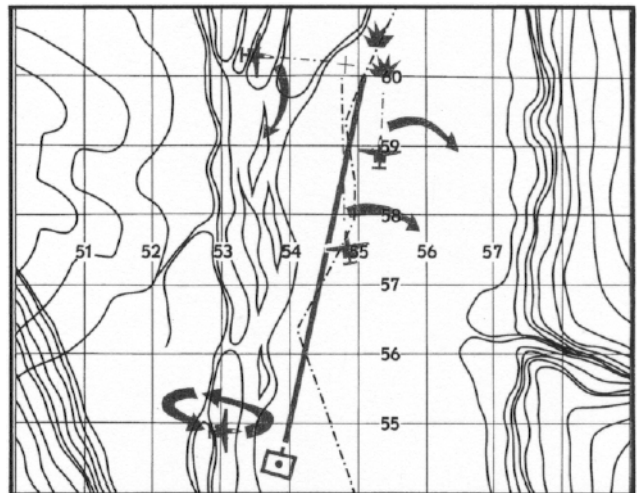


Figure 4. Gun-target line avoidance (simultaneous fires). By knowing the battery location, the target location, and the maximum ordinate, the pilot can avoid the projectile in-flight and over the target while maintaining maximum tactical flexibility.

Altitude separation, while it is a safe and easy method, may present a serious problem to the fighter pilots. In this day of high-threat surface-to-air missiles and radar air defense guns, pilots rely on extremely low altitude flying for their survival. A call to a CAS pilot telling him to fly above 6,000 feet to avoid artillery may result in a "suck eggs" reply. In a high-threat scenario, such as that which exists in Europe, altitude separation is really unsatisfactory; it should be considered only in a low-threat environment (one with limited threat surface-to-air systems). Weather may present yet another problem to the ALO using the altitude separation method — if the clouds are low, the pilot may not be able to fly above the maximum ordinate and still see the target.

- With the exception of altitude separation, the separation methods discussed up until now have only addressed aircraft avoidance of artillery impacts in the immediate vicinity of the target area. Gun-target line avoidance allows for safe separation of aircraft and artillery in the target area, over the firing units' locations, and along the trajectory of artillery and mortar shells (figure 4). By knowing the firing units' locations, the maximum ordinate, and the target coordinates, the CAS pilot can attack from any direction and employ any tactics he wishes and still be certain of avoiding both the rounds in-flight and the fragmentation near the target. Once the basic information has been passed to the pilots, indirect fires can be employed as required with none of the restrictions associated with time or lateral separation.

Several problems do arise in effecting gun-target line avoidance. Split-battery

operations, platoon and section fires, fires shifted more than a few hundred meters, hipshoots, and offset guns can all create hazards to the uninformed CAS pilot. However, as long as the FSO is doing his job and the firing units keep the FSO informed of any changes, the ALO can be certain of having the information necessary to make gun-target line avoidance work.

The necessity for the ALO to encode battery locations before transmitting them over unsecured radios presents the greatest handicap to the pilots when the separation method is gun-fire line avoidance. While it is possible for a pilot to decode messages while flying in a single-seat fighter at 350 to 600 miles per hour, 200 feet over the trees, it is exceptionally dangerous, very time consuming, and not very popular with the flying community. The use of previously encoded initial points as a reference does allow the firing unit locations to be easily transmitted to the pilot without compromising those locations. The ALO and the pilots will have a list of these points. Additionally, the installation of secure radio systems in Air Force aircraft, though they may not be compatible with Army secure systems, will allow for secure communications within the Air Force system.

In the final analysis, the simplicity of control and the greatly increased tactical flexibility for both indirect fires and close air support make gun-target line avoidance the best method for keeping them separated.

- The "big sky-little bullet" theory — the fact that an artillery shell is very small and occupies only a tiny fraction of the sky at any given moment — has led pilots to rely on the law of probability as the basis for this form of separation. Knowingly or unknowingly

most ALOs, FSOs, and CAS pilots are using this method when they ignore the more positive forms of separation. By depending on luck to avoid disaster, the FSO, ALO, and the CAS pilot are placing CAS missions at unnecessary risk. Since the CAS pilot is already using this "big sky-little bullet" theory to avoid incoming enemy indirect fires, his use of the theory to avoid friendly indirect fires only makes the "big sky" that much smaller. When either the tactical situation, communications, or other needs dictate the use of the "big sky-little bullet" theory, the ALO must tell the pilots so that they can adjust their tactics accordingly.

Types of fire versus types of separation

The choice of the right method of separation for a particular type of indirect fire varies with the tactical situation, the weather, the surface threat, and the capabilities of the particular close air support aircraft. Here are some recommendations:

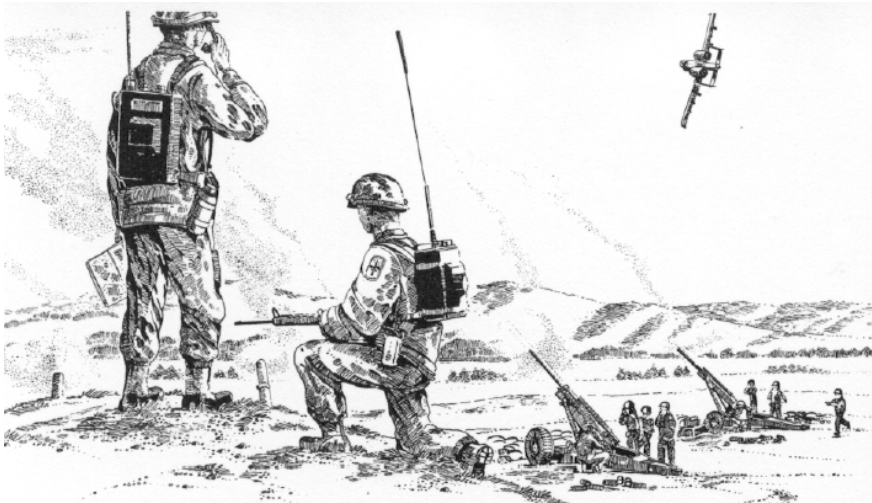
- Preparation fires — All methods are acceptable. Time separation is easier to use with preparation fires than with most other forms of indirect fires.

- Counterpreparation fires — All methods are acceptable; however, with fires coming from both sides, the "big sky" is not so big.

- Harrassment and interdiction fires — All methods are acceptable, but gun-target line avoidance is best.

- Groups — It is better to use one of the two forms of separate fires; but if simultaneous fires are necessary, the better method is lateral separation in which the impact area is boxed off.

- Series — Time separation works better here.



Drawing by Geoff Pleasance

- Program — All methods are acceptable. However, if a SEAD program is necessary due to extensive surface-to-air threats, pilots will not accept altitude separation.
- Priority — The gun-target line method is best because of the static gun-target locations.
- Smoke — Time separation precludes mucking up target area visibility at a critical time for the pilot. Also, timed smoke may aid the pilot by marking the target or by obscuring an enemy air defense gunner's vision.
- Illumination — Time separation is best if illumination is being provided specifically for the CAS aircraft. Aircraft pilots avoid the flares over the target area by visual means.
- Final protective fires — Simultaneous fires are essential. The gun-target line method is best due to the concentration of fires.

Problem areas

In addition to considering the type of fire mission, the weather, the tactical situation, the threat, and aircraft capabilities, there are a number of potential problem areas that will affect the selection of the best separation method.

- Split-battery operations/platoon or section fires/offset guns/multiple gun-target lines — Such situations create several lateral avoidance areas, different maximum ordinates, different ranges and times of flight, and a smaller "big sky."
- Shifting fires — In this case, gun-target lines change, as do the lateral limits; it is the same "big sky," just in a different place.
- Obscuration fires — Visibility decreases such that a pilot cannot see the target; in addition, his optically-guided, long-range missile capability is degraded.
- Short rounds — These rounds are a problem, but the risk is small enough to be worth taking.

- Communications — Ensuring that the right hand knows what the left is doing is difficult since the Air Force and the Army do not have compatible secure systems or the same authenticators.

- Fires beyond the fire support coordination line (FSCL) — The current communications chain makes it virtually impossible to get real-time information to the pilot. The "big sky-little bullet" theory is the only option here.

- Free fire areas — Since there is minimal control by the FSO in this situation, the "big sky-little bullet" theory is about the only way to go.

- Nuclear fires — Pilots will know when nuclear fires are anticipated and will automatically make the appropriate adjustment to their tactics.

- Multiple Launch Rocket System (MLRS) — The longer ranges, very high rates of fires, and flatter trajectories of the MLRS make this new system a challenge to the FSO and ALO. As the tactics and control measures for the MLRS are established, procedures for integrating the MLRS with CAS aircraft can be developed.

- Higher echelon fires — Unless the FSO has been specifically briefed, it is highly unlikely that he will possess enough knowledge on higher echelon fires to effectively ensure the separation of aircraft and indirect fires. If possible, direct coordination with higher echelon FSEs or tactical air control parties should be accomplished.

Putting it together

If all of this discussion seems a bit complicated, it need not be. While it is imperative that everyone involved — the field artilleryman, the mortarman, the close air support pilot, the fire support officer, the air liaison officer, the forward air controller, and the FISTS — understand the four methods for separating CAS aircraft, the battalion FSO and the ALO will decide on the best separation method. They will

analyze the tactical situation and the potential problems associated with the type of indirect fire selected and advise their respective players on the separation method selected and monitor the situation to ensure that safety is not compromised and that the best possible results are obtained. If everyone understands his portion of the big picture and if the FSO and ALO work as a team, the mission will be successful.

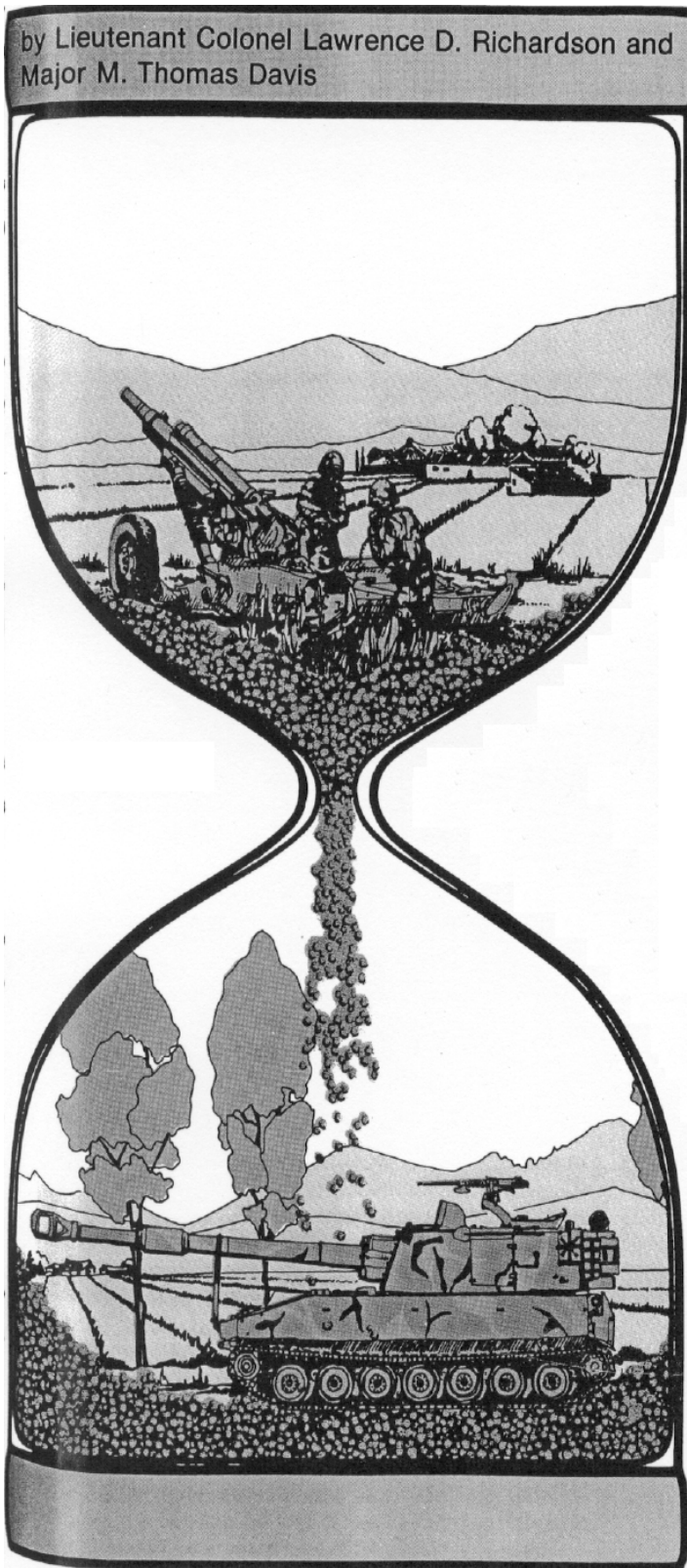
Unfortunately, many units seem to want to wait for the "big one" to play the field artillery-CAS separation game and therefore waste many training exercises. While peacetime scheduling and safety restrictions preclude "let's do it tomorrow" planning, several joint live-fire practices will make life much easier under the "do it now" pressures of wartime. With several months of preplanning, a notional practice session or two, and a sound knowledge of publications such as FM 6-20, FM 100-42, and AFM 2-14, Army and Air Force units can practice joint live-fire operations. While peacetime requirements will necessitate high-level involvement in the planning stages, it is imperative that execution of the live-fire mission be totally controlled at the lowest level exercising direct control over both the indirect fires and the CAS aircraft — in other words, by the ALO and FSO.

For years, the issue of safe separation between indirect fires and CAS aircraft has been shoved aside because "who cares; we haven't shot one down yet." The increasing need for combined fires in the face of a numerically superior enemy and the introduction of the A-10, an airplane dedicated to the close air support mission, have made it necessary to establish and practice methods that will maximize the benefits of combined fires while minimizing the risks to the participants. By practicing combined operations and believing in them, Warthogs and Redlegs will take another step along the road to full readiness. ☒

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Change along the Chosin

by Lieutenant Colonel Lawrence D. Richardson and Major M. Thomas Davis



The adoption of the AirLand Battle concept as the tactical doctrine of the US Army has forced the various combat arms to reevaluate their specific operational techniques, as well as their force structure. American field artillery units around the globe have initiated a thorough reconsideration of their previously accepted methods of employment. The 2d Infantry Division Artillery, stationed in Korea, has upgunned to meet the demands of the emerging doctrine and is coming to grips with the new ideas in a most demanding and difficult environment. Here is a look at the flow of change in the land of the "frozen Chosin" and the considerations behind their acceptance.

The major American tactical unit in Korea is the 2d Infantry Division, a light infantry division whose division artillery once consisted of three direct support battalions equipped with M102s and a single, general support composite battalions equipped with M114s and M110s. All corps-level field artillery assets available for reinforcing or general support reinforcing missions were Republic of Korea Army units, the majority of which were equipped with 105-mm weapons, mainly M101A1s. Needless to say, there was little flexibility available to the force commanders in positioning or employing fire support assets.

AirLand Battle doctrine has changed this picture; a larger, more capable, artillery force now supports the United Nations Command in the defense of South Korea. But, before noting the specifics of this increased capability, it is best to review the condition which mandated it.

The historical record clearly demonstrates that combat in Korea is characterized by rapid transition from the defensive to the offensive. The unprovoked North Korean invasion of the South on 25 June 1950 forced the American and South Korean forces to conduct a hasty retreat across the peninsula until a line was finally established around the port city of Pusan. After the amphibious landing at Inchon in September 1950, the United Nations forces took the offensive and pushed the front north to the banks of the Yalu River. However, when the Chinese Communist forces entered Korea in November 1950, American forces were again forced into full retreat, only to return to the offensive in the spring of 1951. The political and strategic importance of Seoul, the Republic of Korea capital which is located less than 40 kilometers from the demilitarized zone, makes it a prize which must be tenaciously defended and, if captured, attacked and repossessed. This consideration alone indicates that any future Korean conflict will likely conclude with an offensive operation.

Apart from these historical indications, the AirLand Battle doctrine emphasizes initiative, depth, agility, and synchronization — the basic precepts of the offensive. A defender must absorb only those blows which are necessary and unavoidable and then seize the initiative to punish the attacker, disrupt his planned deployment, and force him to fight under redefined and therefore unfavorable terms.



The North Korean threat is arrayed across the 151-mile demilitarized zone (DMZ) and positioned well forward in an apparent offensive posture. A recent series of border and infiltration incidents hint at a North Korean intention to disrupt normal activities in the Republic prior to a series of important international events being hosted by the government in Seoul. Because of its strong desire to reunify the country under its own terms, the government in the north has taken every opportunity to keep the level of tension along the DMZ at a heightened state. North Korea possesses a large artillery inventory, but the majority of its weaponry seems to be light artillery intended for forward deployment in support of frontline attack forces. Its capability in this regard has recently been enhanced by the addition of some late model self-propelled howitzers.

The terrain over which these defensive and offensive operations would be fought offers significant challenges. As all who have seen it can attest, Korea is a very rugged and mountainous land — a condition complicated by the extensive number of rice paddies and the rather extreme seasonal fluctuations of weather and temperature. The road network of the country is only partially developed, especially in the area north of Seoul; therefore, movement from one area to another is often difficult. There are few east-west roads and trails running between the several cross-compartments defined by the mountain ranges that rise between Seoul and the DMZ. These cross-compartments create at least three avenues of approach from the north into the Seoul urban complex that conceivably could support operations by armored or mechanized forces.

These avenues of approach are the same areas which will support the original positioning and, perhaps, the lateral repositioning of friendly field artillery units. Artillery units in the Sibyon-ni corridor can support action in the adjacent Cheorwon approach; however, the relative size of the Kaesong-Munsan approach (commonly known as the Western Corridor) will probably necessitate artillery positioning astride this likely enemy axis of advance.

Two other items of terrain which complicate the picture are the numerous rivers and streams that crisscross the area of operations and the large number of small towns and villages prevalent in the Korean countryside. Most of the rivers and streams are



shallow during the majority of the year and therefore have numerous fording sites, which is most fortunate because there are few major bridges and many of those that do exist are old with deteriorating supports and cross members. Unfortunately, although the water is usually shallow, the banks are frequently quite steep and require some degree of engineer preparation. In many instances, the steep banks have been turned into fortified positions by the South Korean Army and are thus formidable obstacles for any force attempting to cross to the opposite shore.

Because the rivers are shallow with generally rocky beds, they may be used on occasion as roadways providing the best route from one area to another. Like the ability to ford, however, this consideration is a seasonal one. The depth of Korean rivers fluctuates greatly during the monsoon season, often rising several feet in a matter of a few hours. What was a usable route for movement in the morning may become an impassable obstacle by early afternoon.

Weather also plays a considerable role in the availability of usable surfaces for movement. During the growing season for rice, which extends from late spring until the early fall, all of the rice paddies used for the production of this singularly important agricultural crop become definite military obstacles. After the rice is harvested and the extremely cold winter season arrives, this condition changes completely; the frozen paddies become usable for crossing by nearly all classes of vehicles. Drivers — especially of wheeled vehicles — must be careful of the icy conditions. Movements under these conditions must be well-planned and coordinated because there is little assistance available to sand the ice or provide snow removal.

American field artillery units in Korea must,

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therefore, have the capability to range the threat forces, neutralize or damage them, and separate the leading echelons from those following — and do all of this without lengthy, difficult redeployments. They must have weapons with a range sufficient to enable them to participate in the deep battle to create the conditions which would allow the initiative to swing to the side of the United Nations Command.

To meet the demands of the mission, the challenges posed by a determined and well-armed enemy, and the combat necessities of flexibility across difficult terrain, it became necessary to replace the light artillery pieces with larger-caliber and longer-range weapons which were capable of concentrating firepower across a broad front. This change was further necessitated by the absence of any corps-level US artillery in Korea. (The usual corps mission is, of necessity, handled by the Republic of Korea Army artillery units. In general, these units lack the range desired to add the depth to the battlefield which is so central to the revised AirLand concept.) These range considerations were important. There is a great tendency to think of the deep battle as a function best assigned to the Air Force, but recent experience has indicated that this thinking can be gravely mistaken. Israel's attempt to use its Air Force as "flying artillery" proved disastrous in 1973. The most flexible and reliable system for affecting the battle across the forward edge of the battle area is field artillery — but the field artillery must be able to range the target.

The adoption of the 155-mm weapon as the standard caliber in the 2d Infantry Division Artillery has added increased field artillery capabilities in several ways. First, there is the obvious asset of increased range and lethality. Since the North Korean forces are expected to use Soviet-style tactics, defending forces must be able to begin the attrition process early in the battle while simultaneously initiating the isolation of the first echelon from the second echelon. These simultaneous actions not only hurt the enemy force and disrupt its plan, but are the necessary prerequisite for hastening the transition from the defensive to the offensive. Large-caliber artillery weapons serve both actions more efficiently than light ones which must expend larger amounts of ammunition to achieve comparable results. Also, the larger weapons complement rather than duplicate the capabilities of the Republic of Korea Army artillery assets available to the force commander. As the Korean light artillery attacks and blunts the leading edge of the main thrust, the larger-caliber American weapons can reach into the rear, seal the attacker's escape route, and ensure his isolation. Defeat of the enemy in detail can then be accomplished by maneuver forces assisted by air-delivered munitions placed deep in the rear.

Finally, the longer range of the larger tubes enhances the division artillery's ability to mass fires across the front. The conversion to the 155-mm increases area coverage in the division sector by nearly 90 percent, a truly impressive addition to the arsenal available to the force commander in his efforts to shape and control the battlefield. This additional coverage is all the more useful in Korea because of the



difficulties previously discussed in rapidly displacing artillery forces laterally. The additional range allows for increased support while minimizing the absolute need for repositioning. Movements will, of course, be necessary; but they will be forced by tactical considerations other than the need to redeploy in order to return to a fight that has moved out of range.

A traditional field artillery consideration has been that supporting field artillery must match the mobility of the supported unit. In this regard, the fielding of the 2d Infantry Division Artillery is at once a unique, yet classic, example of the application of this principle. The division artillery's direct support units are tailored to match their supported brigades. The tank-heavy 1st Brigade is supported by an M109A2 battalion, while the two straight infantry brigades are supported by M198 units. This arrangement ensures that the mobility of the artillery will match that of the supported maneuver brigade no matter how difficult the conditions imposed by either the Korean terrain or the combat mission. The general support for the division is provided by an M110A2 battalion currently scheduled to be upgraded by the acquisition of a multiple launch rocket system battery.

The field artillery force created to support the tactical operations of the 2d Infantry Division is the product of a rigorous analysis of the characteristics of the theater, the mission, the capabilities of the potential threat, and the availability of allied forces. This organization, although different in structure and innovative in appearance, actually reflects little more

than meshing of the dictates of the new tactical doctrine with traditional tactical artillery considerations.

There is little reason to believe that the standard field artillery tactical missions will be altered by either the Korean area of operations or the new AirLand Battle doctrine. But, in addition to the deployment issues discussed earlier, artillery employment in Korea still presents several difficult problems.

Perhaps the major problem posed to the artillery commander by the environment in Korea is the severe limitation of usable position areas. Unlike Germany, with its lush and well-groomed forests, Korea has sparse vegetation. The classic tree-line position is a definite rarity. The low, level areas between the mountains in Korea are used for towns, villages, and farming areas. Since rice is the principal crop, most of the area that would be best used for artillery positioning is used for rice paddies. During the severe winter months, these areas can be occupied with little difficulty; but during the rest of the year they are impassable bogs.


The towns and villages are little better. The villages have very small and narrow streets, and the buildings are not solidly constructed. An artillery piece attempting to back into such a street to use it as a gun position would probably cause the surrounding structures to collapse and would be mired in a large pile of rubble. Even though most of the buildings have flimsy metal roofs, there is no overhead protection from the effects of indirect artillery fires. In brief, the Korean village does not present the attractive artillery position evident in other theaters. Again, the contrast to Europe, where many of the small built-up areas can be used for field artillery occupation, is quite pronounced.

The area of operations also presents several interesting problems in establishing the fire support system. Because the mountains are quite high, there are numerous positions available for observation posts which offer excellent fields of visibility. It is not at all uncommon to have a depth of view limited only by the conditions of weather. Some of these locations, however, are difficult to occupy because of the steepness of the slopes; and thus the fire support team (FIST) chief must often weigh the value of increased visibility against the convenience of being located with his section and equipment. The high mountains also create difficulties in establishing radio communications. Because the FISTs are usually on the forward slope of a prominent hill, electronic line-of-sight is usually lost to the supporting fire direction centers which are located on lower ground on the far side of rather pronounced intervening crests. Frequently, use of the organic retransmission assets is the only way to establish even the most routine field artillery communication nets.

Another problem involved with the establishment of the fire support system boils down to difficulties of interoperability with the Republic of Korea Army. As mentioned earlier, there are no American field artillery assets located at the corps level; and so a call for such support or the assignment of reinforcing or general support

reinforcing units requires close work with South Korean Army field artillery units. Although training with the units of the host country is stressed and interoperability has as much meaning in Korea as it does anywhere else, the language and communication difficulties inherent in this task make its accomplishment difficult. Fortunately, American units in Korea are augmented with Korean soldiers (KATUSAs) who perform an invaluable role in translating the necessary radio traffic; but frequently their understanding of the actual intent of the transmission creates problems as they attempt to reconcile the procedures of two armies that have just enough differences in operational procedures to create some confusion in the mind of a young private.

These problems are not without solutions, and there are several procedures that are now routinely followed in Korea to deal with these unique challenges. In order to reduce the necessity to make frequent moves, plans have been made to fire rocket-assisted projectiles whenever possible to extend the range of the units fighting the battle and enable them to reach into several of the corridors that comprise the avenues of approach. The battalion and battery commanders, as well as the S3 and the reconnaissance and survey officer, spend more time than usual seeking out firing positions capable of supporting any proposed operation. As distasteful as it may be, howitzers might have to be positioned more closely than we would prefer, perhaps only 25 to 30 meters apart, in order to use the small position areas that are available. Thus, terrain gun position corrections must be used continuously; and split-battery operations on a regular basis must be considered. In terms of the gunnery problem, the variations of terrain make the use of average site a questionable undertaking, while the presence of massive intervening crests dictates that high-angle fire be given more than the usual attention.

The tactical employment of the upgunned American field artillery in Korea has the attention of field artillery tacticians in the division artillery. Despite the factors which inhibit the preferred methods of operating, steps are being taken to ensure that artillery support is available where and when the maneuver commander wants it. The 2d Infantry Division Artillery, carefully crafted and constructed to meet the requirements of the mission of the United Nations Command, is a ready and able combat unit. It stands prepared to perform its mission in conjunction with its Korean partners. 

LTC Lawrence D. Richardson, FA, was the commander of the 1-15th FA, 2d Infantry Division Artillery, when he wrote this article. A graduate of the Command and General Staff College, Lieutenant Colonel Richardson has held numerous field artillery assignments, including a tour in Vietnam and a previous tour in Korea as a member of the Combined Forces Command Staff.

MAJ M. Thomas Davis, FA, the S3 of the 1-15th FA, has served in the 3d Armored Division Artillery and as an instructor in the Department of Social Sciences at the US Military Academy. A Command and General Staff College graduate, he has a master's degree in international relations from Harvard.



REDLEG FUTURE READ HERE

by Sergeant Major Thomas N. Kuhn

Through the haze of years yet-to-be appear the shimmering images of the Redlegs of the future. Will they be products of chance or design? The tarot cards and crystal balls and tea leaves give no clue, but the Soldier 90 study may be the medium through which field artillerymen can make contact with the shape of things to come.

Soldier 90 is a study initiated by the Soldier Support Center to project an image of the enlisted soldier of the 1990s. The study considers how civilian and military personnel trends will affect the manning of the force in the future. Since the study could not accurately predict all of the socio-economic, political, technological, and legislative influences which might impact on the Army, it was based on the reasonable assumptions shown in figure 1. By studying the past and projecting the future through the

May-June 1984

known facts, personnel managers and combat and training developers are determining the number and the quality of soldiers needed in the 1990s.

Two major considerations lie in the foreground of these futuristic investigations: the primacy of the human factor in the soldier-machine interface and the need for a fully considered deployment plan. The goal of combat developers must be to equip the soldier, not to man the equipment.

The human factor must be the driving force in the concept development and blueprint phases of an emerging weapon system. Further, the deployment plan must incorporate support which insures that trained, motivated, and prepared soldiers arrive when and where they are needed with the proper equipment and spare parts. Too often in the fielding of new systems, a variety of outside influences, sales, and

1. The all-volunteer force will continue.
2. The target recruiting population will continue to be the 17- to 21-year-old male high school graduates.
3. More non-prior service accessions will be required annually.
4. Composite scores from the Armed Services Vocational Aptitude Battery will continue to be used to determine mental entry requirements for MOSs.
5. Population of the United States will continue to grow, but at a decreasing rate. Those persons over age 55 will continue to increase in numbers; those in the 17- to 21-age group will decline in numbers, thereby causing a recruiting constraint.
6. Women and minorities will increasingly be represented in the work force.
7. Science and technology will cause expansion in the job market.
8. The market will offer attractive employment alternatives to military service with increasing emphasis on quality of life in individual freedom, satisfaction, family needs, compensation, and labor environments.
9. The family structure will continue to shift from the traditional. Increases in unmarried couples, working couples, and single parents are projected; and there will be a decrease in the number of children per family.
10. There will be more vocational and technical options for high school graduates and less college enrollment due to tuition cost increases.

Figure 1. Soldier 90 assumptions.

renegotiated contracts have caused the soldiers, their units, and sometimes the whole Army to be jerked through the knothole because the original deployment plan was not well-conceived and had to be changed overnight. The end result has been wasted training, excess costs in time and money, morale problems, and ineffective soldiers or equipment.

The Soldier 90 study provides analytical tools with which to derive manpower resources and requirements early enough in the force modernization process to influence the design of systems, equipment, new organizations, and training programs. It provides a compilation of historical data by career management field (CMF) and military occupational specialty (MOS) and gives trend projections as to the availability of the target population in both quantity and quality to fill field artillery CMFs and MOSs.

Here is a look at the projected 1990 target population from which field artillerymen will be drawn.

- The US population will have grown from its current 222 million to approximately 244 million by 1990.
- The average age will have increased from 30.2 years old in 1980 to 32.7 years old in 1990.
- The 17- to 21-year-old male population, which was nearly 11 million in 1978, will have declined to less than 9 million by 1990.
- Of the 17- to 21-year-old male population, only 26 percent will be eligible at any time for military service; others will be precluded because they do not meet mental and physical standards, have had prior service, or are enrolled in formal schooling.
- The number of persons in age groups 17 to 34 and 55 to 64 will have declined by 1990, whereas the number in age group 35 to 54 will have increased.
- The current birth rate of 1.8 per woman between ages 15 and 44 is below the 2.1 replacement rate required to maintain the current population.

As always, business and industry will be significant competitors with the military for this target population. Fast-growing occupations (such as those associated with computers, electronics, aviation, and energy) and skilled trades (such as heavy equipment operators and automotive, heating, cooling, and refrigeration mechanics) will attract many recruits and will require training or apprenticeship rather than a college education. In addition, the civilian job market is expected to create 1.6 million new jobs per year from now until the end of the decade; but the population to support these new jobs will grow by only 1.7 million. To further complicate matters, the entry skill level of the work force will continue to decrease, thereby causing further competition for the quality worker. Political pressure on the Federal budget will serve to keep salaries and spending at minimum levels.

These factors have always had a bearing on the Army's recruiting goal, but they may become more critical in the future. The Army must be especially concerned with the quality of today's prospective recruits *before* they are allowed to reenlist, because these soldiers will be the section chiefs, gunnery sergeants, chiefs of firing battery, and first sergeants of the future and will have to deal daily with these forecasted problems. Quality recruits are more likely to develop the required high degree of technical competence and thus are better risks for the investment of extensive and expensive training and experience.

The Army position is that a completed high school education and higher mental categories combine to make for a quality recruit. A high school graduate's propensity for completion of his first term of service is twice that of a non-graduate. Although there is not a large amount of objective data to correlate efficiency with the higher mental categories, there are data which show a high correlation between higher mental categories and trainability and retention of learned skills. In this respect, the Armed Forces Qualification Test (AFQT) score can be used to measure a soldier's trainability.

Even though the number of CMF 13 high school graduate accessions is expected to rise to over 95 percent by 1990, the number of personnel in the upper mental categories is expected to decline in all MOSs except 13F, 15D, and 15J. In view of the latest advances in field artillery technology (e.g., TACFIRE, MLRS, RPV, and Firefinder) and tactics, future field artillerymen will need both a higher degree of mathematical aptitude and overall literacy rate. There will probably be adequate personnel to fill the low-skill MOSs but not the more highly technical MOSs. Greater emphasis will have to be placed on reinforcement and sustainment training since accessions with lower mental categories will have a tendency to forget learned skills faster than those in the upper mental categories.

CMF 13 contains 16 MOSs, 13 of which are entry-level MOSs. Each MOS has an aptitude area test score prerequisite. Is there a sufficient number of personnel who meet these prerequisites today, and will there be a sufficient number for the future needs of each MOS?

Here are some pertinent statistics:

• **MOS 13B** requires an aptitude area score in field artillery of 85 or higher. Over 80 percent of the Army accessions scored above 85 in 1981, and this rate is expected to continue.

• **MOSs 13F** and **15J** require an aptitude area score in field artillery of 100 or above. Approximately 40 percent of the Army accessions scored 100 or above in 1981, and the Army projects that there will be sufficient personnel in the future to support the MOS needs.

• **MOSs 15D** and **15E** require an aptitude area score in operations and food of 95 or above (there are 13 MOSs that require such a score). There was a sharp decline in the number of accessions scoring 95 or higher between 1980 and 1981; and, although there will be a continuing downward trend through 1990, there will still be sufficient numbers to meet the 1990 MOS needs.

• **MOS 13M** (a new MOS for MLRS) requires an aptitude area score in operations and food of 100 or above. Less than 35 percent of the Army accessions scored 100 or higher in 1981. Even so, a sufficient number of personnel is projected to be available to meet the 1990 MOS needs.

• **MOS 17C** requires an aptitude area score in surveillance and communication of 95 or higher (seven MOSs require this score). Almost 60 percent of the 1981 Army accessions scored 95 or higher. There are sufficient numbers projected to meet the 1990 MOS needs.

• **MOSs 13R** and **17B** require an aptitude area score in surveillance and communication of 100 or higher (these are the only two MOSs requiring this score). There was a sharp decline from 1980 to 1981 in the number of Army accessions scoring 100 or better. A downward spiral is predicted; so the demand could soon equal supply or possibly exceed it.

• **MOSs 13C, 13E, and 82C** require a skill technical score of 95 or higher (there are 43 MOSs that require this score). Almost 60 percent of the 1981 Army accessions scored 95 or higher, and the projection is that there will be a sufficient number available to meet all 1990 MOS needs.

• **MOS 93F** requires an aptitude area score in electronics of 95 or higher (there are 42 MOSs that require this score). Approximately 50 percent of the Army accessions scored 95 or higher, and the projection is that there will be a sufficient number of personnel to meet 1990 MOS needs.

These statistics seem to point out that the Army is and will be in pretty good shape. There is, however, a razor-thin margin separating the rosy picture from the prospect of gloom. If one were to change accession criteria only slightly by an increase in the prerequisite scores, the quality manpower pool for some MOSs would practically dry up. For instance, 1981 statistics indicate that an increase in the prerequisite skill technical score from 95 to 100 would cause a reduction in the number of available accessions by nearly 39 percent.

A representation of the future of CMF 13 and Soldier 90 would not be complete without a picture of what the noncommissioned middle and senior managers will look like. Reenlistment rates for first-termers are projected to

continue to rise during 1986 and 1987. Careerist reenlistments, to include midterm reenlistees, will stay pretty much on track as now, hovering between 75 and 80 percent. The continued application of bonuses and career development programs will continue to bolster a healthy reenlistment program. Recent Department of the Army initiatives have focused attention on the necessity of reenlisting only those noncommissioned officers who have the potential to benefit the Army of the 1990s while improving themselves.

The professional development of field artillerymen of the 1990s will occur within the parameters of a Noncommissioned Officers' Education System that is designed to provide the formal schooling needed to prepare Redlegs to lead their future forces. Field artillery commanders are more aware than ever that the proper screening, selection, and preparation of a soldier will get the right person at the necessary course at the right time in his or her career. The word is out that the soldier's need and the overall greater need of the Army must take precedence over the unit's need. Training the good soldier in the next higher skill level will insure that a soldier needed in a certain MOS will be there and will be trained to do the job.

Professional development also includes promotion and other forms of recognition. Promotions are prime motivation and retention factors. Deserving and eligible specialists four/corporal and specialists five/sergeants must be recommended for promotion now, or else the field artillery of the 1990s will be the victim of the negligence of supervisors who did not develop their subordinates and thus contributed to increased attrition and personnel turnover. Awards, letters of commendation, and plain old pats on the back are also motivators.

The Redlegs of the 1990s will surely be different in many ways from their brethren in the past. Their personalities will be a function of a background and environment that is being driven by increasing advances in technology. They will work with equipment not yet designed. Their lifestyles and needs will change along with the times. But today's Redlegs do not need to wait until 1990 to figure out how to lead this image from the future. It does not take a dose of magic. Just a pinch of common sense and the indications of the Soldier 90 study, and presto — the future begins to take on a more definite image. Indeed, by addressing the future today, the Field Artillery Community can play a major role in shaping it. The field artillerymen of the 1990s, for all of their differences, will be direct reflections of the field artillerymen of the present. ☒

Sergeant Major Thomas N. Kuhn is the senior enlisted member of the Field Artillery Proponency Office at Fort Sill, Oklahoma. Sergeant Major Kuhn has held a variety of assignments, including Chief, Field Artillery Branch, Enlisted Personnel Directorate, MILPERCEN, Department of the Army; NCOIC, Enlisted Personnel Management, Adjutant General Division, Fort Sill; NCOIC, Personnel Management Division, 199th Personnel Service Company, Korea; chief instructor of the Personnel Specialist Course and member of the 1st Signal Brigade Personnel Management Assistance Team in Vietnam; and the Consolidated Military Personnel Activities (COMPACT) Sergeant Major, Fort Sill.

Fragments

FROM COMRADES IN ARMS

M30 heavy mortar system improvement

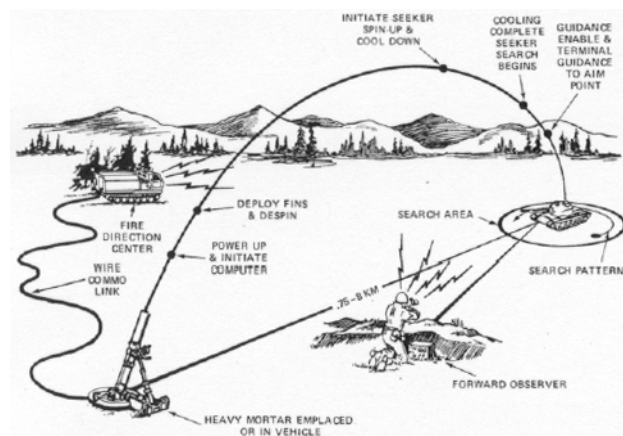
The US Army Armament Research and Development Command has started a phased program to improve the M30 4.2-inch heavy mortar system.

The weapon usually is deployed in an M106A1 tracked mortar carrier, although soldiers can break it down into five loads which can be moved manually for short distances. It has a range of nearly 7,000 meters with the M392A2 heavy mortar bomb — a high-explosive round that is a member of the Army's family of improved conventional munitions.

Major elements of the phased improvement program call for:

- The development, or adaptation, of a trailer or wheeled carriage to serve as a weapons carrier for the M30.
- The adaptation to the M30 of the M64 self-illuminating sight and fire control from the 60-mm lightweight company mortar and the improved 81-mm medium mortar.
- The adaptation of the M734 multi-option (delay, impact, near-surface, and proximity burst) fuze to the 4.2-inch M329A2 high-explosive round, which is also being evaluated for possible use with the improved 81-mm mortar bombs.
- Development of training rounds for the M30 mortar. Currently the Army does not have any training rounds for the M30, and troops in the field have had to train on the weapon by placing a 60-mm tube inside the 4.2-inch mortar tube and using 60-mm rounds.

Under a complementary and longer-term research project, the Army is considering the development of an autonomous-homing "smart" mortar munition equipped with a shaped-charge warhead for use against armored vehicles. This concept would provide the Army with its first fire-and-forget, precision-guided mortar bomb.



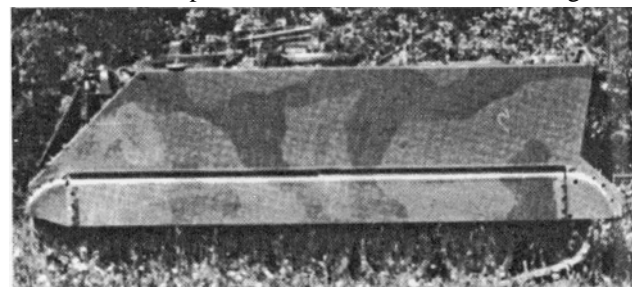
This diagram reflects the proposed use of the fire-and-forget antitank round for the improved 4.2-inch heavy mortar.



The United States Marine Corps' LVT7 landing vehicle tracked amphibians are being upgraded by the introduction of the new LVT7A1 configuration. Changes to be included in the LVT7A1 are an improved engine, transmission, and smoke system; it will also have new suspension and automotive systems and a new improved electric drive system for the enclosed weapon station mounting the M85 .50-caliber machinegun. Here Marines participate in the LVT7A1 rollout ceremony. (FMC Corporation photo)

New camouflage pattern adopted

The US Army plans to use a new three-color camouflage pattern which will standardize the camouflage used by the US and West German Armies and make it difficult for enemy forces to differentiate between the two countries' vehicles. After a series of tests, the three-color German pattern was shown to provide better protection than the four-color American design. The new design will include brown, green, and black paint (tan, formerly used by the US, will not be included). The three-color design is more economical, and it takes less time to paint a vehicle in the three-color design.



The three-color camouflage pattern makes vehicles such as this armored personnel carrier harder to detect.

Conversion to the three-color pattern will be in conjunction with the introduction of a new chemical agent resistant coating which protects surfaces from absorbing chemical agents and enables soldiers to decontaminate equipment without breaking down and dissolving the paint.

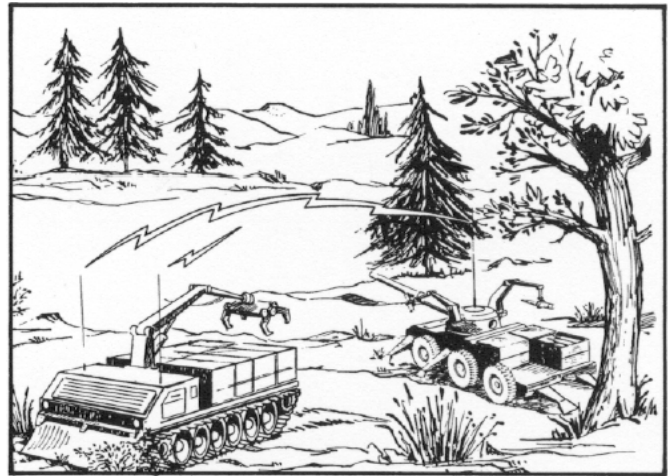
New equipment will be painted before it is delivered to the user. Paint will be applied to fielded equipment in a depot or by a follow-on contractor.

Robotic loader

The Army's effort to develop a more advanced self-propelled howitzer includes a robotic loader which is currently in the exploratory development stage in the Weapons Division of the US Army Armament Research and Development Center's Large Caliber Weapon Systems Laboratory. Engineers there have fabricated a miniature robotic loader "tool" that has the same configuration as that of the envisioned full-size loader. The tool consists of a metal arm with manipulating gripper attached to an overhanging metal framework (gantry). Much like an overhead crane, the computer-operated gripper is moved to desired locations by turning lead screws connecting it to the gantry. The arm apparatus hangs above a mock wooden howitzer loading tray which has a propelling-charge rack on its left and a projectile rack on its right.

The designed computer program will allow the computer on the robotic loader to receive mission requirements and then decide where the gripper must go to load the howitzer. The program also decides what size charge is needed to execute the firing order. This software, together with specially designed hardware, provides the intelligence for the complete weapon system. The computer's controller/microprocessors will have greater data-handling capacity than those used in most industrial robotic devices. To accommodate a change in the howitzer's environment, such as adding an additional component or a new family of projectiles, one simply changes the software.

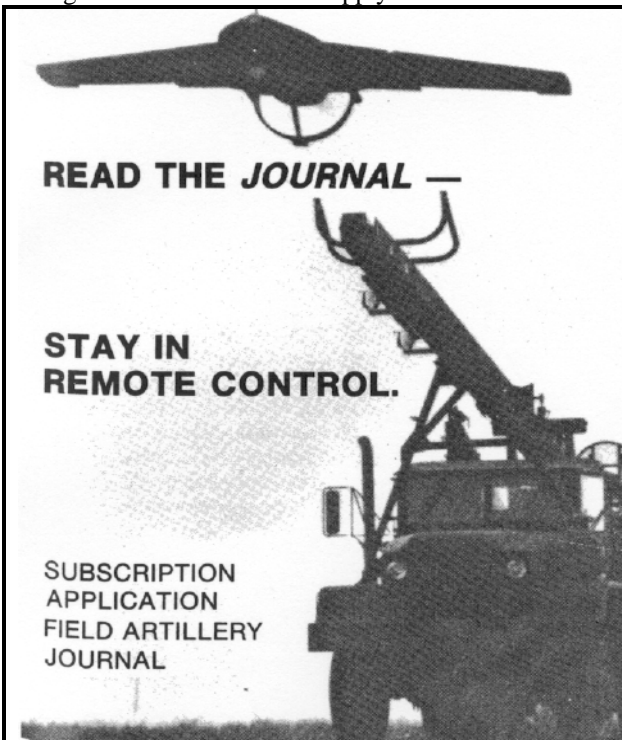
When completed, the loader will remove some of the battlefield stress on the soldier and speed up the loading process by mechanically transferring projectiles and charges from a resupply vehicle to the



Artist's sketch of the robotic loader in operation.

howitzer and from the interior loading racks of the howitzer into the tube. At present, soldiers must manually load the 155-mm projectiles which weigh more than 100 pounds each. The robotic loader will be able to handle projectiles in excess of 100 pounds; and the resupply loader, which will be able to handle up to 500 pounds, will lift three projectiles at once. The howitzer robotic autoloader will weigh 1,500 pounds and will have an arm about 40 inches long with a 30-pound gripper designed specifically to handle 155-mm projectiles and charges.

After operational testing, the loader will be integrated into a howitzer demonstrator in 1986. In 1987, operational testing of the resupply vehicle loader is planned, followed by a complete test of both loaders in their respective vehicles in 1989. (Michael Biddle, US Army Armament Research and Development Center)



Name (Last, First, MI)		Rank, Title
Address		SSAN
City	State	
STATUS		
<input type="checkbox"/> US Army	I am a member of a certified US Field Artillery Association Local Chapter. The name of my local chapter is . . .	
<input type="checkbox"/> US Marine Corps		
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<input type="checkbox"/> US Army Reserve		
<input type="checkbox"/> US Marine Corps Reserve		
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RATES		
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1 Year	<input type="checkbox"/> \$14.00	<input type="checkbox"/> \$21.00
2 Years	<input type="checkbox"/> \$27.00	<input type="checkbox"/> \$41.00
3 Years	<input type="checkbox"/> \$40.00	<input type="checkbox"/> \$61.00
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FORT SILL, OK 73503

Tennessee

by Captain Alan N. Clark



Photos by SPS Howard D. Johnston

The summer of 1983 was an exciting one for the 1st Battalion, 115th Field Artillery, Tennessee Army National Guard. During its annual training period at Camp Shelby, Mississippi, the 155-mm towed battalion completed an external Army Training and Evaluation Program (ARTEP) which was the highlight of a very productive training year. This was not just another ARTEP — it was a turnabout from previous less demanding and sterile evaluations to the realistic and demanding field evaluations of the ARTEP technical validation inspection (TVI). What the battalion learned in preparing for and participating in the

ARTEP/TVI can be beneficial to units in the Field Artillery Active Component as well as those in the Field Artillery Reserve Components.

Background

The exercise was part of a nationwide assessment of Reserve Components artillery capabilities. The mandate of Appendix C of US Army Forces Command (FORSCOM) Regulation 350-2, "Training of Reserve Component Nuclear Capable Field Artillery Units," was that —

FORSCOM is required by current mobilization and deployment plans to reinforce US

Army, Europe with field artillery battalions of the Reserve Components that are mission-capable. These battalions must be able to perform standard battalion-level field artillery tactical missions, to include the delivery of nuclear fires, to be considered as mission-capable battalions and employed as such . . . FORSCOM will bring Reserve Components nuclear-capable field artillery units on line with the Active Army through a standard ARTEP/TVI program commencing with training year (TY) 83. CONUSA commanders will coordinate and

Turnabout

administer the program. Flexibility in phasing units into the program is necessary due to unit variations, but the goal is to have all units participating by the end of TY 85.

Until 1983, nuclear evaluations for the Reserve Components consisted of a yearly command evaluation which was conducted in a sterile environment, away from conventional activities. The nuclear program seemed a separate, distinct facet of the training program; and those not directly involved with it knew very little about it. With the advent of the Appendix C mandate, units suddenly had to become accustomed to operating with a simultaneous nuclear/conventional mission.

To accomplish this requirement, FORSCOM developed an external evaluation based on the particular ARTEP document for each type of field artillery unit. The evaluation included nuclear and conventional firing tasks and was joined to a technical validation inspection to be given within 90 days of successful completion of the ARTEP. Each field artillery unit would be required to complete 80 percent of the battalion- and battery-level fire missions in accordance with ARTEP standards and to complete successfully all nuclear tasks (except the one concerning the emergency action message). All of these requirements would occur within the framework of a minimum 50-hour scenario, which included "continuous field operations with five tactical moves of at least five kilometers each for all elements of battalions, with at least two moves conducted at night."

The evaluations are programmed so that units will be tested (or evaluated) once every three years; so roughly one-third of the Reserve Components nuclear-capable field artillery units were tested during 1983. The 1-115th Field Artillery was one of 16 units selected; the 2d Maneuver Training Command in Jackson, Mississippi, was assigned as the evaluating agency.

Preparations

Personnel in the 1-115th began preparations for the ARTEP/TVI almost immediately after the annual training in 1982, which was when the battalion was notified that it would be evaluated in 1983. There were some reservations about the intent of the

ARTEP and its framework since the organization tasked to conduct the evaluation was to provide its own resources and since the 1-115th was to be left intact for the duration of the ARTEP. There was concern that the ARTEP was becoming a test rather than an evaluation — that the requirements deviated from the spirit and intent of an ARTEP and were akin to the concept of the old Army Training Test. Availability of ammunition was another primary concern, since there was only enough high-explosive ammunition allocated to permit two pieces to fire for effect.

To get the ball rolling, battalion representatives attended an initial planning conference with key representatives from the 2d Maneuver Training Command and then started preparing for the job at hand. Full-time personnel set about gathering information about the evaluation from all sources. A one-to-one contact was established between the 1-115th S3 and the 2d Maneuver Training Command coordinator. They agreed on a list of nonfiring tasks to be evaluated so that commanders would know clearly what tasks to give high priority during inactive duty training.

With the readiness of the Reserve Components on the line, all outside agencies tasked with providing assistance to the unit offered help in

preparing for the ARTEP. The Plans, Operations, and Training Office at the Tennessee Army National Guard headquarters assigned a field artillery coordinator to the 1-115th for liaison and to ensure that emphasis was given to those problems requiring the State's attention. The readiness group in the area increased the number of man-days allocated to the battalion so that priority went to the 1-115th all year.

All reasonable requests for assistance were approved; so the battalion had all the help it needed. Helicopters to assist in nuclear air convoy training, high-explosive ammunition not forecast for other units or turned in by them, and Active Army mobile training teams all were made available to prepare the 1-115th for the evaluation.

Battery commanders and nuclear additional duty personnel adjusted to the new demands. Battery responsibilities for guarding and convoying the training rounds in their M467 containers were integrated into conventional training until personnel developed new habits. For the 1-115th, the S2 was assigned the overall responsibility for monitoring nuclear training, and he constantly reminded all personnel to "think nuclear" if they were to successfully accomplish 100 percent of the nuclear tasks within the evaluation period.





Mobile training teams from the 515th Ordnance Nuclear Weapons Support Detachment in nearby Redstone Arsenal, Alabama, conducted nuclear training and checked tools and publications during almost every drill period. Nuclear weapons additional training assemblies authorized by the National Guard Bureau were carefully coordinated in order to get the most out of the available time. When the mobile training teams were not available, the 1-115th practiced convoy operations and emergency destruction procedures with an M455 trainer or an M467 container fabricated by the Training and Audiovisual Support Center at Fort Campbell, Kentucky. Every time the battalion moved, shot, or communicated, the nuclear mission was involved.

Needless to say, in gearing up for the evaluation, the 1-115th had to come a long way in a short time. The time frame from October 1982 to August 1983 seems lengthy, but not when one considers that only two days per month (22 days total) were available for the battalion to train as a whole. Additional training assemblies and inactive duty training (weekend drills) made for 37 days of actual training, although there were countless more hours of individual preparation, not including the first week of annual training.

Standardization of the battalion's procedures took up two of the additional training days. Battalion officers and noncommissioned officers produced standing operating procedures (SOPs) in a pocket-sized booklet which included topics such as reconnaissance, road marches, the road plans for the prime movers, occupations (hasty and deliberate and day and night), howitzer section emplacements, emergency missions, loading, and actions of the immediate reaction force. Subsequently, every field or live-fire exercise was monitored closely to ensure adherence to the published SOP.

The battalion's tactical SOP also

underwent a complete revision. It was continually refined up to one week prior to the beginning of the ARTEP to ensure that the battalion incorporated lessons learned from its preparatory training. The close attention to the details of the tactical SOP would pay off since the 2d Maneuver Command's evaluating personnel would derive many of their comments for the FORSCOM evaluation from the unit's adherence to its own tactical SOP.

The logistics requirements impacted heavily upon everyone. Because the 2d Maneuver Training Command is only an evaluating agency, it has no organic equipment to support itself during such an exercise. Naturally, the 1-115th could not provide the necessary equipment to the evaluators without severely hampering its ability to perform the ARTEP. The battalion's higher headquarters, the 196th Field Artillery Brigade, stepped in to provide what equipment it could spare. Other necessary items, such as 1/4-ton vehicles and radios, were furnished by units which had already returned from their annual training. Pyrotechnics and small arms blank ammunition used by opposing forces teams also came from other sources.

Another problem for Reserve Components field artillery units is the availability and readiness of the equipment authorized by the modified table of organization and equipment (MTOE). One example is communications equipment. There was a combination of 23 AN/GRC-46 or -47 radios authorized the battalion; but only 19 of these were on hand. Early in the training year, the battalion turned in for repair those radios not fully operational and augmented what it had on hand by borrowing from other units. As a general rule, taking into consideration everything that can happen, a unit should line up the repair of and replacements for MTOE items as early as possible. Because the 1-115th planned early, communications were not a

problem during the exercise; nor were there any other major equipment shortfalls.

Another critical logistics nightmare is ammunition. Normally, a Reserve Components 155-mm battalion is allocated a minimum level of 65 rounds of high-explosive ammunition per section (a total of 1,170 rounds) for its training year and ARTEP so that it can fire all the tables required by Appendix C. At the beginning of training year 1983, however, the 1-115th was allocated only 990 high-explosive rounds for the ARTEP or 180 rounds fewer than was needed for the completion of the evaluation. Assuming that the unit would probably receive additional ammunition allocations when other units' annual training and the mid-year review had passed, the S3 planned to cut back during annual training if necessary and allowed the battalion to plunge ahead. The S3's strategy worked. When the 1-115th arrived at Camp Shelby, it found the allocation adjusted to provide 1,183 high-explosive rounds.

After sufficient logistics and training time are available, the *personnel* who must undergo the evaluation have to put it all together — the ball is in their court. First, *qualified* soldiers are needed at all levels. If they are not qualified, soldiers must be replaced by those who are. Secondly, the officers and noncommissioned officers must be willing to lead; and they must understand the gravity of the evaluation. The 1-115th lost a few qualified individuals along the way because they were not willing to put forth the effort to lead their troops through the preparation for and the actual conduct of the Appendix C evaluation. Finally, the evaluation requires the cooperation of everyone and requires that each soldier give more in terms of effort and leadership.

Discounting the need for capable leaders at the staff level, there are four main groups of personnel who will make or break the ARTEP evaluation: observers, fire direction center personnel, cannoneers, and the special weapons element personnel. There is one word which sums up what each of these groups must do to be effective during the Appendix C evaluation — drill! Each element must train repetitively during inactive duty training in order to master the tasks and meet the time standards.

Forward observers worked with fire direction centers to smooth out communications and procedural headaches. Fire direction centers consolidated and trained over and over on the Appendix C mission so that their computation times were kept to the absolute minimum. Howitzer section

radiotelephone operators drilled with the fire direction centers to smooth out the rough edges of fire command procedures. Howitzer crews trained to minimize the amount of time necessary to set the piece for firing.

Since the Appendix C requirement for "at least one observer team . . . for each firing battery regardless of type battalion" does not differentiate between organic, assigned, or attached observers in the evaluation of observer time, the 1-115th sought augmentation outside its own ranks. Two additional lieutenants from the howitzer battery of the 278th Armored Cavalry Regiment in the Tennessee Guard and three fire support teams from the 3-115th Field Artillery from Memphis, Tennessee, were attached for the duration of inactive duty and annual training. These personnel were all under the control of the battalion liaison officer, who had the assignment of training all observers up to standard by the time the evaluation began.

The consolidated fire direction center training involved the forward observers, radiotelephone operators, and all fire direction center personnel. In addition to three live-fire exercises and inactive duty training, this fire direction element conducted seven full-scale battalion drills from October 1982 through June 1983.

On the cannons, every effort was made to reduce gun time. The "automatic load" procedure described in chapter 8 of FM 6-50 was adopted. Sections were strictly standardized. Battery commanders kept section personnel turnover to a minimum once assignments had been made in order to avoid the time-consuming retraining of new cannoners.

The special weapons element from each battery was drilled on tactical and technical nuclear procedures during inactive duty training and during the nuclear weapons additional training assemblies conducted by mobile training teams from Redstone Arsenal, Alabama. Special emphasis was placed on simultaneous nuclear and conventional operations.

The scheme behind the 1-115th's program of preparation was inherently sound: instead of demanding perfection early and then trying to maintain it throughout the training year, the unit accepted mistakes here and there, ironed out the wrinkles, and kept every element improving from month to month. Thus, when the battalion arrived in Mississippi, the personnel were able to hit the ground running.

Once the cantonment area was occupied and reconnaissance accomplished, the 1-115th moved to the field and began a week of final training prior to the ARTEP. With the Mississippi sun boiling up to 100

degrees Fahrenheit during the daytime, the unit slugged its way through mission after mission. There were endless repetitions of the hipshoot. High-angle fire proved exceptionally challenging; in fact, one night's illumination firing had to be scrubbed for lack of effectiveness.

A new group of advisors for the special weapons teams arrived from Fort Polk, Louisiana; and the teams had to learn a great deal quickly.

The Appendix C evaluation began with the initial reconnaissance of positions. Almost immediately, it was apparent that, at last, everything was falling into place. The timing so critical for maximum performance was second nature to everyone now.

As the firing batteries moved to their initial positions and the battalion nuclear convoy established the battalion's field storage location, the 2d Maneuver Training Command's evaluators readied for the test. When the forward observers received their initial missions at the observation post, the firing batteries started pumping out rounds like clockwork. Even the weather cooperated by sending some showers to cool things down for the first few days of the second week.

The battalion staff received a stiffer test than any command post exercise had ever accomplished — driven by the scenario developed by the 2d Maneuver Training Command, an almost constant flow of intelligence and logistic traffic descended upon the tactical operations center. The operations and intelligence personnel stayed on top of each problem until it was solved.

The nuclear portion of the evaluation also proceeded smoothly, with both air and ground convoys completed by the second day of the exercise and all units meeting the 14-minute assembly time on their first attempt. Only one unit had to be reevaluated on its emergency destruction procedures.

The results were better than almost anyone had hoped for. The 1-115th successfully fired 80 percent of the required missions on the first iteration, which was a record sufficient to pass the evaluation; but refire of those missions not meeting the standard resulted in a 100 percent successful completion of *all* fire missions. Battery B met the standards on all of its missions without a single refire. The 1-115th closed position on its final location only 45 minutes beyond the minimum time required for the ARTEP.

Benefits derived

The 1-115th closed out the book on the ARTEP/TVI by successfully completing

its Technical Validation Inspection in October 1983. So it is now possible to reflect upon the lessons learned from the past year — one of the battalion's most productive years in terms of training.

- With a clear objective set in specific, measurable standards, everyone worked toward achieving the common goal and learned the value of teamwork in the training of personnel. It was the Battalion Training Management System at its best.

- Some of the soldiers in the battalion were not up to preparing for the ARTEP; and they were weeded out early, rather than just prior to or during the evaluation. There were others who were a question-mark right up to the eve of the evaluation, but who performed brilliantly under stress. Continuous evaluation of all personnel was a must.

- The Appendix C evaluation forces leaders to exert positive leadership from top to bottom. Officers and noncommissioned officers must train and motivate *all year long*.

- The battalion discovered many areas which demand attention and improvement, such as NBC defense, perimeter defense, and the establishment of a battalion trains concept, which the unit will implement fully in training year 1984.

- More tangibly, the battalion completely revised and updated its tactical SOP and also standardized its howitzer section operations, fire direction center layout, fire commands, and nuclear operations. The 1-115th also learned how to accomplish a mission which includes both nuclear and conventional tasks.

Conclusion

The 1-115th Field Artillery recognized the challenge of coming on line with Active Component units who had already been involved with the ARTEP/TVI for some time. Battalion personnel created and stuck with a demanding regimen of preparation that resulted in a rating of "mission capable." This is one Reserve Components team that is ready to go to war.



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by Captain Larry D. Barttelbort

On 1 April 1984, the 29th Field Artillery Regiment was reorganized under the Army's new regimental system. The 1st Battalion, 29th Field Artillery, located at Fort Carson, Colorado, serves as the regimental home base battalion. The 3-29th FA replaced the 1-20th FA, and the 5-29th FA replaced the 1-19th FA. Both of these battalions are located at Fort Carson. The regiment's other three battalions are located in West Germany — two at Baumholder and one at Idar-Oberstein. The 2-29th FA replaced the 1-83d, the 4-29th replaced the 1-2d FA, and the 6-29th FA replaced the 2-81st FA.

The history of the regiment and its subordinate units is filled with meritorious service on and off of the battlefield. The following highlights portray the origin of the regiment and the histories of the 1st and 6th Battalions. The histories of the other battalions and batteries associated with the 29th are no less illustrious.

Origin of the regiment

The orders to form Battery A, 29th Field Artillery, were completed on 5 July 1918. The unit was to be an element of the 10th Division of the National Army. Organization of the regiment took place on 11 August 1918 at Camp Funston, Kansas. The regiment, which was equipped with 75-mm horse-drawn guns, completed its training in Kansas, but did not see action overseas; and so it was demobilized on 4 February 1919.

The Regiment was reconstituted into the Regular Army inactive list on 24 March 1923, but was reactivated in August of 1940 at Fort Benning, Georgia, and at Fort Hoyle, Maryland. A long and beneficial association began as the unit was assigned to the 4th Division, Motorized. It now had trucks to pull the 75-mm guns. Elite cadre from the 6th, 17th, and 83d Field Artillery Battalions were selected to man this new regiment. Then, on 1 October 1940, the regiment was reorganized and redesignated as the 29th

Field Artillery and was equipped with 105-mm truck-drawn howitzers. It served as a part of the 4th Division Artillery with the 20th, 42d, and 44th Field Artillery Battalions and the 46th Antiaircraft Artillery Battalion (which was attached to the division).

History of the 29th Field Artillery Battalion

The 29th Field Artillery Battalion established a close training association with the 8th Infantry while both units were assigned to Fort Benning. The battalion prepared for deployment; and Camp Kilmer, New Jersey, was the staging area for overseas movement. The 29th deployed to Europe on 18 January 1944; and the cannoneers arrived in Liverpool, England, on the British ship *Franconia* eleven days later. The troops moved to a permanent station at Axminster, Devon. At first, the unit personnel were busy drawing equipment, receiving orientations, and even sightseeing; but the serious training began on 29 February. The battalion participated in numerous land and amphibious training exercises until 15 May. Then, on 17 May, the 29th moved to Camp Lupton, near Dartmouth, England — the marshalling area for Exercise Neptune. The "exercise" never took place, but the allied invasion of the continent did. The night of 2 June was filled with tension as assault elements consisting of 32 officers and 444 enlisted men loaded into landing craft as the direct support artillery of the 8th Infantry. Loading was completed on 3 June, and the assault began on 6 June. A tragic incident of the D-Day landing at Utah Beach was the loss of Battery B during the assault run. At 0845 hours, the landing craft containing B Battery struck a marine mine about 1½ miles off shore and sank with the attendant loss of 59 officers and enlisted men and all of their equipment. Headquarters, A, and C Batteries landed at 0915 hours, 1,500 yards from their predesignated landing point, and occupied positions 200 to 300 yards inland. Although it had only 43 percent of its assigned strength and had lost one howitzer battery and its aerial observation pilots and aircraft, the battalion delivered highly effective fires. From 6 to 13 June, the battalion fired 262 missions and expended 10,029 rounds of ammunition. The deadly accuracy of these fires, even in the face of numerous displacements under hostile aerial and artillery bombardment, contributed to the steady and continuous advance of the supported infantry and the ever-increasing toll of enemy personnel and equipment. Cherbourg fell on 27 June, and the battalion was assigned to Task Force Roosevelt with the mission of policing and patrolling Cherbourg. Battery B was reorganized on 1 July 1944. For the extraordinary courage, determination, and esprit de corps it exhibited during the allied invasion, the 29th Battalion received a Presidential Unit Citation.

The 29th Battalion had a brief mission of general support to the 90th Infantry Division until 6 July 1944, but then the 29th returned to its normal direct support mission within the 4th Infantry Division. The Eighth Infantry and the 29th Field Artillery Battalion were again in the lead attack as the breakthrough at St. Lô kicked off. The 29th participated in the pursuit of the German Army through the liberation of Paris, the battle of the Siegfried Line, the Battle of the Bulge,

the Saar River Crossing, and the Rhine River Crossing. On V-E Day, the battalion was at the outskirts of Regensburg.

Gunzenhausen was home to the 29th as it fulfilled its occupation duties and prepared to return to the States for redeployment to the Pacific Theater. But those redeployment orders were cancelled when Pacific hostilities ended, and on 2 July 1945 the cannoneers boarded the *Hermitage* at Le Havre for an eight-day trip back to the States. The battalion was inactivated at Camp Butner, North Carolina, on 14 February 1946. The 29th Field Artillery had fired over 180,000 rounds since the D-Day landing.

When the "Fighting Fourth" Infantry Division was again activated at Fort Ord on 15 July 1947, the 29th FA Battalion was also activated as a unit of the division artillery. Again, elite cadre from another unit, in this case, the United States Constabulary, European Command, Germany, was assigned to man the reactivated battalion. The battalion received 105-mm truck-drawn howitzers and returned to train at Fort Benning, Georgia, with the 8th Infantry Division until departing for Europe on 25 May 1951 on board the *USNS Henry Gibbins*. The battalion arrived at Bremerhaven on 4 June 1951 and was garrisoned at Ray Barracks, near Frankfurt, Germany, until it returned to the States in June of 1956. The battalion was formally inactivated at Fort Lewis, Washington, on 1 April 1957 and relieved from assignment to the 4th Infantry Division.

History of the 1-29th FA

Battery A, 29th Field Artillery Battalion, was redesignated as Battery A, 29th Field Artillery, and was activated at Fort Sill, Oklahoma, in June of 1958. A short-lived period of activation ended on 2 September 1960 at Fort Sill.

In 1962, the inactive Battery A was redesignated as the Headquarters and Headquarters Battery, 1-29th Artillery; Batteries A, B, C, and Service were constituted effective 19 February 1962. The battalion was activated at Fort Devens, Massachusetts, with an authorized strength of 39 officers, 2 warrant officers, and 450 enlisted men. It was assigned as an organic element of the 5th Infantry Division, with operational control going to the First US Army. While assigned to Fort Devens, the battalion participated in training exercises at Fort Drum, New York, and supported artillery training of United States Military Academy cadets.

The 1st Battalion, 29th Artillery, was transferred to Fort Carson in 1965 and took on the mission of providing direct support to the 2d Brigade, 5th Infantry Division. The battalion was relieved from the division in 1970 and was assigned to the 4th Infantry Division at Fort Carson, Colorado. It has adopted "Red Barons" as its unofficial nickname, which has been in use since at least 1971.

History of the 6-29th

Battery F, 29th Field Artillery Battalion, was redesignated in 1959 as Headquarters and Headquarters Battery, 6th Howitzer Battalion, 29th Artillery, and activated at Fort Lewis, Washington, as an element of the 4th Infantry Division. Its organic batteries were organized at the same time. In 1963, the

unit became the 6th Battalion, 29th Field Artillery. It deployed to Vietnam during September 1966 and arrived at Cam Rahn Bay on 6 October 1966; it then deployed to the Tuy Hoa area and assumed the mission of direct support to the 1st Brigade, 4th Infantry Division. Equipped with 105-mm towed howitzers, the 6-29th fired day and night during the countermortar program of Operation Adam in the Tuy Hoa area. The enemy was forced to withdraw into Cambodia in the Spring of 1967 during Operation Francis Marion. Operation MacArthur combined the efforts of the 1st Brigade, 4th Infantry Division, and the 173d Airborne Brigade. During the operation, the 6-29th FA's tactical operations center controlled as many as 14 firing batteries, with total ammunition expended exceeding 80,000 rounds. The battalion received a Presidential Unit Citation for its actions in this phase of combat.

The battalion received numerous attacks on its fire support bases during the Tet offensive in 1968. Two battalions of the 325C North Vietnamese Army Division attacked Fire Support Base 29 on 25 May. This base was occupied by an infantry unit and the advance party of B Battery. The advance party was preparing for the arrival of the main body when the attack came, and these artillerymen were called to defend the perimeter. Seven firing batteries ringed the perimeter with steel, and 197 enemy dead were confirmed (many more unconfirmed were probably killed or wounded). The advance party of Battery B received a Presidential Unit Citation for its valorous actions from 25 to 26 May 1968. Battery A moved to Fire Support Base 29 during the summer of 1968, and the base was continually under siege of fire until it closed on 12 November 1968. Intense enemy fires continued during the evacuation, and A Battery personnel provided security until all the howitzers were airlifted out.

In early 1969, the 1st Brigade was tasked to block and destroy transportation routes in the Plei Trap Valley. Battery A was located at Fire Support Base 20 during late March 1969 and started receiving extremely accurate enemy indirect fires. On 26 March, 54 rounds landed within the parapet of the 4th Gun Section. An Air Force forward air controller directed the fires of Battery A and another unit's 175-mm guns to knock out the enemy howitzers.

During March and April, the 1st Brigade and the 6-29th FA moved to Camp Radcliff at An Khe where a mission of pacification support was undertaken. Major attacks were sporadic because of the extensive use of artillery to preempt enemy attacks. In May of 1969, Battery A made a combat assault into Cambodia and fought to secure firing areas. Action was fierce, and the batteries were forced into direct fire roles on numerous occasions. Heavy contact and complex enemy installations caused the maneuver arms to rely increasingly on effective artillery fires.


Following the withdrawal of American forces from Cambodia, the battalion supported Republic of Vietnam Ranger operations in Cambodia, with supporting fires being launched from fire bases within Vietnam. After these operations, the battalion supported the 1st Brigade's efforts in the An Lao Valley and Nui Miev Mountains and later to

the south in Phu Bon and Phu Yen provinces. In early November, the 1st Brigade, moved to Ban Me Thout in order to relieve local Republic of Vietnam forces. Action was light, and the operation was terminated on 29 December 1969. The battalion participated in Operation Wayne Stab I from January through March 1970 to disrupt enemy activity during the Tet holidays. Operation Eichelbarger Black commenced in late March of the same year.

When the 4th Division prepared to return to the States, the 6-29th FA provided covering artillery support as the final operational elements of the division withdrew. The battalion departed the Republic of Vietnam on 14 December 1970 and was inactivated effective 15 December 1970. In 1978, the battalion became Battery F, 29th Field Artillery, the target acquisition battery for the 1st Armored Division in Germany. It served in this capacity until it was reorganized under the new regimental system on 1 April 1984 as the 6th Battalion, 29th Field Artillery.

The tradition

In keeping with the traditions of the 29th Field Artillery Regiment's organization date of 11 August 1918, this day has been designated as the official organizational day. The coat of arms and distinctive insignia of the 29th Artillery consist of a shield, a crest, and a wreath. The artillery functions of the unit are represented by two artillery shells and the color scarlet. The sunflower represents the state flower of Kansas, the state of organization for the 29th. The motto beneath the shield is "Fidelis et Verus," which means faithful and true. The crest alludes to the D-Day landing of the 29th Field Artillery Battalion for which the organization was awarded the Distinguished Unit Citation, (now known as the Presidential Unit Citation). The trident alludes to Operation Neptune which launched the Normandy assault and is blue in reference to the award of the citation. The seven-pointed mullet alludes to the VII Corps and is similar in silhouette to its shoulder sleeve insignia. The eight bezants refer to Combat Team 8, and the six-pointed star (from the coat of arms of Cherbourg) to the Cotentin Peninsula where Utah Beach is located. The mullet and the star simulate a shell burst. The rammers, aside from their functional use in loading the pieces, are used to symbolize "ramming home" the Normandy landing and the push forward to final victory in subsequent actions. The wreath, which appears on the design of the crest, is a heraldic requirement for all crests. It consists of twisted skeins of silk composed of the principal metal and color of the shield — in this instance, gold (yellow) and scarlet.

A part of the Army's proud history for 66 years, the 29th Field Artillery Regiment welcomes its new members to the fold. Together, these battalions will strive to enhance the record of the "Fidelis et Verus" Redlegs. 

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Photo by Jill Ponto

Snake Charmers

by Major Joseph C. Antoniotti

In the five years since the first engineering-development guided projectile was fired, military evaluators have used about 80 rounds in simulated combat situations — notably during the Copperhead operational test in 1979 and during the fire support team vehicle (FISTV) operational test in 1982. These firings, combined with the results of standard test and evaluation procedures, have determined Copperhead's maneuver capability and reliability, have led to

seeker improvements, and have demonstrated that Copperhead *will* work in combat. Yet these same firings in a simulated combat environment have done little to help in creating and understanding the tactics necessary for the most effective use of the guided projectile.

In the past several years, numerous articles appearing in the *Journal* and other defense-related periodicals have discussed precision guided munitions in

general and the Copperhead guided projectile in particular. They have addressed the overall concept of precision guided munitions, to include their design and operational sequence and the impact of Copperhead on the battlefield. None of these articles, however, has analyzed Copperhead's possible employment alternatives.

When Copperhead is fully fielded, fire support teams, maneuver commanders, and fire direction centers of Copperhead-equipped field artillery battalions will discover the best way to use it. In the meantime, the doctrine must of necessity be generated by personnel with little Copperhead experience. The following insights, derived from eight years of operational analyses and simulations, might help serve as a starting point to fill this vacuum in field artillery doctrine and to give the Field Artillery Community a "leg-up" for thinking about possible ways to use Copperhead most effectively.

Types of targets

It is wrong to think of Copperhead as solely a tank destroyer. It can engage and destroy any hard target within range which can be located by a laser designator; tanks, armored personnel carriers, command/observation posts, antitank guided missile positions, and bunkers are all possible targets for Copperhead. Only a lack of ingenuity on the part of the FIST and gunnery team would limit the utility of the system.

Analyses conducted during the past several years have attempted to identify the highest priority target for Copperhead engagement. More often than not, the threat's main battle tank has received this priority; but the destruction of the BMP and BTR armored personnel carriers accompanying a tank-heavy attack might result in a higher payoff for the maneuver commander than would the destruction of a portion of the tanks themselves. It may be that the best overall target for Copperhead is the threat artillery. For example, in several different combat simulations when no artillery was present on either side, the blue force was able to completely defeat the threat. But when only the threat had artillery, the blue forces suffered a complete defeat (in fact, in some analyses, the no-artillery blue force on the forward line of own troops suffered about a 20 percent loss from indirect fire effects alone). Obviously, the effective attack of threat artillery is important — it will, however require long-range designation through devices such as the remotely piloted vehicle.

Methods of attack

Current doctrinal guidance specifies that the number of rounds to be fired in a single mission is the number of target elements plus one ($N + 1$, where N is the number of targets in the target array), up to a maximum of six rounds. That is, if four vehicles were approaching a Copperhead engagement area, five rounds would normally be fired for a single fire request; if, however, seven vehicles were approaching, the maximum number of rounds (to be fired in at least 20-second intervals) would still be only six. The rationale behind this upper limit of six rounds is an

assumption from the Legal Mix V studies. This analysis showed that during the 100 seconds from the impact of the first round to the impact of the sixth round, a target group moving at 10 to 15 kilometers per hour would be able to cover approximately 300 to 400 meters and find a position which would not be visible from the designator's location. But the limit was never meant to be, and should not be, a hard and fast rule. If the observer can tell that a specific Copperhead engagement area will have targets passing through it for many minutes, he should feel free either to ask for more than six rounds in the initial fire request or to request "repeat" to get the appropriate number of rounds on target. This continuous fire of Copperhead could also be extended to include final protective fires when the oncoming threat is predominantly armored.

High value targets such as command observation posts, air defense weapons, and unemplaced bridging equipment could be better engaged with Copperhead with two or more rounds fired as a "platoon one round" rather than "by piece." This method of engagement increases the certainty of hit and does not allow the target any warning time for maneuver out of the designator's field of vision.

When they engage armored targets in column formation, FISTs or separate lasing teams may not want to attack the closest target first; for the attack could (if the night sight is not mounted) temporarily mask some of the following vehicles because of smoke and debris and, more importantly, could also serve to warn the following vehicles of the FIST's or separate lasing team's presence. Making the first attack on a vehicle in the rear of the column solves both of these potential problems — it removes the masking potential and prevents the immediate visual or oral warning of the following vehicles. This example also shows that, whenever possible, observers should mount and boresight the night sight even during daylight operations.

Another concept which needs to be more fully evaluated is the use of Copperhead in combination with dual-purpose improved conventional munitions. Explosions of many munitions should tend to mask the impact of Copperhead on a target array, thereby delaying the target array reaction and permitting more Copperheads to be fired effectively.

Copperhead is a totally different type of weapon. To use it effectively, the fire support officer and fire direction officer must be willing to evaluate the system from a new point of view. Checking the graphical effects table will no longer lead to a "not effective" solution. A "battalion six rounds" of dual-purpose improved conventional munitions can easily be replaced with a "platoon two rounds" of Copperhead in the right circumstances. The challenge is for the planners to recognize these circumstances and take full advantage of the projectile's potential and use it only for purposes for which it is suited.

Allocation

A question about Copperhead which continues to nag planners is: How are Copperhead projectiles and fire missions to be allocated to ensure maximum



effectiveness and flexibility? For an eight-gun battery, a possible method would be to give the priority preplanned engagement area to one of the FISTs or separate lasing teams communicating with the battery. This FIST or separate lasing team would cover the best avenue of approach into the main battle area and would have first call on Copperhead assets, normally a two-gun section. A second FIST or separate lasing team, perhaps one assigned no conventional final protective fire, could be given second priority on Copperhead calls to the battery.

The battery itself, organized in two semi-independent firing platoons, would make one of those platoons the primary Copperhead unit. This platoon would be allocated about 75 percent of the Copperhead projectiles in the battery. Within this platoon, the two pairs of guns would be allocated projectiles on approximately a 60- to 40-percent basis. If 50 Copperheads were present in the battery, the primary platoon would have about 38 projectiles. The first and second sections, the priority Copperhead gun pair within that platoon, would have 12 rounds each; and the remaining guns would have 7 rounds each. The second platoon of the battery would have only 12 Copperheads to distribute among its four sections. These projectiles would normally be distributed evenly. This concept allows all sections to fire the system but gives one platoon the primary responsibility and makes one gun pair the priority Copperhead firing unit.

Under this concept, the battery would always assign Copperhead missions to the first pair of howitzers in the first platoon as long as that platoon was not



Photos by Sam Orr

previously engaged with another Copperhead mission. Assuming that this single platoon represents the largest number of guns that could normally be diverted from conventional missions, only the primary platoon would fire Copperhead on a routine basis. The alternate platoon would handle calls which were received when the primary pair was already busy, when one of the primary guns was called out of action for any reason, when there was a surge situation, or when there were specific support requirements such as dedication or following a remotely piloted vehicle observed fire mission.

Most combat simulations conducted over the past several years indicate that Copperhead will comprise between four and eight percent of the total rounds fired by a 155-mm howitzer. Yet these few rounds may well be the difference between the success or failure of the supported maneuver unit. In the early 1970s, battalion commanders were requiring FADAC to be checked by manual fire direction computations before a round could be fired; and it took many years for that mistrust to disappear. Copperhead undoubtedly must also undergo a period of growth and mistrust before it becomes an accepted part of the field artillery arsenal. Open discussion of employment tactics may be the education which minimizes this period of acceptance. Redlegs should learn to charm the Copperhead so it strikes well rather than strikes out.



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View from the Blockhouse

FROM THE SCHOOL

Journal notes

By the time this issue of the *Journal* hits the streets, many readers will have received the readership survey covering the calendar year 1983 editions. Their feedback will indicate how the *Journal* can best continue to serve the needs of the Field Artillery Community. The survey will surely indicate the growing popularity of the "Right by Piece" section. It offers Redleg commanders a chance to shine the spotlight on their unit's traditions and training achievements. It is also a chance for amateur photographers within the units to strut their stuff. An appearance in the *Journal* is a free morale booster that more and more unit commanders find they simply cannot pass up.

FIST employment and control

Recent coordination between the Commander in Chief of US Army, Europe and the Commandant of the US Army Field Artillery School has affirmed the importance of the following guidance in the areas of fire support team (FIST) employment and control:

- The FIST chief should be located where the company commander wants him — normally, with the company commander.
- Chapter 7 of TC 6-20-3, *Fire Support Operations in Brigade-Size Units*, outlines the digital communications options available to the FIST chief. The FIST chief must decide whether to use a centralized, decentralized, or pre-designated control and communications option with the forward observers (FOs). To make this choice, the FIST chief must consider the tactical situation, the degree of training of the FOs, and the availability of fire support assets. Generally, the FIST chief should assume a more centralized control posture in the defense and a more decentralized posture in the offense. In a TACFIRE environment, centralizing digital communications at the FIST headquarters is the preferred communications option when the FOs are not well trained and the tempo of operations is slow. (When the FIST digital message device is fielded in FY85, it will resolve this last problem area.)

Field units should continue to apprise the School of their experiences with the FIST doctrine. As more and more units field TACFIRE systems and the M1/M2/M3 family of fighting vehicles, field input will be essential in updating and improving FIST employment and control procedures.

TACFIRE tips: Location of the fire support officer

The location of the fire support officer (FSO) is critical to the success of the battle. During the planning phase, the FSO should be where he can use his variable format

message entry device (normally adjacent to the operations section of the supported maneuver force). During this period he should supervise the preparation of schedules of fire which support the anticipated scheme of maneuver. When the battle begins, he must position himself where he can quickly coordinate fire support assets and activities according to the intent of the maneuver commander.

He will probably need to leave the tactical operations center to be with the commander close to the action. His primary link to the battalion fire direction center and other fire support sections must be FM voice communications. The FSO should rely on the FM voice communications channel to alter the priorities which the direct support field artillery battalion follows in honoring calls for fire. Messages of interest must be transmitted to the variable format message device, which will probably still be located at the main planning headquarters. The fire support sergeant must have the authority to coordinate fires and maintain the support data base.

The FSO may find it necessary to borrow some equipment and radio frequencies from the maneuver unit to support this split operation. Additionally, the FSO has available a 1/4-ton truck with an AN/VRC-46 radio equipped with a Vinson device. He could use an operation/fire net for fire support coordination.

Field artillery survey in the 1990s

The fielding of the position and azimuth determining system (PADS) in March 1982 marked the beginning of a new era in the conduct of survey operations. Compared to conventional survey parties, PADS increases the speed of survey operations from three- to seven-fold, depending on the mode of transportation. This increase is significant, but will it be adequate for the 1990s?

Three hundred thousand dollars is the approximate cost of one PADS, and planners are asking if there is not a cheaper way to do the job. The Field Artillery Mission Area Analysis examined the PADS survey capability versus other survey capabilities and concluded that, although further increases in the number of PADS available could solve the problem, the Field Artillery Community could consider other technical approaches such as land navigation systems and the Global Positioning System.

The Multiple Launch Rocket System (MLRS) planners recognized the limitations of the present survey and fire control systems and have designed a launcher that includes a fire control system capable of providing on-board directional and position control. This system, the stabilized reference platform/position determining system (SRP/PDS), includes a gyroscope which provides the azimuth for laying and referring and a computer which uses input from the gyroscope and the vehicle odometer to determine the

launcher position in universal mercator grid coordinates. These data are then put into the fire control computer which computes the firing commands and automatically moves the launcher pod to the proper azimuth and elevation for firing. Survey procedures for the MLRS differ from standard practice in that the battery PADS survey party is required to establish platoon area survey points, which are used to initialize the SRP/PDS and to calibrate the odometer.

The MLRS technology is now being extended to cannon artillery. The M109A3 howitzer extended life product improvement program includes development of an automatic gun positioning system (AGPS), which is similar to the MLRS SRP/PDS. The AGPS, now in development, also includes a gyroscope, an odometer input, and a computer. It differs from the SRP/PDS in that accelerometers are used to measure velocity or distance traveled; the position data must be transmitted to the fire direction center where fire commands are determined; and the crew must traverse/elevate/depress the tube with present controls. Survey doctrine for the AGPS will be similar to MLRS survey doctrine. The advantages of the on-board laying and positioning equipment are that the unit gains maximum flexibility in the selection of position areas, the individual launcher/howitzer positions can be surveyed with zero response time, and the number of points to be surveyed is reduced.

But suppose the Army could field a system that each user could mount in a vehicle or back-pack and could determine one's horizontal and vertical positions as required. There is such a system in development — the NAVSTAR Global Positioning System (GPS) — which is to be fielded in 1988.

The Global Positioning System is a space-based, radio positioning, navigation and time-transfer system which can be mounted in a vehicle or can be back-packed. The three major components of the GPS are the space, control, and user segments.

- The space segment will be composed of 18 satellites in six orbital planes. The satellites will be arranged so that a minimum of four satellites will be in view to a user, thereby insuring worldwide coverage. Each satellite will continuously transmit ephemeris (location) data and time signals.

- The control segment will include a number of monitor stations throughout the world. These stations will track all satellites in view passively and accumulate ranging data from the satellite signals. This information will then be processed at the master control station to determine satellite orbits and to update the ephemeris data in each satellite.

- The user segment will consist of user equipment sets, test sets, and repair equipment. The user equipment set will use the data transmitted by the satellites to derive position, navigation, and time information upon command by the user. There will also be a controllable reception pattern antenna unit which provides a high anti-jam capability. In an MLRS unit, the user equipment set will be mounted in the MLRS platoon leader's high-mobility multipurpose vehicle and will be operated by unit personnel as an additional duty. The initialization and calibration points

required for the SRP/PDS can be established during reconnaissance. A similar approach will be followed in the self-propelled howitzer battery. The user equipment can also be dismounted and used as a manpack (similar to the AN/PRC-77 radio) if required.

The Global Positioning System, when used with weapon fire control equipment, can provide responsive survey support with reduced personnel and equipment costs. It has the potential to satisfy most field artillery requirements for horizontal and vertical position data. Requirements for appropriate azimuth determining equipment are now being developed to permit expansion of the above concept to other field artillery systems in the 1990s. (Roy E. Penepacker, Directorate of Combat Developments)

The Aquila

The date scheduled for achieving initial operational capability of the Army's remotely piloted vehicle (RPV) is September 1987; however, a US Army Training and Doctrine Command (TRADOC) initiative provided an RPV early operational capability to the US Army Forces Command in January 1984. TRADOC's intent was to allow the user to provide input to materiel and combat developers for the development of doctrine, ARTEPs, soldier's manuals, trainer's guides, and field manuals, as well as to identify issues and criteria that must be evaluated during operational testing.

The soldiers tasked by TRADOC to operate the equipment attended a five-week prerequisite course at the Field Artillery School, an 11-week classroom and hands-on training course at the contractor training facility, and two weeks of actual flight training. The contractor, Lockheed Missiles and Space Company, Inc., assumed responsibility for all maintenance of RPV-peculiar equipment during the achievement of the early operational capability.



Aquila launch. (Lockheed Missiles & Space Company photo)

A development test and experimentation conducted by the TRADOC Combined Arms Test Activity is evaluating the concept of RPV employment. The Test Activity is using the January 1984 III Corps command post exercise and various field training exercises to examine command, control, communications, and intelligence issues.

The early operational capability for the RPV does not mean that there is a full production system in place, but it does mean that a remotely piloted vehicle to meet the needs of the total Army will be a reality in a few short years with the fielding of the Aquila. (MAJ Eugene S. Thompson, USAFAS)

Standardization/interoperability update

As described in many previous editions of the *Journal*, the United States participates in numerous North Atlantic Treaty Organization (NATO) and American, British, Canadian, and Australian (ABCA) working parties, working groups, and panels in an attempt to reach agreement on procedures, tactics, techniques, standing operating procedures, equipment, interchangeability, and other mutual support activities. The Field Artillery School provides representation to both organizations. Agreements reached at those meetings are called draft Standardization

Agreements (STANAGs) for NATO and draft Quadripartite Standardization Agreements (QSTAGs) for ABCA.

After these STANAGs/QSTAGs have been properly and thoroughly coordinated, they are approved for national ratification. Then comes the most important step — implementation — which is accomplished by the proponent field artillery department/agency who incorporates the ratified STANAG/QSTAG in the appropriate field manual. Table 1 is an update on STANAGs/QSTAGs that have been implemented in field artillery field manuals; the location of the subject matter within each field manual is also indicated. (Mr. B.M. Berkowick, USAFAS International Coordinator, NATO/ABCA)

Table 1. STANAGs and QSTAGs which have been implemented.

Title	STANAG No.	Ratifying date	Matching QSTAG No.	Implementing document	Current location
Bombing, Shelling, Mortaring, and Location Reports	2008.....	16 May 72	503	FM 6-121.....	App D, E
Target Grid Procedures	2011	24 May 72	505	FM 6-30.....	Chap 3, Sec I
Operation Orders, Annexes to Operation Orders, and Administrative and Logistics Orders	2014.....	Sep 76.....	506	FM 6-20.....	Page K-7
Method of Describing Ground Locations, Areas, and Boundaries	2029.....	Mar 65.....	514	FM 6-121.....	App I
Proforma for Artillery Fire Plan.....	2031.....	Mar 80.....	515	FM 6-20.....	Page K-3
Emergency Alarms of Hazard or Attack (NBC and Air Attack only)	2047.....	Dec 72	183	FM 6-50.....	Page 6-16
Relief of Combat Troops	2082.....	Aug 78	None	FM 6-20.....	Pages 4-23 & 5-32
Battlefield Illumination	2088.....	Jan 80	182	FM 6-30.....	Chap 6, Sec III
Fire Coordination in Support of Land Forces.....	2099.....	Nov 73.....	531	FM 6-20.....	App J-13
Principles and Procedures for Establishing Liaison.....	2101.....	Apr 76	533	FM 6-20-2	Page 10-6
Friendly Nuclear Strike Warning to Armed Forces Operating on Land	2104.....	Aug 81.....	189	FM 6-20.....	Page K-33
Destruction of Military Technical Equipment	2113.....	22 Jun 65.....	534	FM 6-50.....	Page 4-14
Recognition and Identification of Forces on the Battlefield	2129.....	Sep 78.....	538	FM 6-20-1	App I
Call for Fire Procedures	2144.....	Apr 80	225	FM 6-30.....	Chap 5, para 5-7 & 5-11; Chap 6, Sec II & III
Target Numbering System (Nonnuclear)	2147.....	16 Oct 79.....	221	FM 6-20.....	App J-4
Regulations for Military Motor Vehicle Movements by Road.....	2154.....	5 Jan 76	539	FM 6-50.....	Page 3-19
Recording of Data for Artillery Survey Control of Points	2865.....	1 Dec 75.....	None	FM 6-2.....	App P
Radio Telephone Procedures for the Conduct of Artillery Fire	2867.....	11 Dec 75.....	246	FM 6-30.....	Chaps 4 & 6
Calls for Destruction, Smoke Illumination, and Danger Close Missions.....	2875.....	3 Feb 80	None	FM 6-30.....	Chap 5, para 5-11; Chap 6, Sec II and III
Tactical Tasks and Responsibilities for Control of Artillery.....	2887.....	Unknown.....	217	FM 6-20.....	App C-7

Table 1. STANAGs and QSTAGs which have been implemented (continued).

Title	STANAG No.	Ratifying date	Matching QSTAG No.	Implementing document	Current location
Adaption of a Standard Atmosphere.....	4044	14 Jun 67	186	FM 6-15	Page 2-16
Adaption of a Standard Ballistic Meteorological Message.....	4061	11 Jun 68	332	FM 6-15	Pages 2-5 & 10-1
Adaption of a Standard (Cannon) Artillery Computer Meteorological Message	4082	2 Aug 68	252	FM 6-15	Page 10-5
Format of Requests for Meteorological Messages for Ballistic and Special Purposes	4103	2 Nov 66	386	FM 6-15	Page 3-7
Adaption of a Standard (Cannon) Artillery Firing Table Format	4119	28 Sep 73	220	FM 6-40	Chap 6
Adaption of a Standard Character-by-Character Meteorological Message Format	4131	13 Nov 72	267	FM 6-15	Page 1-1, Chap 2
Standard Target Acquisition.....	4140	Unknown	389	FM 6-15	Page 10-19
Howitzer, M1A1, Carriage; Howitzer, 155-mm, M1A2 with Ammo and FCE.....	None	Apr 79	57	FM 6-81	
Manual Fire Direction Equipment and Methods of Engagement for Post 1970	None	6 Mar 70	224	FM 6-40	Chap 2, Sec III; Chap 3, Sec I & II
Standard Survey Accuracy Requirements for Surface-to-Surface Artillery.....	None	4 Oct 77	269	FM 6-2	App O
Principles and Procedures for Establishing the Minimum Scale of Communication for the Use of NATO Land Forces	5048	16 Dec 77	522	No FM-6 Series	Implementation

Drummond's four rules

At a recent Field Artillery Officer Basic Course graduation exercise, Major General James E. Drummond presented his four rules for Basic Course graduates. The following excerpt from his remarks gives the flavor of those rules.

Make no bones about it; this graduation *is* truly a meaningful milestone, and it marks a point in time when your responsibilities change and from which you view professional responsibility differently. It's a time when the real excitement begins as you move out to join your first units. Equally, it's a time henceforth from which the Army looks at you differently and expects bigger and better things from you. . . .Your influence and your ability to help lead the Army and to get things done are measurably improved as you carry away from this formation your diploma of course completion.

I don't want to dwell today on the importance of a good organization for motor stables, or pulling ESCs, or circling the rounds fired on the conduct of fire form. You've already had enough — probably too much — of that. Instead, I would like to give you Drummond's Four Rules for Basic Course graduates. Perhaps you can file these away in your data bank and maybe one day use one or two of them. My first rule for Basic Course graduates is: *"You can't expect to hit the jackpot*

unless you put a few nickels in the machine." This rule means that you will get out of life in the Army only in direct proportion to what you put into it. To get any return at all, you've got to risk a few nickels of yourself. You must have an unselfish willingness to work hard at being a soldier.

A great part of investing of yourself is in learning the business. "Professional competence is the mother of leadership." I believe that totally. Soldiers respond to and follow only those leaders who know their job — leaders whom they view as competent. Your soldiers don't expect that you know everything, but they'll expect — no, more than that, they'll *demand* — that you care enough to try to learn. You people have worked hard to master the fundamentals of being an artillerist. You must continue to learn and to further your tactical and technical proficiency. . . .As you join your first troop unit, be totally prepared and unselfishly willing to put a few nickels of yourself in the slot. The monetary rewards are not much — they never have been and never will be — but that overwhelming feeling of personal satisfaction that comes from commitment to soldiers and a job well done is a bountiful jackpot in itself. . . .Even more important than your personal satisfaction . . . is the contribution that a caring, involved, and unselfish young officer makes to small-unit cohesionNinety percent of our soldiers in the Army are in

small units — batteries, troops, and companies. You know as well as I that soldiers perform and soldiers will fight because they are loyal members of a "super" family at squad, platoon, or company — a family that they are determined not to let down because that caring family won't let them down; a family which is intimate, motivated, and self-disciplined. When the climate for that small unit is set by leadership who unequivocally invest of themselves, you get exactly the degree of cohesion and family feeling we are looking for. So put a few nickels in the machine!

Drummond's second rule is also simple: "*Sacred cows make the best hamburger.*" When you join that new unit, don't be afraid to question why they do something a certain way. Every ballpark has a different set of ground rules, but don't hesitate to challenge their validity. One of the people you will be continually meeting in the Army (as in all bureaucracies) is the "old sarge"; and "old sarge" may be a major, or a colonel, or even a general. "Old sarge" is the keeper of the sacred cows. Old sarge will tell you, "Look, lieutenant, we've always done it that way," or "That's the way *they* want it done." But you can never find out who *they* is. Well, simply because we've always done something a certain way doesn't make it right, nor [does it] make it the best way.

One of the best things about the Army education system is that, each year, Basic Course graduates reenergize the Army. You come into units with a high energy level, the very latest and most up-to-date doctrine, procedures, and techniques at the small unit level. You bring fresh new ideas, new approaches; and you can spot better ways of doing things. You are uncontaminated by 207 years of "We've always done it that way." Challenge our sacred cows, our preconceptions. . . .

But a caution is Drummond's third rule for Basic Course graduates. The corollary of "sacred cow" is: "*There's something wrong if you are always right.*" So, despite the fact that your stay here has convinced you that you are the answers to the Army's prayers, despite your firm conviction that you are being sent to Fort Lewis, Washington, by the Chief of Staff of the Army himself to straighten out the 9th Division Artillery, keep an open mind and see the others' viewpoints. . . . Make sure you know what you are talking about before you move into shifting units around the 2d Armored Division Artillery or the 42d Group — at least for the first couple of weeks after you arrive.

When I spoke a few moments ago about "old sarge" — despite how I phrased it — I spoke of him with reverence and respect and the deepest affection. I don't need to remind you that the great bastion of strength of the United States Army is the noncommissioned officer corps. The institutional wisdom and experience that the NCO represents have been sustaining factors for the Army as long as we've had an army — on a thousand battlefields, in a million motor pools, and [in] countless barracks. And good NCOs pride themselves in their willingness and their ability to coach and train young officers. They want to be *sure* you know what you are doing, and they want you to set high standards. They want you to be a success. And what better way than to give you the benefit of *their*

experience. Listen to them! Seek out their counsel and advice! Think about what they tell you! They know you can't always do everything they suggest, but they do want to be able to tell you. And they want to know how you feel about their work; they want to believe you will stand up for them and appreciate their individuality. If you do these things, you'll find a supporting relationship that will make your job immeasurably easier. When you are right, they'll back you all the way. If, by chance, you're wrong, they'll set you straight; but they'll still back you because the NCO corps knows that loyalty, as integrity, is non-negotiable. The business of the Army is conducted by sergeants; and, if business is good, it's because you have given them the authority and responsibility to do their job and you've taken full advantage of their expertness, competence, and hard-earned experience.

Drummond's fourth rule is: "*If you push on something long enough, it will fall over.*" It's all too easy for a young officer joining his first unit to become discouraged. The responsibilities at times appear overwhelming. You'll sign for 10 million dollars worth of equipment and take on the responsibility for the lives of 50 to 100 men. Pretty big burden for a 22-year old, wouldn't you say? . . . I guarantee you that if you'll try, if you'll give your best shot at things, you will eventually accomplish what you set out to do. . . . Persistence can often achieve the seemingly impossible. Do what you know is right. Stand up for principle and have the courage of your convictions. But don't confuse *courage* with *bravery*. If your new battery commander is meaner than a junk yard dog and you are not afraid to go into his office to tell him he's all fouled up, that's bravery. If you are afraid but go in anyway, that's courage. If you are convinced of the correctness and integrity of your position, push on; and things will fall into place.

You graduate this course at a critical time. . . . You people can help us resolve our problems with your energy and talent, your freshly learned professional skills, and, above all, your youthful outlook. Staying young . . . [is] a matter of idealism, enthusiastically supported and believed in. It's young ideas; it's spirit; and it's giving a damn. . . . May you never be disappointed in the Army or in yourselves.

Reserve Components OBC and OAC

The second iteration of the new Officer Basic Course (Reserve Component) will occur this year. This course provides officers in the Reserve Components the same instruction provided in the residence course, but configured in four phases which combine both correspondence and resident course instruction. There has also been a modification to one phase of the Officer Advanced Course (Reserve Component). A student can no longer get credit for Phase II by correspondence — he or she must take this phase of instruction in residence to be qualified in the Branch. These changes to the training of officers in the Reserve Components will be discussed in greater detail in a future issue of the *Journal*.

Right by Piece

NOTES FROM UNITS



FORT SILL, OK — Private First Class Darrell E. George of the 2d Battalion, 36th Field Artillery, uses the shoulder-fired Redeye air defense missile to track an expendable ballistic aerial target as it blasts off in the distance. Specialist 4 Robert R. Bolar coaches him. (Photo by SP4 Kerry Akridge)

210th Field Artillery Brigade receives Partnership Award

HEIDELBERG, GERMANY — The 210th Field Artillery Brigade and the 44th Artillery Battalion of the Netherlands were presented a Project Partnership Award in a ceremony at Heidelberg, Germany, for the interoperability work done by the two units during Carbine Fortress '82, part of the 1982 REFORGER series. Project Partnership is the annual program which promotes interoperability among allied units in Germany. The two units took top honors in the US-NATO, Non-German, Joint Training Exercise category.

During Carbine Fortress '82, the Headquarters and Headquarters Battery of the 210th included the 44th Netherlands Battalion, a 155-mm howitzer unit from 't-Harde, as a part of the Brigade organization for combat. The 44th actually became one of the 210th's battalions and proved to be an excellent partner in the interoperability exercise. In 1981, the 44th was officially recognized by the Dutch Army when it was selected as the best field artillery battalion in its Army.

Coordination and planning were extremely important to the success of the interoperability exercise. Initial

arrangements began six months prior to Carbine Fortress. Logistics and operations had to be arranged. The 44th was completely integrated into the 210th's organization during the exercise and was aligned with the US system for personnel reporting, intelligence data flow, operational activities, and logistics support and reporting — no small task during an exercise of this size.



Personnel from the 44th Netherlands Artillery Battalion and 210th Field Artillery Brigade work out a logistics problem during a pre-REFORGER training exercise.

To assist in operations, liaison officers were exchanged between the two units for the duration of the exercise. Adherence to Standardized Agreements (STANAGs) by both units facilitated all operations and ensured true interoperability. The units experienced a slight language barrier, even though many of the Dutch spoke English very well.

During the actual exercise the soldiers did not have many opportunities to directly intermingle, but the two units shared ideas and methods as well as camaraderie. The commanders hosted joint meals where the Dutch soldiers could sample the American Army food and vice versa. The Dutch enjoyed American cooking, and the Americans liked the berets worn by the Dutch as part of their uniform. The units would like to have an ongoing partnership, but distance presents a problem.

Winning a USAREUR Project Partnership Award was "the icing on the cake" for the 44th Netherlands Battalion and 210th Field Artillery Brigade. It was a nice way to top off a model interoperability exercise. (Story and photo by Ruthann M. Sprague, Public Affairs Officer, 210th Field Artillery Brigade).



The guns of Battery B, 3-178th FA, boom loud during the unit's annual training at Fort Stewart. (Photo by SP4 Thomas Henderson)

Guard artillery units fire up Fort Stewart

FORT STEWART, GEORGIA — "You never quite get used to the sound of it. Even after all these years, I still get a charge out of it every time one of those big guns goes off! It's really something — there you are in the middle of the woods, the sun is shining, there's a nice breeze blowing, it's quiet. Then somebody yells 'fire' — and the world starts to act silly! Man, that sound is really heavy-duty!"

The words of a veteran chief of firing battery of the 151st Field Artillery Brigade really sum up the annual training efforts for this South Carolina Army National guard outfit. The Guardsmen can definitely lay down

some heavy firepower and noise with their 8-inch and 155-mm howitzers. The 151st Brigade, which headquarters in Sumter, South Carolina, had its two principal battalions, the 3-178th FA of Lancaster and the 4-178th FA of Georgetown, training at Fort Stewart last spring. (SP5 Benjamin D. Moore, 108th Public Affairs Detachment)



Soldiers of Battery B, 3-178th FA, prepare to send another round downrange. Here, they are shown placing the powder charge into the artillery piece. (Photo by SP4 Thomas Henderson)



Soldiers from Battery B, 3-178th FA, hump another round for their howitzer while training at Fort Stewart. (Photo by SP4 Thomas Henderson)



Members of the 1-22d FA team begin to raise their arms in triumph as they cross the finish line. The finishing Americans received a hearty round of applause from their British hosts.

Larkhill Gun Run

LARKHILL, ENGLAND — On a narrow, hot road that twists through the golden fields and lush meadows of Southwest England, a small band of US soldiers strained up another hill. Using only ropes and brute strength, 18 soldiers from the 1st Battalion, 22d Field Artillery, ran a 4,048-pound howitzer to a third-place finish in the second annual Larkhill Gun Run, Larkhill, England.

The 1-22d FA team was the first US team to participate in the Larkhill Gun Run, which began last year as a charity fund-raiser with seven teams participating. This year, however, the field doubled as 14 teams, including the 1-22d, tried their hand at the gruelling 7.8-mile course. The 1-22d FA had already tasted victory before they arrived in England, having won a preliminary gun run in Germany that determined which division artillery unit would win the honor of representing the 1st Armored Division and the US Army at Larkhill.

From the moment the big Chinook helicopter that carried the team from Germany landed at Larkhill, it was apparent that Mother Nature was not going to make it any easier for the runners. Britain was in the midst of a heat wave that produced temperatures in the 90s, and high humidity only made things worse. Many of the British teams already at Larkhill were forced to slow down their training to avoid heat injuries.

Another problem arose when the 1-22d started their first practice run with the British 25-pounder gun. The 25-pounder gun is lighter than the US howitzer the



The strain of pulling the gun 7.8 miles shows on the face of First Lieutenant Morgen, 1-22d FA, as he helps pull the howitzer away from the finish line.

team pulled to victory in Germany, which caused many of the team members to jump to the conclusion that pulling the British gun would be "a piece of cake." After running the gun into a ditch for the second time, the 1-22d realized that they would need new methods and techniques to control the gun while running downhill. The British gun rolled easier than the howitzer, and the braking device was much different; two clicks of the brake was not enough to slow the gun enough for proper control, and three clicks stopped the gun cold. It soon became apparent that the artillerymen would need a brakeman riding on the gun. Although the 1-22d did make several changes in pulling methods, they did not abandon their practice of pulling the gun trail first, despite the fact that they were the only team that did so.

Rumor and speculation ran rampant in the days before the race as teams evaluated their competition. One of the most respected teams was the 29 Commando Regiment, the only team that never seemed to brag about how good they would do in the big race. Their silence seemed ominous.

Finally, the waiting was over. A steel drum band filled the air with the rhythmic sounds of island music as teams lined up and awaited the starting gun at Westdown Camp. The teams raced against the clock rather than against each other, because the road was barely wide enough for one gun team. If a team overtook another one, the slower team would pull off the road to let the faster team go by.

The 1-22d knew that they must keep running, "no matter what," and that they would have to pass at least two teams (started at 10-minute intervals) if they were to have any chance at winning. They accomplished these feats and crossed the finish line with a time of 1 hour, 22 minutes. It was a close race, with only 10 minutes difference between first place and sixth place.

As it turned out, the other teams had good reason to be wary of the Commandos, who ran their gun to victory. In the spirit of good sportsmanship, the 29 Commandos traded their regimental T-shirts with their new-found American friends; and soon there were "Commandos" with Texas drawls and 1st AD T-shirts heading back to Liverpool. Although T-shirts reading "Larkhill Gun Run . . . Never Again!" were a popular item with the 1-22d team after the race, many of the team started talking about how they would do "next year." (Story and photos by Robert Moffitt)



An OH-58 pilot hovers the aircraft while giving an aerial observer candidate a familiarization briefing. (Photo by Don Smith)

101st revitalizes aerial observer training

FORT CAMPBELL, KY — Based on the AirLand Battle concept and the increased responsibilities that the AirLand Battle places on Army air assets, the 101st Airborne Division Artillery (Air Assault) has developed a new aerial observer training package which is administered to selected fire support specialists (MOS 13F) semiannually. The week-long course, supervised by the division fire support element, has a full period of instruction which includes the basic duties of an aerial observer, aerial adjustment of artillery fire, combat intelligence, and communications. Members of Battery A, 377th Field Artillery (Target Acquisition and Aviation), provide instruction on aircraft familiarization, aerial reconnaissance techniques, helicopter operations, and terrain navigation. The students culminate the training with a practical exercise using nap-of-the-earth flying procedures.

The special program of instruction developed for the week-long course hinges on a demanding scenario. The enemy formation continues to move as the aerial observers are transmitting hasty fire plans via FM digital communications to the covering force area field artillery headquarters. The minefields and hidden obstacles are complete; aeroscouts are maneuvering attack gunships into kill zones. The distant horizon reveals dust trails — evidence of a dispersed enemy combat reconnaissance formation. Aerial observers watch from masked positions as the lead armor reconnaissance element moves closer to the first hidden minefield. The aerial observer listens as the leader of the flight of A-10 aircraft makes initial contact with the air cavalry S3 and fire support officer. The quick digital transmission to initiate the on-call fire plan is sent; and, within seconds, 155-mm and 203-mm rounds are impacting in and around the enemy formation. The lead element is caught in the minefield and is under attack by field artillery fires. The enemy advance is quickly slowed. Attack helicopter gunships engage the enemy's flank, while close air support aircraft attack armor targets in the center and rear of the force. Simultaneously, the aerial observers shift the field artillery fires to block the enemy's retreat.

The scenario integrates attack helicopters, close air support, engineer obstacles, and long-range field artillery fires to stall the lead elements' advance and to channelize the follow-on elements. The reconnaissance force is stalled and heavily damaged; the threat commander is forced to deploy and decisively commit his main combat force early. Infantry antiarmor teams, previously air assaulted into hidden ambush positions, begin hitting the enemy's opposite flank. Additional aerial observers move in. From their "big picture" vantage point they can watch the battle develop. The coordinated combined arms team continues to pound and wear down the threat force.

This scenario depicts a battle that is quick, fierce, and extremely lethal. The aerial observers' long-range observation capability, excellent mobility, and dependable FM digital communications are the keys to the accuracy and timeliness of the field artillery fires on the wide, fast-moving covering force battle. The program of instruction, which begins with classroom instruction, allows fire support team (FIST) personnel to develop an additional combat skill that enhances their technical expertise. A minimum of three hours of flight time is programmed for each student. Class sizes vary from 20 to 24. Graduating 13Fs are awarded a certificate of training and are expected to maintain proficiency in aerial observation during quarterly prime training.

With the completion of TACFIRE fielding on 2 September 1983 an additional class was added to the program of instruction on the use of the digital message device (DMD) in the OH-58 helicopter. One cable links the DMD to the FM radio in the OH-58 aircraft; however, the DMD runs off its own battery power. One aircraft cable (CX-13161, A1-14811D, NSN 5995-01-110-6945) is authorized to each aerial observer.

The field artillery aerial observer is highly mobile and can respond quickly to the commander anywhere on or beyond the battlefield. The aerial observer has speed, is unrestricted by terrain, and can see deeper into the battlefield than the ground observer. A trained aerial observer in an airborne platform is an important asset that affords flexibility in supporting air assault operations, deep battle operations, and all operations of AirLand battle doctrine. (Captain Keith Bucklew, Division Fire Support Element, 101st Airborne Division Artillery (Air Assault))

18th Field Artillery EDRE

FORT BRAGG, NC —The 18th Field Artillery Brigade (Airborne) emergency deployment readiness exercise (EDRE) at Fort Bragg in September 1983 was one of the largest ever coordinated by the brigade headquarters. The brigade's soldiers and equipment moved at night to Holland Drop Zone. There were four different types of aerial delivery: five personnel drop sorties, nine heavy equipment drop sorties, a low altitude parachute extraction system delivery of a five-ton truck, and 17 air-land sorties. The participants parachuted onto the drop zone and then infiltrated several miles to the mock cinder block city, officially called the Military Operations in Urban Terrain Facility, to set up a headquarters.



The four recent graduates shown here are Captain David Berry, Headquarters and Headquarters Battery, 2d Infantry Division Artillery; Second Lieutenant Scott Brown, 8th Battalion, 8th Field Artillery; Staff Sergeant Rickey McNeil, 6th Battalion, 37th Field Artillery; and Sergeant John Smith, 1st Battalion, 15th Field Artillery. The instructors of the two-week course stand in the rear. (Photo by Michael K. Marlow, 2d Infantry Division)

Artillerymen receive aviation instruction

CAMP CASEY, KOREA — Warriors from the 2d Infantry Division Artillery are learning about aerial adjustment of artillery, aviation regulations, aviation safety, and aerial navigation. Instructors from the 2d Aviation Battalion provide 55 hours of academic instruction and 15 hours of flight (of which two hours are flown at night).

American-Canadian air-defense exercise

NUERMBERG, GERMANY — The United States Army's 2d Battalion, 377th Field Artillery (Lance), and the Royal Canadian Air Force teamed up recently and conducted the first air-defense exercise between the two North American allies.

The unusual exercise began with the Lance missilemen conducting a roll-out exercise simulating a no-notice attack by the Warsaw Pact. After occupying their training positions, the field artillerymen began their road march home to Herzo Artillery Base, a small kaserne near the Bavarian city of Nuremberg.

Simulated rear-area intruders blocked their route of march, causing the American soldiers to establish all-around security and react to an air-defense alert. The battalion's Redeye gunners selected positions which covered likely air avenues of approach into the area.

Meanwhile, at Baden Soellingen Air Base in the German Black Forest, Canadian fighter pilots from the 421st and 439th Tactical Fighter Squadrons were scrambled for the mission. Prior to noon, the pilots received a ground situation briefing from their US ground liaison officer and an intelligence update from Canadian Wing Intelligence.

At 1340 hours, the Redeye teams announced the first sighting of hostile aircraft. The daring Canadians



Two Redeye gunners of the US 2d Battalion, 377th Field Artillery (Lance), prepare their Redeye shoulder-fired, ground-to-air missile for a simulated launch at a Canadian F-104. (Photo by CPT Harvel Ayers, Chaplain, 2-377th FA)

streaked into the target area at low level to simulate their attack against an enemy missile unit.

On the ground, the Lance missilemen's reaction was both immediate and intense. Men dove for cover and took aim with whatever weapon was available. The deployed Redeye teams tracked the jets and simulated launch of their shoulder-fired, ground-to-air missiles.

The Canadian F-104s continued their attacks, always in pairs, always with a different tactic, and always from a different direction. Sometimes the Canadians came low and fast, and sometimes they used diving attacks or strafing runs. In all, the engagement between the two units lasted 50 minutes, giving everyone ample opportunity to practice their trade and refine their tactics.

The full results and evaluations are still being exchanged between the Canadians and Americans; however, plans are already underway to conduct similar joint training exercises in the near future. (MAJ Paul Green, 2-377th FA)



FORT BRAGG, NC — The colors of the 8th Field Artillery Regiment are unveiled at a ceremony at the Fort Bragg Main Post Parade Field. Both the 1st Battalion, 6th Field Artillery (now 5-8th), and the 1st Battalion, 73d Field Artillery (now 3-8th), were redesignated as members of the 8th Field Artillery Regiment. (Photo by Jerry Healy)



BERGEN-HORNE, WEST GERMANY — Private First Class Mark Wilson of Battery C, 94th Field Artiller, stacks projectiles during a training exercise which would determine which gun crew was the best in the battery. (Photo by Brian Farman)

Realistic Firefinder training

GRAFENWOEHR, GERMANY — A way to make live-fire training more realistic for target acquisition assets has been the wish of many an S3. During a recent density training period for the 2d Battalion, 20th Field Artillery, 4th Brigade, 4th Infantry Division (Mechanized), this wish became a reality.

The AN/TPQ-36 radar (Firefinder) comes equipped with a software training program, the programmed operator proficiency trainer (POPT), which simulates artillery and mortar trajectories and allows the operator to practice operational procedures and techniques necessary to locate and process hostile weapons locations. Although the POPT is a very realistic training medium, it does not permit the operator to transmit a hostile location to TACFIRE and have TACFIRE initiate a fire mission. This step is important in the processing of a hostile weapon location and requires operator training in the Firefinder report mode message formats sent to and received from TACFIRE.

So, the problems to solve were how to have the radar detect a simulated hostile weapons location that could be processed to TACFIRE and how to have a live-fire mission initiated as a result of the location. All of this and safety too! That simulated weapon had to be detected within the artillery impact area.

In October of last year, the 2d Battalion, 20th Field Artillery (Bobcats), formulated and executed a plan that allowed the battalion Firefinder radar and TACFIRE to join (interface) forces and conduct a real fire-for-effect mission on the Grafenwoehr training range. The Firefinder radar was placed in the hostile (fire) mode of operation and oriented on the ever familiar Grafenwoehr impact area, grid 0409. The system was emplaced so that the shrapnel of an artillery round impacting at grid 0409 would appear to be a volley of hostile weapons fire out of that location. It was, in essence, a false target location,

detected by the radar as an actual hostile weapon location.

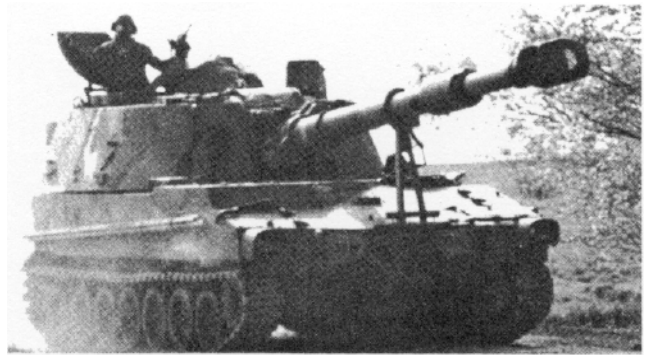
Once the target was generated, the Firefinder operator performed the necessary height corrections and entered the location to permanent memory. The hostile location was then sent to the TACFIRE shelter over digital FM communications. The data was processed at the 2d Battalion, 20th Field Artillery, TACFIRE shelter; and a fire-for-effect mission was passed, via digital communications, to B Battery, 2d Battalion, 20th Field Artillery, where the target was engaged. To increase the realism, the B Battery fire direction center provided the radar with friendly fire data necessary to conduct adjust missions. When the B Battery mission was fired, the round was tracked; and a subsequent adjust mission was generated by the radar. The adjustment received at the TACFIRE shelter was in the form of universal forward observer corrections (i.e., right . . . add . . . etc.).

During the remainder of the live-fire exercise, each of the report modes linking the Firefinder radar to TACFIRE was exercised. The day's activity marked what was believed to be the first time a "hostile" target was located, processed, and fired on by a combination of Firefinder and TACFIRE in Europe. It was a high point in battalion- and section-level training for the 2d Battalion, 20th Field Artillery. It proved that the Firefinder and TACFIRE magic does work. (CW2 Thomas Curran)

CW2 Thomas Curran's report on his training technique was so interesting that it came to the attention of the TRADOC system manager for Firefinder, the Firefinder project manager, and the US Army Field Artillery Board. These experts tested the technique and concluded that, while the technique provided realistic training opportunities, the resulting 20 percent reliability in target detection made the technique inadvisable from the perspective of training area safety and as a means of accurate impact location for ARTEP scoring. —Ed.



The M577A1 command post vehicle leads the way to the site for the 2d Battalion, 5th Field Artillery, all-NCO field training exercise.



An M109A2 self-propelled howitzer follows in line with other conveying vehicles to the next site during the 2d Battalion, 5th Field Artillery, all-NCO field training exercise.

Field training without officers?

FORT RILEY, KS — Firing batteries do not usually operate without the guidance of officers; but a special field training exercise marked the beginning of a new experience for many of the noncommissioned officers of the 2d Battalion, 5th Field Artillery, because they conducted such an exercise last May without the assistance of their battalion officers.

The objective of the exercise was to give the gun batteries practice in hipshoots and hasty displacements. After the hasty move-outs to different occupation areas, personnel at the new sites camouflaged their vehicles and laid the battery. Overall, the three-day field training exercise was a big success; and the NCOs expected even better results in their future all-NCO exercises. (Story and photos by SP4 Joseph P. Satterthwaite)



An NCO performs an end-for-end test with the gunner's quadrant during the 2d Battalion, 5th Field Artillery, all-NCO field training exercise.

D-TAB trains at Fort Chaffee

FORT RILEY, KS — At 0400 hours on a day last spring, Battery D (Target Acquisition), 25th Field Artillery, 1st Infantry Division Artillery, was alerted to move out at 0900 hours on the following day for a two-week emergency deployment readiness exercise. The destination was Fort Chaffee, Arkansas, which was a two-day, 490-mile tactical convoy away. Thirty-two vehicles, divided into three serials, made the trek with an overnight stop at the Ponca City, Oklahoma, National Guard Armory.

The exercise scenario allowed the two sound/flash ranging platoons, three AN/MPQ-4A sections, the AN/TPS-25A section, and the processing section to locate, identify, and analyze enemy targets. The warning operation orders for the first half of the exercise had been prepared earlier and were based on ARTEP and SQT tasks identified by platoon sergeants, platoon leaders, the first sergeant, and the commander.

It rained steadily the first two days of the exercise; and the unit learned some lessons about the capabilities of its vehicles on wet roads, trails, and open fields. Recovery was a word with which every driver was intimately familiar by mid-week.

The main TACFIRE computer remained at Fort Riley, but the platoons and sections (except for the survey section) were linked with the processing van's variable format message entry device via the digital message device and thus got a good feel for some aspects of the TACFIRE environment.

As always, the survey platoon was busy throughout the exercise. The first priority for survey (as decided by the TAB commander) was sound/flash, with emphasis on the microphone bases; second priority went to the AN/TPS-25A radar section. The survey platoon split up so that one survey section lived and worked with one sound/flash platoon. T-2 theodolites and distance-measuring equipment were the mainstay for one section, while the other section relied on T-2s, subtense, and taping methods. Both sections used the TI-59 computer without the survey chip for their computations. The wet weather slowed the surveyors down, but they managed to get control to where it was needed in the allotted time.

The survey plans were a real challenge because the trig list of the second-, third-, and fourth-order survey

points was questionable at best. The surveyors spent most of their time on the two microphone bases; so hasty survey techniques became second nature to personnel in the observation posts and radar sections. The radar sections made extensive use of simultaneous observation to bring in fifth-order azimuth control.

Each sound/flash platoon set up its own processing center, six-microphone base (usually two-second), and two observation posts. Each platoon moved at least twice, and the observation posts moved four or five times. Meteorological balloons were flown every four hours from one of the command post locations. Both the survey and tactical wire teams kept very busy.

The attached mortar platoon from the 4-37th Armor Combat Support Company had received a healthy ammunition allocation of 800 4.2-inch mortar rounds which gave the AN/MPQ-4A radar sections ample opportunity to train 17B personnel on high-angle weapons location. Even the inexperienced operators were getting accuracies of 10x30 by the end of the exercise.

Each move by the mortars prompted a digital message by the processing section to indicate a new looking azimuth and cueing time for one or all of the radars. Since each section relocated at least five times, the warrant officers were able to train the section chiefs and assistant section chiefs on site selection, proper camouflage techniques, security requirements, and hasty survey. (Proper camouflage for the Q-4A radar antenna was difficult because of a temporary shortage in radar transparent camouflage screens and the inordinate height at which the antenna had to be set to allow movement of the antenna. Effective use of the terrain, especially the wooded areas, helped negate these difficulties.) All sections cut their setup/march order times in half during the 10-day field training exercise.

The TPS-25A section found maintenance the biggest challenge throughout the exercise; but the soldiers still found time to improve their camouflage techniques, site selection, orientation, and use of the digital message device.

Other lessons learned in this exercise were:

- **Rations.** The platoon sergeants were tasked to pick up

A-rations twice a day and deliver them to sections that were sometimes 10 to 12 kilometers apart. One A-ration meal a day would have been sufficient and much less of a logistic burden on the platoon.

- **Recovery.** Throughout the exercise, the Arkansas clay took its toll. With no tracked vehicles available for recovery, the M543 5-ton truck, together with manpower and innovative winching, was the only resource. Temporary losses of vehicles, however, really emphasized to platoon sergeants and leaders the importance of setting priorities and sticking to them during emplacement.

- **Security.** Each platoon had enough people for 24-hour operations, but security requirements sorely tasked each section to man its crew-served weapon 24 hours a day. It might be better for maneuver units to provide both air and ground security, but coordination requirements would be significant.

- **Split operations.** A two-second microphone base has a very limited range for accurately picking up breaks from a 4.2-inch mortar round impact. Because of this range limitation and the size and shape of Fort Chaffee's impact area, the mortar platoon was forced to perform split platoon operations, which doubled the logistical and personnel problems.

- **Communications.** As always, the range of the AN/VRC-46, AN/GRC-160, and other available radios and the number of nets available impacted on the operation. Each sound/flash, survey, and radar platoon had its own voice net. All digital communication was on one net — the TAB command/intelligence net, which was the net most used throughout the exercise. Even the very limited tracked vehicle traffic tore up the wire laid from observation posts, command posts, and microphone bases; such experiences highlighted the real need for a radio data link.

The Fort Chaffee exercise provided an excellent opportunity for D-TAB to train on emergency deployment operations; battery-level field mess operations; field supply, maintenance, and POL operations; recovery operations; tactical convoy procedures; battery-, platoon-, and section-level ARTEP tasks; and operations at the marshalling and tactical assembly areas.

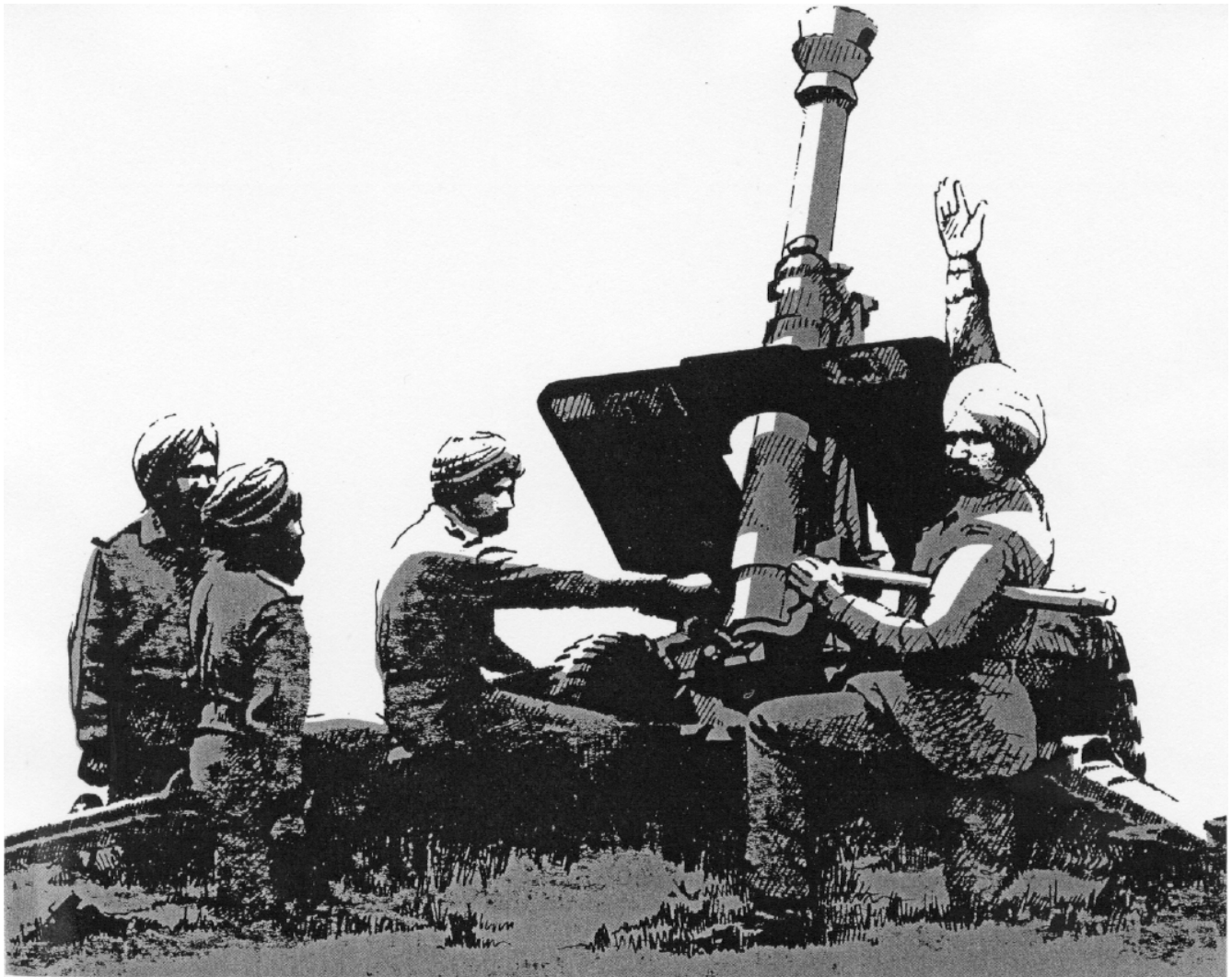
Regimental time on target

GRAFENWOEHR, GERMANY — The European chapter of the 5th Field Artillery Regiment conducted what may be the first regimental time on target (TOT) at Grafenwoehr, Germany. Both the 3d Battalion, 5th Field Artillery, 210th FA Brigade (8-inch, self-propelled, from Nuremberg, and the 4th Battalion, 5th Field Artillery (155-mm, self-propelled), 1st Infantry Division Forward, from Neu Ulm, were training separately at Grafenwoehr last year when the two battalion commanders decided to evaluate the massing of the regiment by firing a TOT.

Each battalion has the ARTEP requirement to conduct a TOT with a reinforcing unit during which all rounds are fired at the same target at a predesignated time; and all must land in the allowable radius of error around the

target, impacting within plus or minus three seconds. The night before the TOT, the commanders designated 1800 hours as H-hour. At 1755 hours both battalion S3s made contact and conducted a time hack. At approximately 1759 hours, the battalion fire direction centers gave "shot" to the observers; and all eyes were trained on the target. At 1800 hours (plus or minus three seconds), 36 rounds devastated the enemy target, bringing a resounding cheer from the hill and leaving the 5th Field Artillery Regiment's mark on the Graf impact area.

After the exercise, the officers of both battalions participated in a regimental officers' call at the Graf Officers' Club; and each officer signed the newly created regimental scroll which will record the names of members of both battalions and will be used for roll call during future functions. (CPT William H. Cleckner IV, 4-5th FA)



Jawans, Sahibs, and Firepower

by First Lieutenant Kevin Conley Ruffner

Independent India's Regiment of Artillery is almost 50 years old, and during that time it has amassed considerable combat experience. Using a melting pot of American, European, Soviet, and Indian doctrine, tactics, and equipment, it has provided fire support to the 950,000-man Indian Army in conflicts ranging over some of the more difficult parts of the country's 9,500 miles of border. Western field artillerymen would be remiss if they did not gain some familiarity with the history and current organization of the jawans (soldiers) and sahibs (officers) of

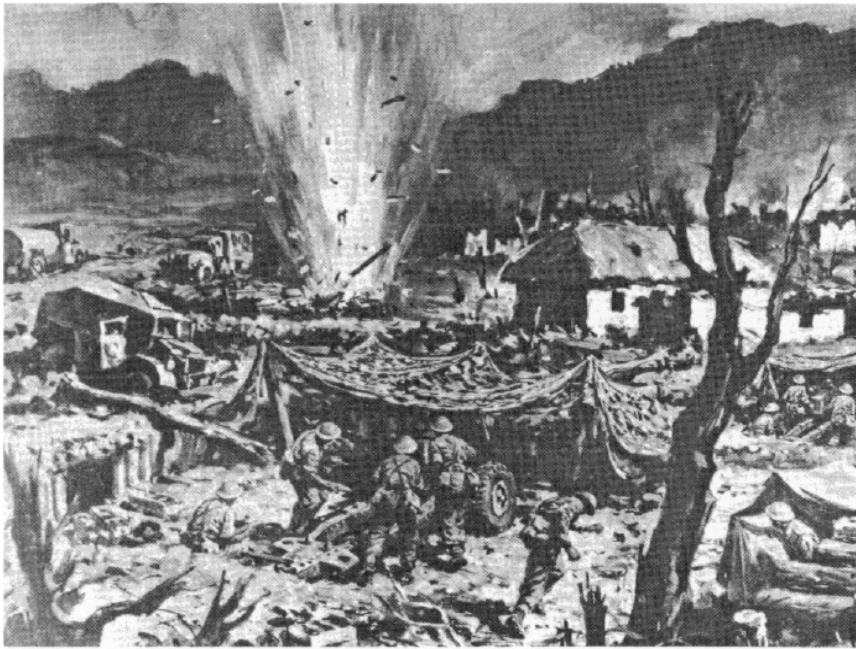
this branch of the Indian Army which has performed so well in both large-scale conventional warfare and anti-insurgency operations.

General history

Though the use of artillery in India is at least four centuries old, the Indian Regiment of Artillery did not come into existence until 15 January 1935. In the 17th and 18th centuries, the British mastery of artillery enabled the East India Company, a British mercantile firm, to subjugate the various Indian princes and

hasten the decline of the Mogul Empire. With the defeat of French forces at Plassey in 1757, the rule of the East India Company was assured; and, over the next 100 years, the Company recruited both Europeans and Indians to serve as artillerymen in its three armies located in Bengal, Madras, and Bombay.

When British rule in India was threatened in 1857 with the sudden upheaval of the East India Company's native troops (Sepoys), the vicious fighting in the mutiny that ensued forced the British government to



Photos courtesy Brigadier Sabharwal

Direct fire during the battle of Bir Hacheim, 1942.



Defense of a gun position during the battle of the Kaladin Valley, Burma, 1944.

abolish the East India Company, disband the Indian artillery units, and assume direct rule in India. The British felt that the Indian possession of modern weaponry was a potential threat and thus maintained the Indian Army as only a light infantry and cavalry force commanded by British officers. A few batteries of Mountain Artillery within the Royal Artillery retained Indian gunners, and a few Indian princes kept their artillery weaponry; so some native Indians remained familiar with field artillery operations.

During the last half of the 19th century, the Mountain Artillery was involved in an action reminiscent of Rudyard Kipling's *Gunga Din*. The artillery, equipped with the 7-pounder R.M.L. gun, supported British and Indian troop movements in the Northwest Frontier (now Pakistan) and into

Afghanistan. The campaigning was extremely difficult with short, bloody skirmishes in all variations of temperature. Pack mules struggled over rocky cliffs to carry the mountain guns, but often the artillery was unable to bring effective fire on the Pathan warriors because they would vanish as soon as the artillery struck.

At the turn of the century, the Boer and the Russo-Japanese Wars forced the British to modernize their Mountain Artillery; so the British replaced the 2.5 R.M.L. gun which had entered service in 1889 with a new 10-pounder gun. The mountain field artillerymen came down from their mountain stations to train with British field artillery on the plains of India and to improve their overall knowledge of gunnery.

With the outbreak of World War I in 1914, the Indian Army mobilized for service away from home. The Mountain Artillery, in the meantime, grew from 12 batteries to over 30 batteries. The gunners fought in many campaigns in Africa, Palestine, and Mesopotamia but did not serve on the Western Front.

The inter-war period saw the inevitable decline of the Mountain Artillery, and it was returned to the Northwest Frontier. The British, however, realized the need for continual training and in 1923 established the School of Artillery at Kakul. The Indian government eventually decided to expand its artillery into an official branch of the Army; and on 15 January 1935, the Regiment of Artillery was formed. The first unit of the new branch was "A" Field Brigade, which consisted of four batteries. The Brigade was commanded by British officers, but this time

some newly-commissioned Indians were allowed in the junior grade ranks. In 1937 the battle-hardened Mountain Artillery transferred to the newly formed Indian Regiment of Artillery.

The Regiment of Artillery experienced its baptism of fire in World War II. The Indian Army had expanded in less than six years to over two million men, all of whom were volunteers. The artillery, likewise, grew tremendously and organized along British lines. New training centers were built; and modern weapons, such as the 25-pounder and the 40-mm Bofors antiaircraft gun, were introduced into the Indian artillery. The Regiment of Artillery proved its valor on the battlefields of North Africa, Italy, and Burma as well as other locations. On one occasion, in May 1942, an Indian field regiment held off two German Panzer divisions of Rommel's Afrika Korps at Bir Hacheim. Despite the Indian unit's heavy casualties and the loss of 16 guns, 64 German armored vehicles lay burning in the desert sands that day.

Although starting from scratch, the Indian artillery raised an amazing total of 12 mountain regiments, 11 field regiments, 7 antitank regiments, 2 medium regiments, 2 coast regiments, 14 heavy antiaircraft regiments, 15 light antiaircraft regiments, and 1 survey regiment. The superb conduct of the Indian Artillery during World War II earned the King's pleasure; and, in 1945, he granted them the title of "The Royal Indian Artillery." The Indian Artillery relinquished this title after India gained her independence in 1947, but the Pakistani Artillery opted to retain its royal charter.

India's independence from Great Britain was a wrenching affair for both civilians and military personnel. The Indian Empire was partitioned into two nations — India and Pakistan — which meant that the government as well as the Indian Army would be torn apart. Units were altered on the basis of religious identity, and officers and men had to choose between the armies of the two new countries. For the Hindu and Sikh soldiers there was no option — the Pakistani Army was open for Muslims only; so many Muslims left the Indian Army for the Pakistani Army. One-third of the units and equipment of the original army became Pakistani, and the remainder went to the Indian Army. Corresponding to this plan, the artillery was separated into 8½ Pakistani regiments and 18½ Indian regiments.

The next 15 years saw the Indian artillery serve in Kashmir against Pakistani tribesmen and in Korea, Indo-China, and Egypt as a neutral military United Nations peacekeeping

force. In 1962, however, the Indo-Chinese border, which extends for hundreds of miles, erupted in war. For years the Red Chinese had denied the boundary and consistently encroached on Indian territory. In 1950, China occupied Tibet; but the Indian government did not complain. Then the Chinese Army began serious preparations to invade India's border provinces. Several skirmishes occurred in September 1962, and the following month the Chinese launched a full-scale assault along the entire border. These onslaughts, similar to the Chinese and Korean attacks in Korea in 1952, swamped Indian defensive positions. The Indian artillery was hindered to a great extent by a lack of mobility, inability to concentrate firepower, and the freezing of lubricants in the harsh climate. The Chinese mortars outgunned the Indian artillery because they were easier to maneuver and capable of higher rates of fire than the outdated Indian guns and mortars, many of which could not be transported in the Himalayas where few roads were available and the altitude reached 19,000 feet. The Mountain Artillery discovered that its trusty mule, a European breed, was no match for the high elevation. Within a month after launching the invasion, however, the Chinese called off their attack and withdrew. The cost was dear for the Indian Army because nearly 10,000 of their men were killed, wounded, or captured.

The Indian government was shocked by the Chinese attack, but it jolted the Indians into recognizing the need for a strong defense. The army, in particular, was to be rearmed with modern weapons and strengthened in overall manpower and the number of units. A new organization, the Mountain Division, was set up to be specifically trained and equipped for mountain warfare; and its artillery would be lighter and easier to transport.

No sooner had the army begun to institute the changes under the Five-Year Defense Plan when hostilities erupted with Pakistan. The 23-day war in September 1965, a short but bloody affair, resulted in one of the largest tank battles since World War II. The fighting was not contained in Jammu and Kashmir, scene of the 1947-48 strife, but also reached Punjab, which was farther south. The Indian artillery defended the northern sector and also supported the advance of the Indian Army into Pakistani territory. At the Ichhogil Canal near Kasur, the Indian artillery had a devastating effect on the Pakistanis. Indian troops destroyed countless Pakistani tanks and inflicted heavy casualties at Usal Uttar. The



The 3d Indian Field Regiment (5 Madras Field Battery) in action during the Battle of Moirang, 1944.

Indian Army used antitank weapons, armor, and artillery with uncanny accuracy and isolated the enemy infantry from their M48 tanks, which allowed the M48 tanks to be picked off at will. The Pakistani counteroffensive was stopped in its tracks, and the fighting soon ceased.

The 1965 war was a great boost for Indian morale, for it demonstrated that the Army was rebounding from the 1962 debacle. The Indian Army continued to modernize and, because of the Anglo-American arms boycott in 1965, turned to the Soviet Union for much of its new weaponry. Simultaneously, increased defense spending helped domestic arms production. Many European arms and vehicles, for example, were now being built in India under license. The artillery's power was enhanced with the purchase of equipment such as the Soviet 152-mm D-20 medium gun.

Within six years after the 1965 war, India had extensively reorganized her army and was able to meet the challenge posed by a two-front war in East and West Pakistan. Throughout 1971, the political situation in East Pakistan had deteriorated to the point that it threatened to destabilize India's eastern states. The repression of the Bengalis by West Pakistan was extremely harsh, and a sizeable portion of the East Pakistan population fled to India. Taking matters into her own hands, India launched a massive invasion of East Pakistan, now known as Bangla Desh. The Indian Army in the west was mainly employed as a holding force against Pakistani attacks, though limited operations were conducted to improve the tactical situation. The

Bangla Desh campaign was a masterful example of a combined arms operation. The Indian artillery suppressed enemy defenses as the infantry and armor units circumvented the position to continue the push to Dacca, the main objective. It had proved itself a force with which to be reckoned.

Current organization

The Indian Army now is organized into five geographic commands; and within each of these commands are corps, divisional, and independent brigade-size units. At present, the Army is composed of 2 armored divisions, 17 infantry divisions, 10 mountain divisions, 5 independent armored brigades, 1 independent infantry brigade, and 1 parachute brigade. Attached to these formations are divisional and corps artillery assets and 14 independent artillery brigades. Approximately 25 percent of the Indian Army is poised on the Indo-Chinese border while the remainder faces Pakistan or is in reserve.

The Indian Regiment of Artillery is one of the most complex and diverse branches of the Army. Although it still retains its traditional designation of regiment, the Indian artillery organization is similar to that of a corps. Within the artillery are field regiments, medium regiments, heavy regiments, heavy and light anti-aircraft regiments, mountain regiments, coastal defense units, and survey and aerial observation posts. The artillery employs over 20 different weapon systems, ranging from old British World War II guns to new weapons designed and manufactured by India.



On the trail with the Indian Mountain Artillery.

At Army headquarters level, India's artillery falls under the Director of Artillery, who is responsible for organization, training, and inspection of all artillery units. Another function of the Director of Artillery is the procurement and maintenance of artillery equipment and ammunition. At the command level, a major general coordinates artillery support in conjunction with other command units; for example, he can assign the independent artillery brigades to the command's various corps. The corps artillery is similar to an artillery brigade and supports any of its divisions. The basic Indian artillery unit is the field regiment, which is the backbone of the divisional artillery. Like a US direct support 105-mm field artillery battalion, the field regiment has three firing batteries of six (sometimes eight) guns. A lieutenant colonel commands the regiment, with majors commanding the batteries. Altogether the field regiment has 32 officers and 540 enlisted men.

The Army is also in the process of building up stocks of Indian designed and manufactured equipment. (The *Washington Times* recently reported that India plans to make its first major arms expenditure from the United States in two decades. India has proposed to purchase nearly a billion dollars worth of M198 155-mm howitzers, accessories, and ammunition. This deal, if approved, will greatly modernize the Indian Army.) The equipment of the Indian artillery varies greatly depending on what type of division it supports. The armored divisional artillery is the only self-propelled artillery in the Indian Army; the infantry and mountain division artilleries are either towed or pack-transported.

The main gun of the field regiments of the two armored divisions is the Value Engineered Abbot, a British self-propelled 105-mm gun that entered service in the 1960s. It is a simpler version of the Abbot which is being phased out of the British Army. In addition, some artillery units still employ the self-propelled British-Canadian Sexton with its 25-pounder gun which dates back to World War II. India is reportedly designing a self-propelled gun consisting of a Soviet 130-mm M-46 field gun mounted on the chassis of the Indian Vijayanta tank. Only a few have been produced, but it is believed that this new self-propelled gun will fire high-explosive and armor-piercing high-explosive projectiles and will carry about 30 rounds.

The infantry division, which forms the teeth of the Indian Army, has about 16,000 men. The armament of the infantry division artillery is even more diverse than that of the armored division. Until recently, the standard gun was the venerable British 25-pounder which saw widespread action 40 years ago. India's modernization drive has replaced the 25-pounder to a great extent with Soviet, British, or domestic weaponry. Among these are the Russian 100-mm M1944 and M1955 field guns and the British 105-mm light gun. There are suggestions that the 25-pounder will finally be retired when the new Indian 105-mm field piece is issued. Complete details on this weapon have not been released; thus knowledge is rather sparse, but the design is believed to be based on that of the Abbot gun.

The newest of India's divisions, the mountain division, is specifically organized for high altitude, sub-zero degree

warfare. Its artillery is somewhat similar to that of the infantry division artillery except for the method of transport. The mountain regiments, descended from the old Mountain Artillery, count in their inventory the Italian 105-mm Model 56 pack howitzer and the Yugoslavian 76-mm M-48 mountain gun, better known as the Tito Gun. Some mountain batteries may still have the American 75-mm M116 pack howitzer, another World War II veteran. However, since the early 1970s, India has produced the 75-mm howitzer 75/24, which can be broken down for transport and which comes in two models, each with a variation in the shield.

At one time, the bastion of the medium artillery regiments at divisional and corps levels was the British 5.5-inch gun; but this gun has been replaced by the Soviet 130-mm M1946 and 152-mm D-20 guns. (The medium regiment is comparable to a US 155-mm battalion.) Also found at corps level are heavy artillery units with the Soviet 180-mm S-23 gun and the American 8-inch M115 howitzer. Antiaircraft weapons are found at the corps level and in many of the independent artillery brigades. The Indian antiaircraft system is broken down into light and heavy regiments, depending on a unit's mission and equipment. The main gun for the light antiaircraft regiment is the 40-mm M48 L/70, a Swedish weapon that is also produced in India. The mobile light antiaircraft units have the Soviet ZSU-23-4 self-propelled antiaircraft gun, which is called the Schilka in India. The light antiaircraft regiment has three batteries of 18 guns each, for a total of 54 weapons. The heavy antiaircraft regiment retains the superb British 3.7-inch heavy antiaircraft gun as well as the British Tigercat SAM and the Soviet SA-6 Gainful missile.

Artillery transportation in the Indian Army is as varied as its weaponry. Among the domestic prime movers is the Shaktiman (4x4) 5,000-kilogram truck, an Indian version of the West German MAN. Transportation for the mountain regiments remains as it always has been — the mule. After the 1962 war, India began to breed its own mules to replace the European-import pack mules.

Currently the Indian artillery is undergoing extensive modernization in its fire direction system, and apparently some form of computerization is being utilized. The Indian fire direction officer is known as the gun position officer, and he is usually a lieutenant. Forward observation officers are employed at the maneuver company level to provide fire support. The Indian

Regiment of Artillery is also responsible for the training of officers and men to serve in aerial observation posts. About 75 aircraft, Krishak and Auston 9, are manned as air observation posts. Survey and counterbattery detection are conducted by corps units in conjunction with personnel at lower levels.

The soldiers

The average Indian soldier, or jawan, comes from a predominantly rural background. He usually enlists in army at the age of 17 for an initial active duty commitment of seven years, which can later be extended to 15 or 28 years, depending on promotions. The recruit's basic training is demanding since physical conditioning is emphasized. Artillery recruits undergo their 10 months of basic training at either the Artillery Centre at the Nasik Road Camp near Bombay or at Golconda in Hyderabad. From there the young soldier, as a new gunner is called, will attend further training in his specialty. Field and antiaircraft artillery personnel move to the School of Artillery at Deolali, only a few miles from Nasik Road Camp. Mountain gunners continue their training at the School of Mountain Warfare in Darjeeling, while coastal artillerymen proceed to the Coastal Artillery Wing of the School of Artillery at Colaba near Bombay. The majority of Indian artillery jawans serve in field, antiaircraft, or mountain artillery units because there are only a few coastal batteries in service at the port cities of Bombay and Madras.

After his second period of training, the jawan reports to his regiment where he serves as a gunner class II. By his fourth year he may have reached the rank of gunner class I, the equivalent of an American E2. Pay in the Indian Army is low by western standards, but so is the cost of living. A recruit receives about \$40 to \$60 a month in addition to his housing, clothing, and medical requirements. Military service is held in high regard throughout India as it offers the soldier and his family a steady income, job security, and educational opportunities. For every one man who enlists in the Indian Army, another eight are rejected. It is even reported that bribery of recruiting personnel by hopeful recruits is a problem.

After the 1857 Mutiny, the British began to take credence in the "martial races" theory. According to this Victorian belief, the men of South India and Bengal were undesirable due to certain physical defects. The men from northwestern India, on the other hand, were highly praised for their

soldierly qualities. Thus, the British Indian Army recruited mostly from such groups as the Sikhs, Gurkhas, and Rajputs. However, upon India's independence, Indian leaders demanded that the Army be reflective of the entire population. To this effect, recruiting was expanded to include all religions, castes, and ethnic groups. Artillerymen are now recruited from all parts of India, but the "class company" style of assignment is used; i.e., each of the three batteries in an artillery regiment is formed of soldiers from different religious or ethnic groups. Thus, the jawan is usually assigned to an artillery battery composed of men from his section of the country. The Indians believe that this enhances esprit de corps and eases the soldier's adjustment in the military.

If the jawan is promoted through the noncommissioned officer ranks, he may then enter a position unique to the Indian and Pakistani Armies — the status of the junior commissioned officer (JCO), a legacy from Imperial days. The JCOs (there are three different ranks) fill the junior officer slots and tend to be a cultural bridge between the regular officers and the enlisted men. The JCOs are the experts of their regiments, having served with the same units their entire careers; and most of them possess more years in service than their commanding officers. In the United States Army, the JCO might be compared in position and experience as a cross between the command sergeant major and the warrant officer.

The Indian Army officer, in contrast to the enlisted man, comes from an educated, well-to-do urban environment and often has little in common with his troops. Despite strict separation between the ranks, loyalty and trust in the regiment are fundamental. The majority of artillery officers receive their commissions after attending three years of schooling at the National Defense Academy with candidates from all services. In the fourth year, the "gentleman cadet" enters the Indian Military Academy in Dehra Dun for a final year of education. In the last semester, branch selections are made on the basis of class rank. The artillery officer goes to the School of Artillery at Deolali for his basic school and then is assigned to an artillery regiment. As in most armies, the Indian Army places great emphasis on education and training for its officers. Higher ranking officers continue their education at such institutions as the Defense Services Staff College and the National Defense College to improve their knowledge of military skills and civil/military relations.

Some challenges

The Indian Army has been described by many observers as being more British than the British Army itself. For example, the Indian Army still follows the traditional customs of previous centuries and, even more essential, still believes the military is the servant of the people. Indian Army uniforms, insignia, mess customs, and even the idea of the regiment show the British heritage. Perhaps the most ironic reminder of the colonial days is that Indian officers are still addressed as "sahib" by their troops. This old Hindu title, meaning "master," was used by the British to affirm their power; and it is surprising to find it still in use in the Army.

A major drawback of the Indian Army, including its artillery, is that it is severely lacking in mechanization and mobility. As one Indian defense official commented: "It's a footslogging, rifle-wielding army. If we threw our men against an equipment-oriented army, we'd be offering them for slaughter." The artillery lacks sufficient numbers of armored vehicles, and the very diversity of its equipment poses administrative and logistical problems. In addition, the challenge of mastering the complexity of mechanization and computerization is increased because of the lack of skills of many jawans. Extensive training is required to teach soldiers basic educational and mechanical skills in a nation where male literacy is estimated at only 30 percent. With increased recruitment from all over India, language barriers are exacerbated in the Army. Hindi is the national primary language, but there are another dozen officially recognized languages and hundreds of other languages and dialects. As a result, English is often spoken by the officers and JCOs.

Despite its deficiencies, the Indian Army Regiment of Artillery has proved, in the final measure, to be a top fighting force. It has stood beside the infantry and armor in every mission. Akbar the Great, the powerful Moghul Emperor in the 16th century, described his artillery as "the locks and keys of the Empire." The modern Indian Regiment of Artillery remains a steadfast defender of the world's largest democracy, a 20th century "lock and key."



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TAKE OFF WITH THE MAY-JUNE ISSUE:
The jet set sees close air support from a higher plane.