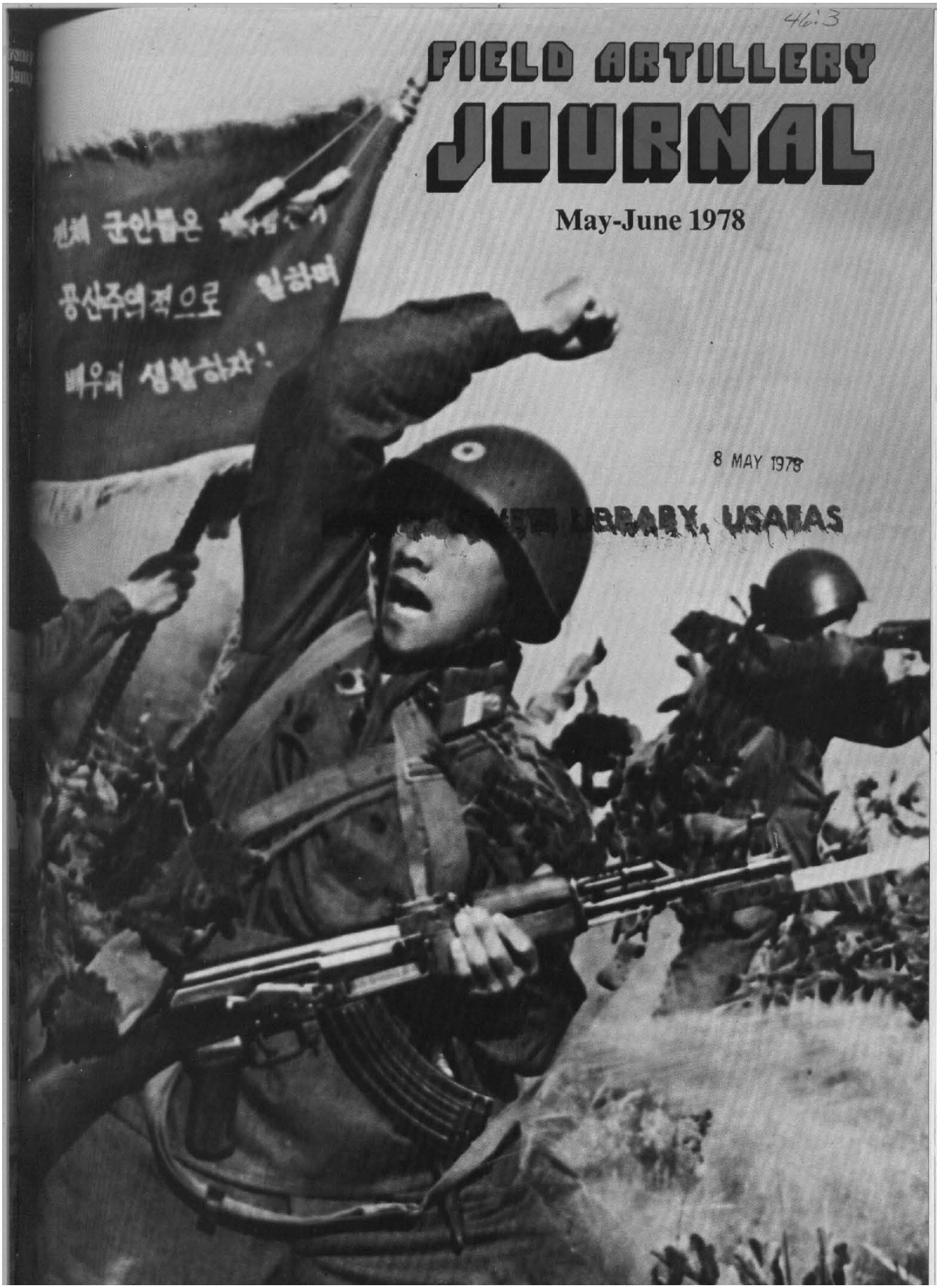
FIELD ARTILLERY JOURNAL

May-June 1978



FIELD ARTILLERY JOURNAL

Volume 46 **May-June 1978** **Number 3**

The *Field Artillery Journal* is published bimonthly at the US Army Field Artillery School for the same purpose stated in the first *Field Artillery Journal* in 1911:

"To publish a Journal for disseminating professional knowledge and furnishing information as to the field artillery's progress, development, and best use in campaign; to cultivate, with the other arms, a common understanding of the powers and limitations of each; to foster a feeling of interdependence among the different arms and of hearty cooperation by all; and to promote understanding between the regular and militia forces by a closer bond; all of which objects are worthy and contribute to the good of our country."

Funds for the printing of the publication were approved by the Department of the Army, 1 September 1973.

All articles and information submitted are subject to edit by the *Journal* staff; footnotes and bibliographies may be deleted from text due to limitations of space.

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Cover photo spotlights a two-part article on North Korean artillery. Back cover is a drawing by Ed Chestnut commemorating the US Army's 203d birthday, June 14.

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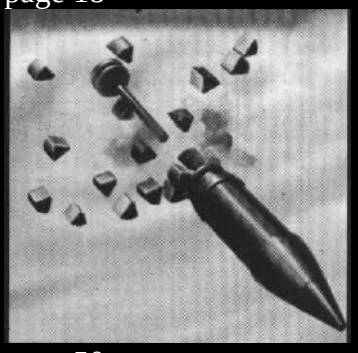

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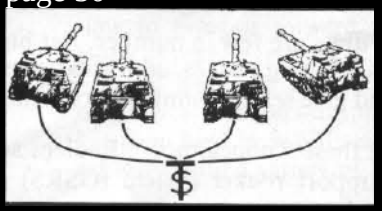

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On The Move . . .

by MG Jack N. Merritt

This summer we will see a dramatic change in the conventional combat equation in Europe with the arrival there of an improved nonnuclear warhead for the Lance missile. In the past, both of our Field Artillery missile systems have had only a nuclear capability. This was fine for Pershing because of its great range, but if we hoped to keep the war nonnuclear, we needed the extra firepower of Lance in the conventional mode. Also, Lance's range extends far beyond the range of cannon artillery. This added conventional capability is truly significant when you survey the Warsaw Pact threat and try to determine how to take his attacking formations under conventional fire at the earliest possible moment and at the greatest range. We can now expect the Lance units to join the battle *first*, rather than hoping they would *never* fire.

Advances are also being made in our largest caliber weapon, Pershing. We will soon complete advanced development testing of Pershing II which modifies the current Pershing Ia in several ways.

Most important is the new guidance system which will make its targeting the most accurate weapon system in the world when viewed from a CEP/range point of view. Using an onboard computer to assist in terminal guidance by radar mapping, Pershing will deliver a warhead with such accuracy that the idea of neutralizing point targets many miles from the front is now a fact!

Then there is a very vital role Pershing plays in NATO deterrence as part of our nuclear strike program. While this is a mission observed by only a few people on a day-to-day basis, the Warsaw Pact is well aware of our high state of readiness to deliver a powerful payload deep into their homeland. The others who are aware of this important function are the Pershing missilemen themselves who pull "quick-reaction alert" duty in the field for extended periods of time.

Missile units are few in number, but big in capability. Our missiles' long-ranges add great depth to the battlefield and give senior commanders great flexibility.

Joining these "noncannon" Redlegs soon will be the general support rocket system (GSRS) personnel. We have not yet determined what MOS the crews will have, but, as with our other noncannon units, the officers will all be in career field 13. This system will deliver such high volumes of destructive power that the firing of one GSRS launcher *load* will surpass the effects of an 8-inch *battalion* firing two volleys.

I say all the above to remind *all* Field Artillerymen of the importance of all the Field Artillery weapons systems. Without any one of our calibers, there would be a sorely felt gap. There is no one caliber that is any "better" or more favored than any other. If there is any perception that tube cannoneers are favored over missile cannoneers, it is due strictly to the numbers involved — 93 Active tube battalions and 12 Active missile battalions, and three calibers of tubes versus two calibers of missiles.

As titular head of the Field Artillery I remind you that there is only *one* Field Artillery in the US Army, it is the most professional group of soldiers in the world — and the missile component carries a mission responsibility far greater than its size.

letters to the editor

"There are improvements to be made in nearly everything we do, if we will but exploit all the resources available to us, including soliciting the ideas of all soldiers, from private to senior general." –GEN Bernard W. Rogers, 17 Aug 76

Planning

The following is some guidance I prepared for battalion operation officers to ease their frustration caused by long range (6 to 12 months) planning of training. It may be of benefit to others:

I want you to consider the importance of planning and the great difference between "planning" and "proper planning." I will not cover the fundamentals of management and planning such as the backward planning process, management by objective, etc., which you have heard about. Those are in textbooks and can be read anytime. What I will discuss are several planning errors which I have encountered.

• Inflexible planning: Ask yourself what the effect will be if the event cannot be conducted as planned. If the effect will be unacceptable, then you need to allow more slack by use of "make-up" scheduling. Since there isn't enough time to "make-up" everything, it must be restricted to critical subjects and events.

• Naive planning: Your plan is going to suffer bumps, bruises and delays. There are always going to be times when priorities will change, requiring adjustment of your goals.

• Intolerant/ selfish planning: This is when a unit has the idea that theirs is the only show in town. Your higher headquarters is concerned with helping all units achieve their objectives, not just one.

• "Once and for all" planning: The planner tries to be "finished" with his plan by doing a thorough and enduring job that will last forever. The truth is, any plan can be kept alive only by constant and thoughtful adjustment and analysis. Like plants, plans tend to die if they are not carefully watered and fertilized.

• Underplanning: The "proper planner" will always have a contingency plan to compensate for shortfalls, increasing the chances of 100 percent utilization of time and capability. Just because plans are on paper, they don't automatically take place. You must notify your higher headquarters that you have "cancelled" because anything that any unit does or doesn't do will affect other units.

• Crashing: No planning or a previous disregard of planning usually results in crashing. Occasionally it happens in spite of some of the best planning. Some people use it as a way of life because it relieves the monotony and it is more challenging and exciting to do something in a hurry and at the last minute. My only comment is that crashing is usually required when a planner/manager has failed to do his job.

• Fishbowl planning: The planner usually did not talk to other unit S3s nor consult all known schedules and plans of higher, adjacent, and lower units and may not have circulated a draft plan for comment — planning that has not been thoroughly coordinated and is doomed from the start.

These comments are not directed at any particular individual or occurrence. We are all probably guilty of each practice at one time or another. I ask that everyone keep these problems in mind and strive to overcome them. In conclusion, I would like to cite *Proverbs* 11:14 in the New English version of the Bible: "FOR WANT OF SKILLFUL STRATEGY AN ARMY IS LOST; VICTORY IS THE FRUIT OF LONG PLANNING."

Patrick R. Hughes
LTC, FA
S3, 24th Inf Div Arty
Fort Stewart, GA

Basic load makeup

I read with interest Captain Starry's letter (January-February 1978 *Journal*). It recalled a recent discussion I had with my son.

Background: My son is an engineer working in a surface weapons laboratory. I am an old FO and later a trains commander in both WW II and Korea. My son has always had an avid interest in large weapons and the military, is often a serious listener to war stories, and is a student of WW II.

I do not recall what started our talk but I mentioned the times I would have liked to use "Willie Peter" [white phosphorus] and it wasn't available. I also mentioned other targets and how I dealt with them using high explosive and various fuzes. Next thing I knew he was lecturing me on the fact that there are all kinds of new ammo for all circumstances. I reminded him I knew that and that I read the *FA Journal*. That stopped the lecture!

My son still insisted that there would be no worry about the type of target or the mission as ammo would be there to take care of it. I started my own lecture then, reminding him that a Field Artillery battalion only had so many vehicles to carry ammo and that supply would only last a limited time. I brought out the fact that, if the battalion were carrying only two or three different kinds of rounds, its effectiveness would be seriously impaired, depending on what situation developed — and resupply takes time. A dump might stock many types, but again it takes time to bring it forward — and the battle might be over.

I told him, that in my opinion, the only logical solution was still the one my battalion used in WWII: carry all high explosive with a variety of fuzes except

that one vehicle would be loaded with special types of rounds—those types dictated by the probable missions in the area at that time. My son realized the problem and our conclusion was simply that it was a problem — a serious one. The only other idea I have at the moment is that selected general support battalions could be designated for certain missions and supplied accordingly.

Regarding another letter in the same issue, I dearly wish General Ott had not used the term "manager." To me that word is as unmilitary as walking around with your jacket unbuttoned and your hands in your pocket. I am inclined to think my old VII Corps CG, General "Lightning Joe" Collins, might agree.

Ralph R. Balestrieri
1LT (Ret), FA
Eatontown, NJ

There is a major analysis underway to try and solve the logistics of ammunition distribution. I, like you, am not fond of referring to commanders as managers, but it is just such problems as the ammo situation you discussed, combined with time and space factors of modern warfare, which require commanders to manage (plan) more and delegate command.—Ed

Calculators and TACFIRE

I was very interested in the March-April issue of the *FA Journal*, particularly the article on use of an HP25C calculator for a firing chart. I have devised a similar program for the HP97 which varies only in details. I would suggest certain advantages to the HP97 or similar machines in that they can provide a tape printout of missions which is invaluable in preventing errors. A hard copy record of missions would be worth the additional cost. The main disadvantage is that the HP97 does not have continuous memory (i.e., it loses the program when it is turned off); however, it can be programed with magnetic cards which is quite an advantage in avoiding errors.

The idea of calculators makes much better sense than TACFIRE for battalions and batteries. I think some objective discussion of TACFIRE would be very valuable since I am beginning to doubt that it is worth the price. Artillery officers I have talked to who have worked with TACFIRE are inclined to agree.

TACFIRE appears to me to have a number of major flaws which will limit its use:

1) Cost: We can't afford to equip all units with it.

2) Generator: Anyone who has had experience with a FADAC 400-cycle generator will agree that this is a problem, especially in poorly trained units which we might have to deploy in an emergency.

3) Size: The layout for a battalion FDC is simply too big and too heavy.

4) Mobility: The ultimate stupidity of going back to a wheeled vehicle for the FDC in a self-propelled unit amazes me.

5) Vulnerability: This goes with mobility. If we are going to survive artillery counterfire, the FDC needs an M577 command post carrier as it now has instead of a shelter that won't stop a fast moving BB.

6) Communications: There are several problems here. First, I understand that the FM radios used must be perfectly aligned to make TACFIRE work. I doubt that this is possible in a combat environment. Second, the character of transmissions from FDCs is going to be very distinctive, allowing ready identification as a battalion FDC by ASA units. Third, I have not seen any comment on vulnerability to ECM, but I suspect TACFIRE does not work too well when jammed. The assumption that wire will do the job in lieu of radio can be contradicted by a careful reading of wire used in previous large scale wars.

I would like to see some serious discussion of these points, but so far I have only seen a typical Army snow job (a la the Gama Goat) in print. I think it is quite possible that we would be better off spending the money on decent sound ranging equipment and other such items mentiond in "On The Move" by Major General Merritt (March-April 78 *Journal*).

Chester P. Carson Jr.
CPT, FA
3-75th Arty (155 SP) USAR
Springfield, MO

Your comments are appreciated. Interest in small calculators continues to grow, and programs for FA use are now available (page 25, March-April 1978 **Journal***).*

Your comments about TACFIRE indicate a basic misconception (shared by many) that TACFIRE was designed to replace the firing chart or to rapidly compute observed fire missions. In future issues, articles from the 1st Cavalry Div Arty which is testing TACFIRE will convincingly demonstrate that TACFIRE's role in fire planning and management of the terribly complex artillery battle of the 1980's is indispensable. For example, during OT III, the 1st Cavalry Div Arty fired 648 live missions in one 18-hour period. During the 12 days of OT III, 15,000 targets were generated resulting in 12,093 fire missions in addition to building 350 fire plans. OT III for TACFIRE involved 10 FA battalions all controlled with the Div Arty TACFIRE set. In the six months TACFIRE has been at Fort Hood, the AN/MJQ15 power plant of two 15-kw generators has been shown to be extremely reliable. During that six months, the TACFIRE was never "unavailable" due to mobility problems. Efforts are underway to "harden" the TACFIRE shelter which is no "softer" than other important vehicles such as radar and RATT rigs. On commo, FM, AM, VHF and wire interfaced well with TACFIRE, including retransmission of digital traffic through extensive electronic warfare. The alignment of FM radios was an initial problem, but was overcome and the problem served to remind communicators of the need for proper operation and maintenance of radios.

These comments are not intended to stifle the debate we welcome, only to share with you some of the facts coming from tough testing at Fort Hood.—Ed.

Bibliographies Available

We have just been advised of new biblographies available for the military writer/researcher.

The following bibliographies may be obtained from the National Technical Information Service, 5285 Port Royal Rd., Springfield, VA 22161.

SB14 ADA029015
Korean Conflict - $4.50

SB30 ADA029017
Vietnamese Conflict - $4.00

SB31 ADA024106
Historical Listing of Schematic Developments in Artillery - $4.00

SB33 ADA024348
Historical Listing of Artillery; Mortars - $4.00

SB34 ADA024294
Historical Listing of Artillery/Guns & Howitzers - $4.00

SB35 ADA024295
Development of Shrapnel - $4.00

SB36 ADA024296
Development of Artillery - $4.00

SB37 ADA018668 (Rev. ADA025169)
1973 Middle East War - $4.00

SB38 ADA031189
Proximity Fuzes - $4.00

SB39 ADA031356
Military Leadership - $4.00

SB40 ADB015599L (Contact Defense Documentation Center)(US Govt. agencies only) Checklist of U.S. Artillery Models

SB41 ADA047804
Sound/Flash Ranging - $4.00

SB43 ADA047813
Checklist of Foreign Artillery Models - $4.50

SB44 ADA048202
Direct/Indirect Gunnery Laying - $4.00

SB45 ADA041184 (Rev. ADA046121)
666 World Battles - $4.50

SB46 ADA047811
Military Casualty and Statistical Data in Wars - $4.00

LES MILLER
Morris Swett Library
Fort Sill, OK

Firing battery transport

The Field Artillery Community has given a lot of thought to the FIST and its vehicle. The M113, appropriately equipped, will produce the desired results of mobility and survivability. We have seen in the maneuver battalions and from our own FIST experience that, in overall performance, a tracked vehicle is more suited to the mission in Europe than is a wheeled vehicle. It is now time to use that same type of thinking for the firing battery.

Today, even in an armored or mechanized division, the firing battery still remains partially mechanized. The major drawback to our present TOE is that the battery commander and battery executive officer (XO) do not have the mobility, flexibility, and survivability that the remainder of the battery has. The M151 and the M561 "Gama Goat" have limitations which adversely affect the overall performance of the firing battery in Europe.

The battery commander has no organic transportation to move his advance party. In order to accomplish the reconnaissance mission, he must degrade his ammunition carrying capability by dedicating one of his six M548 carriers to move his advance party. He has reduced his ammunition carrying capability by nearly 100 rounds, and he provides an unmistakable signature when he enters a new firing position. Also, since the M548 is not an armored vehicle, the survivability of these critical personnel of the firing battery is greatly reduced.

The battery XO is vulnerable to attack, particularly to incoming artillery. He is also limited in his mobility and lacks an efficient communications center and backup FDC capability. The M561 cannot always lead the firing battery because of terrain limitations. The M561 is a "soft" vehicle and therefore cannot (or should not) be positioned within the firing battery where it should be to provide the best control over firing operations. Because of this, the XO normally remotes away from his command center (BOC) and reduces his efficiency by reducing his communications capability and his ability to check the FDC's firing data. Normally the XO establishes either a stationary post behind the base piece or a roving post while he moves from gun to gun along the line of metal. The makeshift BOC is not efficient during split battery operations because it is small and lacks adequate equipment. The advent of an eight-gun battery may make the need for a fully operational secondary FDC more ciritical, even an absolute necessity.

One answer to this problem could be to change the TOE by adding an M113 and driver to the headquarters section (to be used by the firing battery advance party) and by adding an M113 to the firing battery section (to be used by the XO as the BOC). By adding an M113 to the firing battery, we can delete the M561 from the current TOE.

Michael A. Lindquist
CPT, FA
Btry C, 2d Bn, 27th FA
APO New York

Old magazines wanted

The Morris Swett Library, USAFAS, is missing several issues of the following publications: *PS, The Field Artilleryman, Artillery Trends*. Anyone interested in donating issues of these is asked to call AUTOVON 639-4525 or AC 405-351-4525, or write to the address shown below:
Morris Swett Library
ATTN: Mrs. Marburger
USAFAS
Fort Sill, OK 73503

James H. Byrn
Supervisory Librarian
Morris Swett Library

Why buy the M198?

I was surprised by the article on the M198 howitzer in the January-February issue of the *Journal*. The characteristics given in the list didn't seem all that impressive, so I did a little research (figure 1).

Incoming

I can't see any advantage in the M198 considering the 1-ton increase in weight; that's a difference of 25 rounds of ammo which could be sling-loaded with an M114A1 in airmobile operations. My Reserve Component Advanced class was told last year by the Weapons Department at Fort Sill that the Marines were mounting the tube from an M109A1 on their towed pieces so that they could shoot charge 8 and RAP rounds. Would not an M109A1's gun tube on an M114A1's carraige produce a weapon better than the Soviet's D-20 and fully comparable to the M198 at a tremendous saving in time, money, weight, and retraining? The M198's only significant feature seems to be that the crew has to rotate the muzzle end of the tube back between the trails for towing. It impresses me that we are getting another "turkey."

I also take serious exception to Lieutenant McNaughton's review of Ian Hogg's fine book *The Guns: 1939-45*. Taken together with its companions, *Barrage: The Guns In Action* and *The Guns: 1914-18*, Ian Hogg has written a very readable, reasonable complete history of modern field artillery from his vantage point as a Master Gunner in the Royal Artillery Regiment and has thrown in a quick look at antitank and antiaircraft artillery for good measure. I can find no basis for Lieutenant McNaughton's many complaints (*Barrage* discusses exactly those things he finds missing in *Guns*) and I can't imagine any book available which provides as much information for the money.

Vincent R. O'Mahony
1LT, FA (PAARNG)
Mechanicsville, PA

	M114A1	M109A1	D-20 (Soviet)	M198
Range (km)	14.6	18.1	17.2	22 to 24
Elevation	O to + 1156	-53 to + 1333	-90 to + 850 (approximate)	-75 to + 1275
Traverse	418L, 448R	6400	800L, 800R	400L, 400R
Weight (lbs)	12,950	Not comparable	12,610	15,500
Tube life (rds)	7,500	5,000	Unknown	1,750
Rate of fire	4/min	4/min	4/min	4/min
Crew	11	10	8	11

Figure 1

The advantage of the M198 over the M114 is as you state — its range (an additional 15 kilometers with RAP and zone 8), which cannot be achieved even with the M114A2 which has the new tube (see page 27, September-October 1977 **FA Journal**). *The new tube cannot fire zone 8 but it can fire RAP rounds. Neither the Army nor the US Marines are putting the M109A1's tube on an M114 carriage, as this would require total redesign of the carriage.*

Regarding the book reviews, we do not modify reviewers' critiques, either pro or con. Each book must be evaluated as it stands without regard to the fact that another book by the same author may have material that supplements the book under review.—ED.

Corrections

In the March-April 1978 issue, the captions on the front cover should be reversed. Also, on page 35 at the bottom of the page, figure 1 should be numbered figure 2 and figure 2 should be numbered figure 3.

Cannon training for Reserve Components

I am writing this letter to express my views on current policies in the weapons training for the Officers Basic Course.

The Weapons Department offers excellent instruction on the Field Artillery weapons currently used by the Active Army, however there is an injustice being done to many officers going through OBC and FACBOC. I am referring to the officers of the Army National Guard and Army Reserve units which do not have the new M102 or the M109A1 howitzers. Many of these units are operating with M114A1, M101A1, and M109 type weapons systems.

In my unit, we operate with the old M114A1 howitzer and, would you believe, the old 8-inch towed? Why we have such outdated weaponry is beyond me, but the fact remains, we have it. National Guard and Reserve troops who have this old equipment still have to learn how to operate and perform maintenance on these weapons when we return from the School.

I strongly suggest that some type of course be established to alleviate this situation.

Richard A. Vargus
2LT, FA, NYARNG
Bronx, NY

It is unfortunate that the weapons of the Active and Reserve Components are so different. With the time and money restraints placed on the training establishment, the School must limit the instructional vehicle to those currently in the Active inventory. While the details of operating the M102 and M101 are different, the principles of maintenance, laying, etc., are near enough that the Reserve officer (as well as the Active FA officers assigned to battalions with M101s) can, with a little effort, translate those principles to their specific weapon. There is an 8-hour block of time set aside in FACBOC for the express purpose of providing additional instruction for those students being assigned to a unit equipped with a weapon other than the M102 or M109 who want additional instruction.—Ed.

Training Management vs Event Driven Training

"In 1977 training became the Army's number one priority." So wrote MG Al Akers, Assistant Commandant of the Field Artillery School, in a January letter to senior FA commanders. During 1977, training managers (battalion commanders) were bombarded with numerous "how to train" documents: ARTEPs (draft, new, and revised), Soldier's Manuals, Commander's Manuals, etc. A new TC, Training Management Crosswalk, is being developed to show commanders the relationship between individual, section, battery, and battalion training. These documents are, in general, well staffed, well written, and potentially invaluable tools to the training manager.

But are we achieving the full potential of managed training? I think not. I question the extent to which these documents actually drive the unit training program. I submit that training managers often do not have the time, material, support, or incentive to really manage training. The training program in many units is event driven. You train for the next "big event" (test). You do so in order to survive. Consider a typical schedule of "big events" for a FORSCOM nuclear-capable unit: the Annual General Inspection (with its normal precursors), battery ARTEPs, the annual battalion ARTEP (by any other name, it still smells like an ATT), Emergency Deployment Readiness Exercises, plus the annual NSI and quarterly "dress rehearsals." All too often the training program is reduced to "getting ready for the (fill in the blank)." This may not be the way senior commanders see the program, but ask the soldier of such a unit.

And now we have the SQT. Many FA commanders are not yet aware of the impact of SQT on unit training. SQT support requirements will eat unit equipment. In recent SQT validation at Fort Sill, a half battalion day (people and equipment) was required to support MOS 15D testing of only 44 soldiers. Nearly every FADAC in III Corps Artillery was needed to validate the 13E SQT. But how about the training time and equipment to prepare the individual soldier? How much is needed? Where do you find it? SQT may well be the straw that breaks the camel's back. In order to prepare their soldiers for SQT, commanders must manage training and that may well mean managing the "big events" also.

I submit that the dilemma of effective training management vs the demands of the next "big event" requires the attention of commanders at all levels. We need to provide the time, material, support, and incentive to effectively manage training. To better manage time and training we may have to attack some "sacred cows." For example:

- Do we cling to the "annual ARTEP," or use the program the way it was designed?
- Do we need scheduled AGIs; or will unannounced, quick, functional area inspections keep the commander informed.
- Do we need an annual certification NSI and quarterly rehearsals, or will surety monitoring during the ARTEP suffice?

We must make training our number one priority. In a peacetime Army there can be no other number one. Maybe SQT will finally force us to take a look at the total demands on a unit, affirm our number one priority, and really *manage*. It's long overdue.

D.P. Tillar Jr.
LTC, FA
HQ, USAFATC
Fort Sill, OK

Munitions concepts encouraged

Congratulations on your excellent related articles, "How Much is Enough" and "Munitions Effectiveness" in your March-April issue. From 1973 to 1978 as Concepts Analysis Agency's (CAA) Director of War Gaming, I grappled with the problem of providing the Army with an analytical basis for ammunition requirements.

Efforts of TRADOC, Fort Sill, and CAA, coordinated by DA DCSOPS Director of Requirements, succeeded in revising what we called old artillery rules of engagement. This had an intense effect on changing the quantity and mix of artillery ammunition for the 1980s.

I am heartened to see that the concepts and data we used were generally consistent with those in your articles. I hope a vigorous look is taken to insure consistency, or the shooters in the field in the 1980s will have just cause to curse the planners of the 1970s.

Joseph B. Murphy
COL (Ret), INF
McLean, VA

Prefers towed howitzers

I take exception with Major Mellin's comments favoring the 155-mm SP over the 105-mm towed in the November-December issue of the *FA Journal*. I have worked on both the 105 towed and the M109 and M109A1 155 SP weapons and, from the crew standpoint, the 105 towed wins hands down. The big problem with any SP system is the amount of time spent on maintenance. I would much rather have a weapon that can be depended on to do the job than to have half the battery out of action before they even reach a firing position, which happens sometimes.

The 105 may have to be closer to the target area and the round may be smaller, but, if nothing else, it is dependable. Any extra displacement time is more than compensated for by the absence of a motor carriage to break down, and I am not convinced that a 105 battery with a well-trained crew cannot displace as fast as an SP battery. A weapon sitting along the roadside gives no support to anyone.

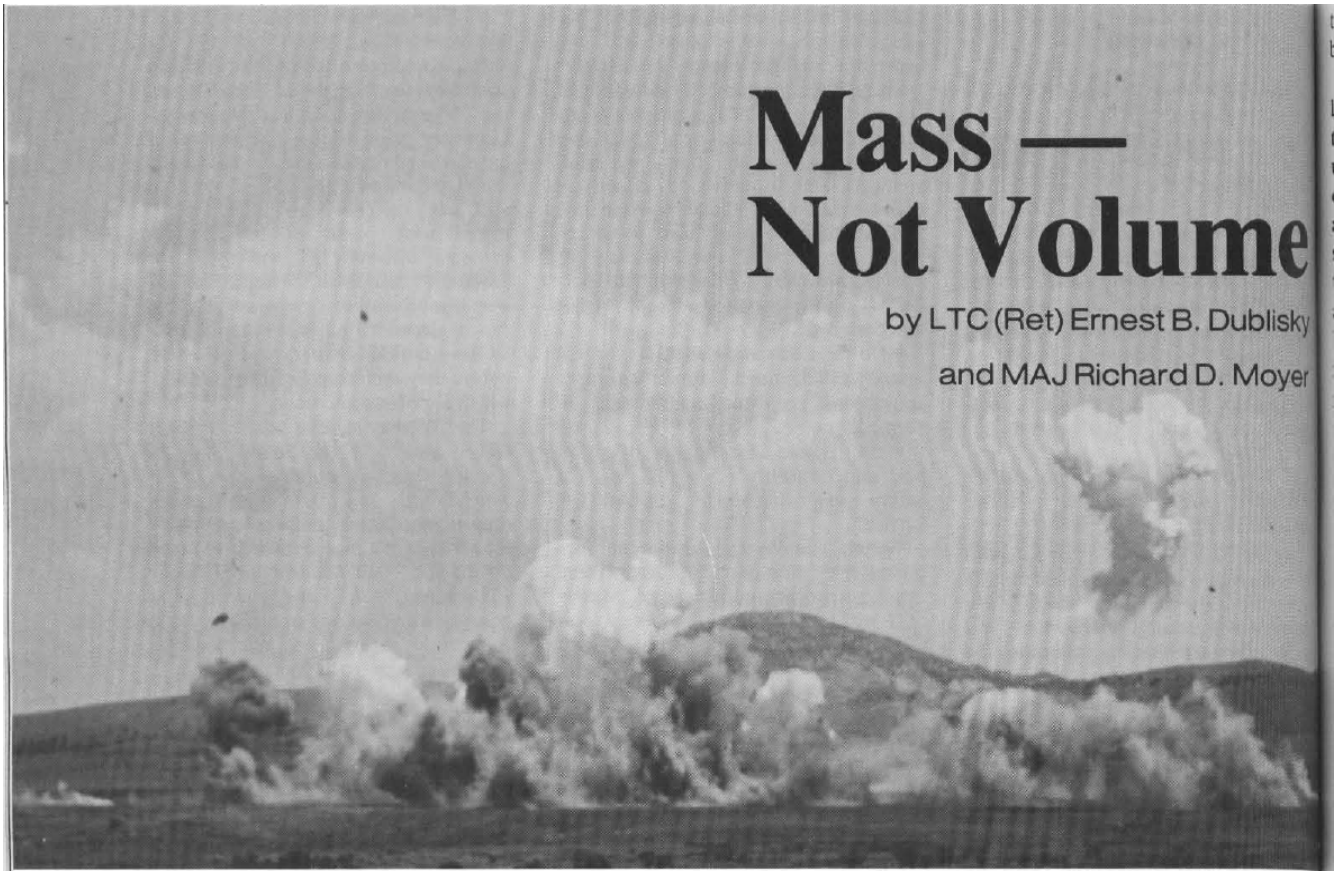
As a chief of firing battery in Vietnam I had a battery of 155-mm towed M114A1s, and we had to take over the mission for an SP battery more times than I care to think about. The 114 is about the toughest weapon I have worked on, and it was a rare day when we had a weapon down for any reason. The deadline time for SP systems compared to the towed systems will tell a very interesting story if the reports are a true reflection of the state of repair of the weapons concerned.

It doesn't do a bit of good to have a deadline report that shows all weapons are "green" when four out of six could not get out of the track park. I have seen it happen, and I wonder about a system that will hang a commander for equipment failure but does very little to get the repair parts that would correct some of the problems.

The simpler the system, the better off we will be, and all the gadgets in the world will not make up for a well-trained crew.

Clifford L. Coultes
MSG
Fort Sill, OK

We think the new M198 155-mm towed will give us the best of both systems — range of the 155 SP and reliability of the towed.—Ed.



Mass — Not Volume

by LTC (Ret) Ernest B. Dublisky
and MAJ Richard D. Moyer

"Loyalty to petrified opinions never yet broke a chain or freed a human soul in this world — and never will."

— Mark Twain

If all the "gut feelings" about this or that concept were laid end-to-end, they would stretch around the earth and we would have a macrocosmic "beer belly." Perhaps one should not totally disparage these "intuitive" insights for, after all, they are born of experience and judgment. But, there is a natural tendency to finally believe that "gut feelings" are rational facts. In reality, they are simply hypothetical substitutes for facts. And, often the basis for intuition, experience, and judgment, is preconditioned by an operative doctrine that simply has been overtaken by the inexorable march of progress.

This article is about one of those doctrines—massing. The *principle* of mass is not disputed—as a principle it is immutable. It is the *application* of that principle in today's and tomorrow's tactical context that deserves additional consideration. From the catapult to smoothbore cannon, and the rolling barrages of World War I—and certainly today—the artilleryman has accepted the fact that, by applying the principle of mass, he could effectively multiply combat power. Imaginative and adroit gunnery procedures to bring separated groups of weapons to bear on a single target has enhanced the effectiveness of the entire fire support system. The catalyst for reevaluation of the application of the principle of mass to the modern field artillery, is weapon and ammunition development.

System effectiveness

Today, we are acutely aware that the combination of weapon and ammunition as a component of the field artillery system comprise a primary ingredient of total system effectiveness. The precision and lethality built into this subsystem, coupled with the accuracy produced by a variety of other contributing subsystems, result in overall system effectiveness. With significant technological improvements rapidly becoming realities, the field artillery must insure that its doctrine properly considers its technical growth, particularly the impact of

the growth on the two fundamental ingredients of battlefield effectiveness—weapon systems and tactics.

The massing requirement is a function of system lethality. For example, what is the requirement to mass tactical nuclear weapons? The answer is none. This upper end of the massing spectrum compared to the other (e.g., the need to mass battalions of 105-mm against an armor-heavy target array) clearly demonstrates the relationship of massing and lethality. With the advent of significantly improved weapons and ammunition systems, a reexamination of the doctrinal basis for massing is essential. The FA must insure that its perspective of massing keeps pace with its requirement to mass. Perhaps more importantly, the FA should examine whether or not conceptual field artillery tactics, procedures, and techniques are consistent with, and supportive of future massing requirements.

Legal Mix V study

For the first time, it is not necessary to evaluate massing requirements on the basis of "gut feelings." The Legal Mix V (LMV) study has provided a computer simulation-generated analytical base that quantifies the value of massing, and the degree of massing *actually* accomplished. The data also provides a quantified answer to "How much is enough?"

To appease those with little faith in the analytic approach, here is a brief description of how the Legal Mix V computer model simulates combat operations to produce data for analyzing massing requirements. The LMV study used three computer simulation models, two of which will be briefly described, since a general knowledge is helpful for one to understand the data used in the discussion of massing. The two models are the Target Acquisition Model (TAM) and the Artillery Force Simulation Model (AFSM).

Target Acquisition Model

The TAM simulates the performance of the Blue Force (friendly) target acquisition system. A tactical scenario gives the locations, strengths, and movements of units on both sides. Based on the presented targets, the employment concept, and acquisition capabilities for each target acquisition system, the target acquisition system performance is determined. The results of the TAM—a time-sequenced list of acquired targets—are input to the AFSM.

Artillery Force Simulation Model

The AFSM is an effectiveness model which simulates the effectiveness of a mix of field artillery systems against the TAM target list. The AFSM is designed to:

- Accept TAM output one target at a time.
- Determine units available to fire.
- Select the most effective munition and type unit.
- Determine the amount of fire necessary to attain a predetermined attack level.
- Fire the appropriate amount of ammunition.
- Assess casualties against the target.
- Store the damage assessment.
- Update the surviving portion of the target.

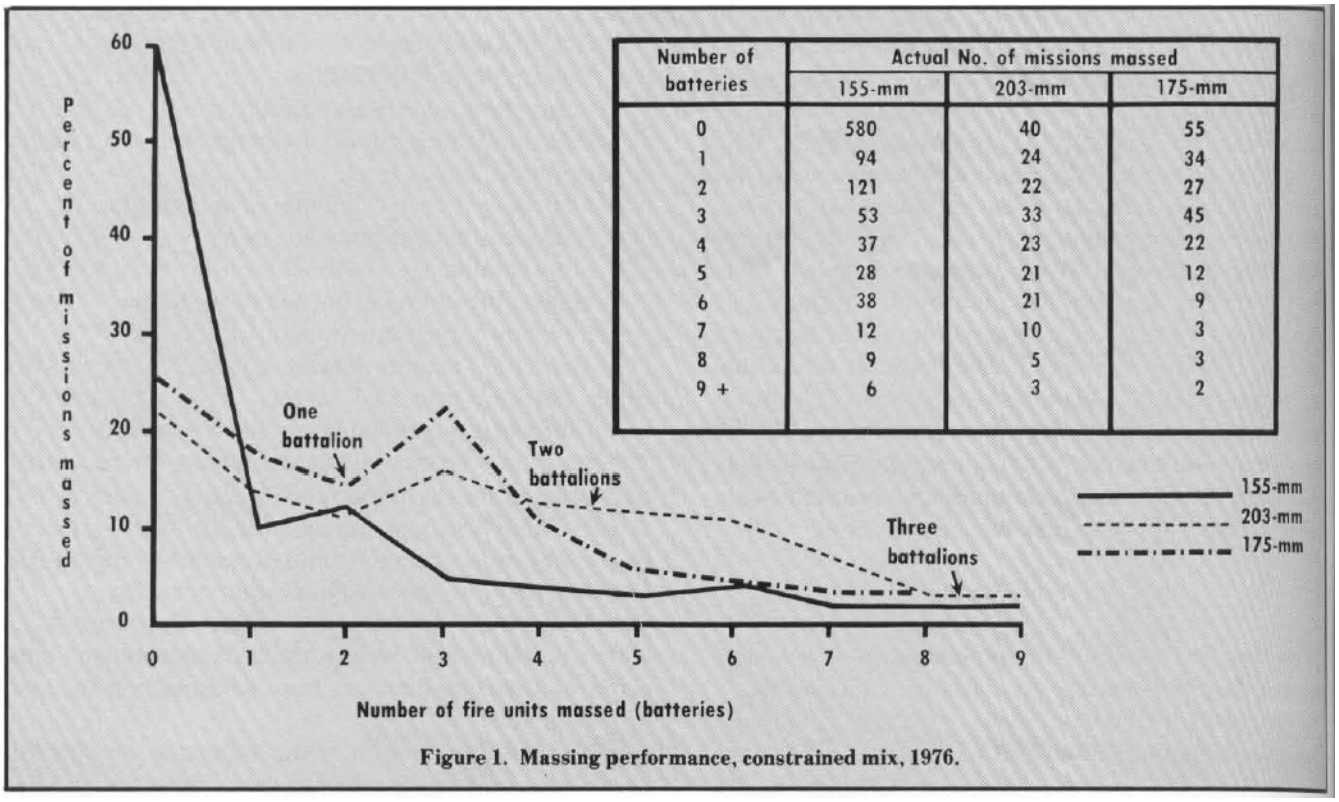
Here is how targets are generally processed

- The AFSM accepts the target list and merges it with other machine-generated targets. This simulates the acquisition of a target and begins the critical path.
- As spaces become available, targets are processed and ordered by the importance (tactical value) of the target. These two steps simulate the real-world gunnery process by storing targets until fire units are available and then firing on the most important ones first.
- The AFSM processes the targets by determining which battalion will receive the mission, and the batteries of that battalion are ordered according to their "busy" status.
- The AFSM determines the estimated number of batteries and/or volleys to meet the required attack level for the specific target. If it is determined that the batteries of the selected battalion can meet the required attack level, the target is assigned to that FDC only. If the selected battalion fails to meet the required attack level, additional battalions are assigned.
- The *most effective* available munition is selected for firing. The number of rounds are converted into full battery volleys and fired. (This selective process will be done by TACFIRE when it comes into the inventory. In the meantime these decisions are made by FDOs, FSCOORDs and FSOs with the assistance of graphical effects tables, experience, and various TCs and FMs).
- The AFSM determines the *accumulated* effects assessed against the target.

Attack levels

How does the AFSM treat massing and determine a "required attack level"? The procedure to mass in the model is explained above; however, AFSM employs three limits on massing.

- The first is the *required attack level*, which is the amount of damage to be done within ammunition constraints and is a function of target type and posture.
- The second *limits the number of fire unit volleys* to six for a single engagement. This was imposed to preclude large expenditures of ammunition on single targets with little effect. Time and ammunition set this upper limit (TACFIRE also uses this upper limit).



Number of batteries	Actual No. of missions massed		
	155-mm	203-mm	175-mm
0	580	40	55
1	94	24	34
2	121	22	27
3	53	33	45
4	37	23	22
5	28	21	12
6	38	21	9
7	12	10	3
8	9	5	3
9 +	6	3	2

Figure 1. Massing performance, constrained mix, 1976.

• The third limiting factor requires that *an incremental improvement in effectiveness be achieved with the firing of each successive volley* or the volley will not be fired. If the required result cannot be achieved within these limits, additional fires within the battalion are requested. If the battalion cannot meet the attack level, it will initiate a request for additional fires until enough fires are massed to reach the required attack level.

Statistical data

This description of how the LMV models produce data is provided to show how real-world procedures are simulated as realistically as possible. The computer-provided data is not "pie in the sky." Even the most inveterate disbeliever in the analytic approach must admit that these decision rules and restraints provide a reasonable simulation of the acquisition-to-firing sequence. With this understanding of the basis for measuring field artillery massing performance (and a little imagination), it is hoped that the statistical data used in this discussion will be meaningful enough to dispel the confusion that such numbers sometimes generate.

There is currently a great deal of discussion about the massing of "many battalions" in surprise fire. The tenor is not the massing of multiple fire units on an integrated basis to achieve maximum effectiveness, but seems to connote the use of battalion upon battalion firing at the same target simultaneously. On the basis of data which will be presented, this apocalyptic view may be an obsolete statement of the modern massing requirement.

Battalion equivalent

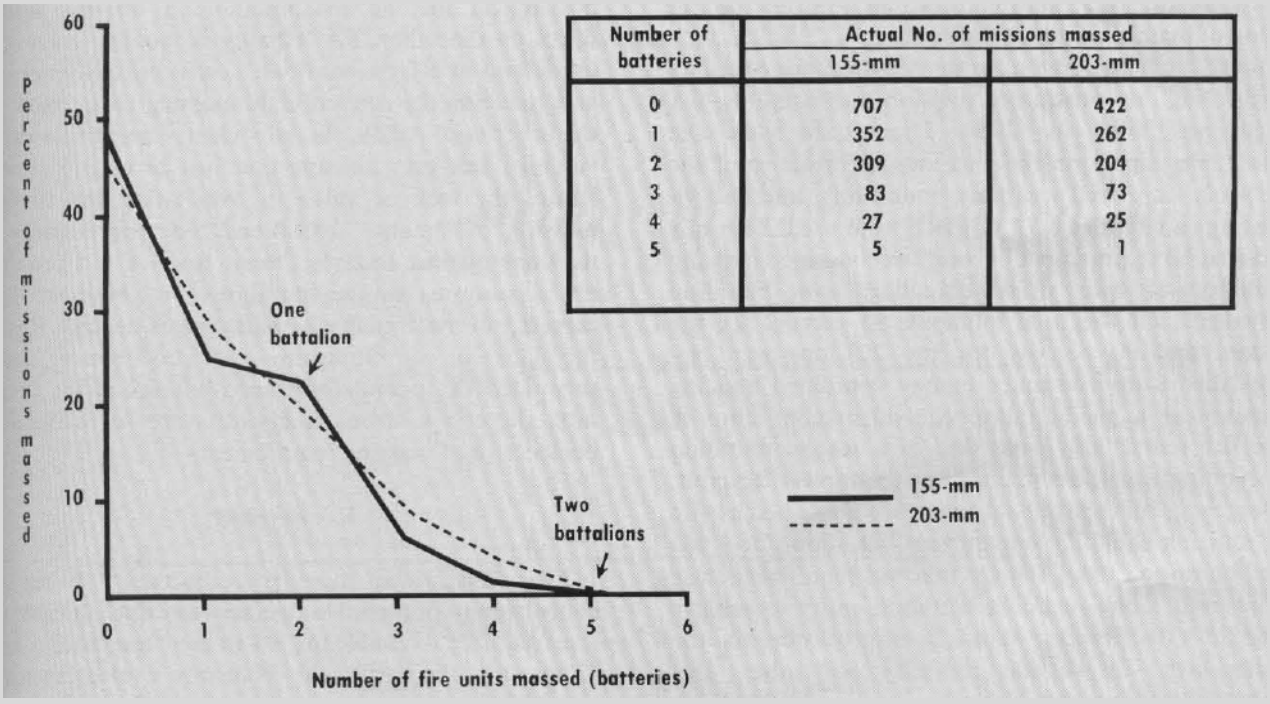
At this point an explanation of the term "battalion equivalent" which is used throughout this discussion may preclude misunderstanding. The massing performance data shown in the various illustrations is for numbers of fire units up to 10 and beyond. The conceptual mix performances shown in figures 2 through 4 and described as containing a number of battery equivalents; i.e., the number of weapons and fire units equated to current fire units. For examble, figure 4 shows a mix which is considered "28 battery equivalents." The three battalions of M109A1 contain 96 weapons which equal 16 current batteries, and the three battalions of M110A1 contain 48 weapons which equal 12 current batteries. Thus, the mix contains the equivalent of 28 current batteries, which by today's doctrinal definition, equals 28 fire units. The important distinction to be made is that, although the mix equates to 28 of today's fire units, it was tactically employed within the simulation as 24 batteries with 36 fire units. Each M109A1 battery in the conceptual mix contained

two fire units. The massing performance data shows the number of times a fire unit massed with "0" other fire units, with "1" other fire unit, etc.

Massing performance

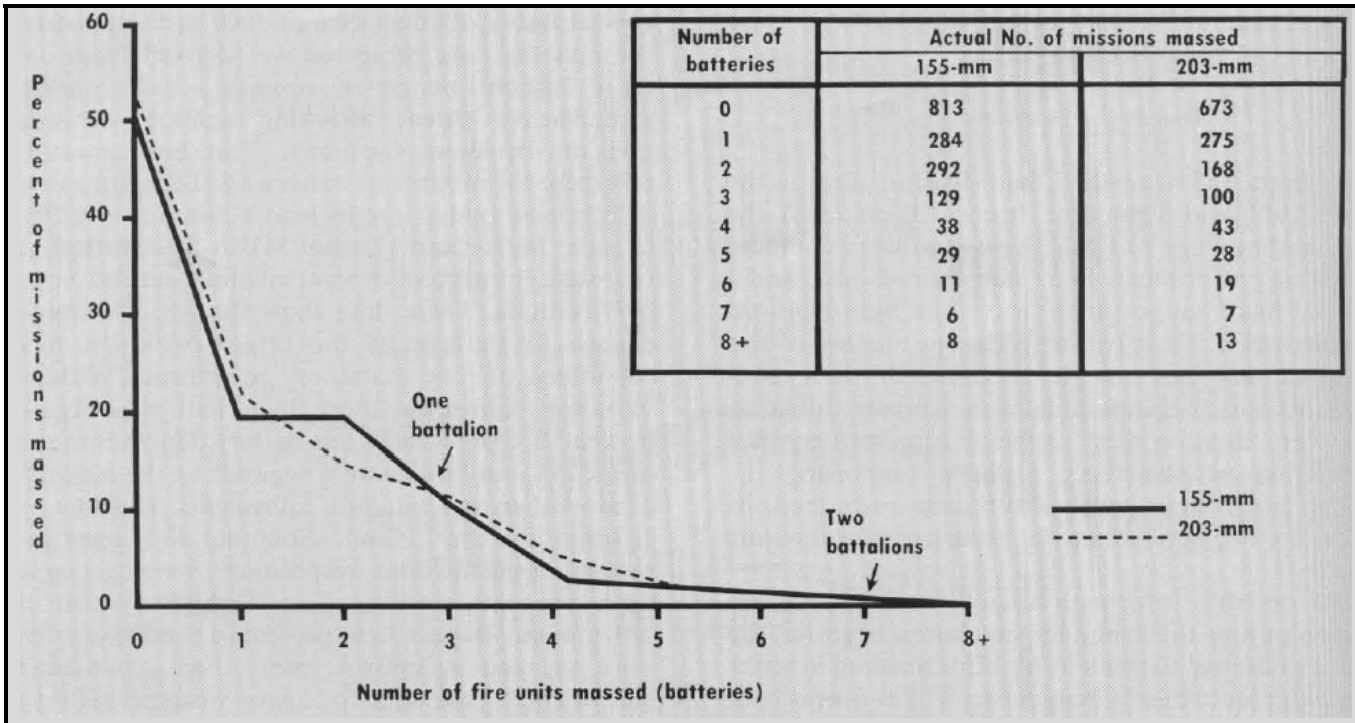
LMV evaluated heavy and light division slices in the current, 1981 and 1986 time frames. Because of the unique methodology of LMV, we were able to compare the massing performance of a "constrained mix" and a "required mix" supporting a heavy and light division. The constrained mix is restrained by the number of fire units, weapons, and people. Because of these constraints, its cost is comparable to the current "division slice". The "division slice" is the division artillery plus that portion of the force artillery supporting the division. Most importantly, although restrained, it employs the FA system materiel postulated for the time period.

Based on this information and the previous explanation of how the computer simulation operates, the reader is cautioned to think of multiple massing in terms of *fire unit* requirements, remembering that operational exigencies may require the accumulation of effects from fire units of several battalions. The persistent notion among many field artillerymen is that massing is accomplished on a much wider scale than the LMV simulations indicate. A quick look at the massing performance of the *current* mix may help to dispel that notion. Figure 1 shows the massing performance of a typical heavy division slice of field artillery today. All the massing data presented was derived from one intense 24-hour period of combat activity against an armor-heavy threat attacking against an armored division in West Germany. The horizontal values represent the number of battery-sized fire units used for the massing analysis, to include 155-mm M109, 203-mm (8-inch) M110, and 175-mm M107. The vertical values represent the percent of total missions massed (engaged) by fire units. These data show that the 155-mm units engage 81 percent of the targets with the massing capability of one battalion equivalent. Within this battalion equivalent more than half the targets (59 percent) are engaged by one battery. Only seven percent of all 155-mm targets were engaged by the massed fires of more than two battalion equivalents. The data for the 203-mm and the 175-mm show that 43 percent and 55 percent of the missions, respectively, were accomplished by a one-battalion equivalent. Only 19 percent of the 203-mm targets and eight percent of the 175-mm targets were engaged by massing more than a two-battalion equivalent. These data for heavy weapons reflect their general support role. Overall, 71 percent of all engagements were accomplished by a one-battalion equivalent of the division slice. Additional analysis revealed that a single battalion entity provided sufficient effectiveness to engage 62 percent of the targets with its organic fire units. In other words, about two-thirds of



Number of batteries	Actual No. of missions massed	
	155-mm	203-mm
0	707	422
1	352	262
2	309	204
3	83	73
4	27	25
5	5	1

Figure 2. Massing performance, constrained mix, 1981.



Number of batteries	Actual No. of missions massed	
	155-mm	203-mm
0	813	673
1	284	275
2	292	168
3	129	100
4	38	43
5	29	28
6	11	19
7	6	7
8+	8	13

Figure 3. Massing performance, required mix, with 24-gun direct support battalions, 1981.

the time, the massing requirement did not exceed the combined effectiveness of three batteries. These data show the high value of fire unit (battery) massing, but, in the current time frame (i.e., without significant improvements in lethality), they put a strain on the notion of massing *many* battalions.

Figure 2 portrays the massing performance of a mix representing the constrained division slice using the FA system postulated for *1981*. These data show the remarkable impact on the massing performance of the mix when improved weapons, munitions, and the integrating capabilities of TACFIRE were used. This mix produced no requirement beyond the combined massing capability of fire units equalling two battalion equivalents. Of the total missions, 93 percent for the 155-mm and 90 percent for the 203-mm were accomplished using the individual or combined massing capability of a one-battalion equivalent consisting of three fire units. Only a portion of a second battalion was required for the remainder of the targets. Overall, 91 percent of all engagements were accomplished by fire unit massing equalling one current battalion. Of 3,060 battalion targets, only 804 (26 percent) required the use of fire units from outside a battalion entity to achieve adequate effectiveness. This is largely due to the significantly improved lethality of the ammunition/weapons mix and the rapidity with which TACFIRE integrates the gunnery process. Naturally, the overall system improvements, particularly in the target acquisition mix, also contributed significantly to the improved operational effectiveness of the system. On the spectrum of massing illustrated by a nuclear mission on one end and battalions of 105-mm against tanks on the other, FA lethality is moving toward the upper end in effectiveness with *conventional munitions* and reducing the conventional massing requirement on the other end. Again, this mix clearly demonstrates the value of fire unit massing and just as clearly demonstrates the lack of value in overstating the multiple massing of "many" battalions. For the majority of missions against today's threat, the FA will probably not mass more than two battalions. For seven out of ten targets, no more than one battalion is needed. Even if the lack of development and procurement funds precluded the postulated improvements in the system mix, there is a strong analytical case for a different perspective of massing requirements.

Required mix

The constrained mix level represents a realistic concession to potential budgetary restraints. It is *not* the level required to enable the FA to meet the requirements imposed by the battlefield. That mix level is inherently the optimum mix referred to as the "required mix" in LMV. Figures 3 and 4 portray the massing performance

of two significant mixes conceived in the LMV analysis. These conceptual mixes were selected for this massing comparison because they represent two important organizational concepts that significantly increase the number of weapons and fire units contained in a heavy division slice, thus influencing the numbers of fire units massing. Figure 3 shows data from a seven-battalion mix organized with three 155-mm battalions, each consisting of four fire units and each fire unit containing six weapons. Each of the four 203-mm battalions consists of four fire units of four weapons each. Figure 4 reflects data produced by a mix consisting of six battalions. The three 155-mm M109A1 four-battery battalions, each battery with eight weapons, were consistently employed as eight four-gun fire units (32 howitzers per battalion). Thus, the mix contained 96 155-mm howitzers at the direct support (DS) level. Today's typical division slice consists of 54 155-mm howitzers at the DS level. The three 203-mm battalions were employed as 12 fire units, each containing four howitzers.

It has been shown at the constrained 1981 mix level (figure 2) that, improvement in system lethality has a profound effect on massing requirements. Larger mixes should produce greater effectiveness and a further lessening of the requirement for multiple battalion massing. Figure 3 shows the massing performance of the first significant oganizational enlargement previously described and supports that conclusion.

These data show that the 155-mm fire units fired *94 percent* of the missions by massing the equivalent of *one* 1981 battalion. The 203-mm fire units engaged *93 percent* of the targets with the massing equivalent of *one* battalion. An additional five percent of the 155-mm targets and six percent of the 203-mm targets were engaged by the massed fires of a second battalion equivalent. Only *one percent* of the missions for both types of fire units required the massing of more than two battalion equivalents. As expected the data in figure 4 depicts the continued improvement in reducing multiple battalion massing requirements due to the combined effect of increased system effectiveness and larger mixes. These data show the massing performance of a mix which was the leading cost-effective candidate in the LMV heavy division analysis. The 155-mm fire units engaged *98 percent* of the targets with the massing equivalent of *one* battalion, and the 203-mm fire units engaged *93 percent* with the massing equivalent of *one* battalion. For the 155-mm units, the remaining two percent were accomplished with two more fire units. An additional battalion equivalent of 203-mm (four fire units) accomplished another five percent of the 203-mm fire missions. Thus, *100 percent* of the 155-mm missions and *98 percent* of 203-mm missions were accomplished by massing *two* battalion equivalents.

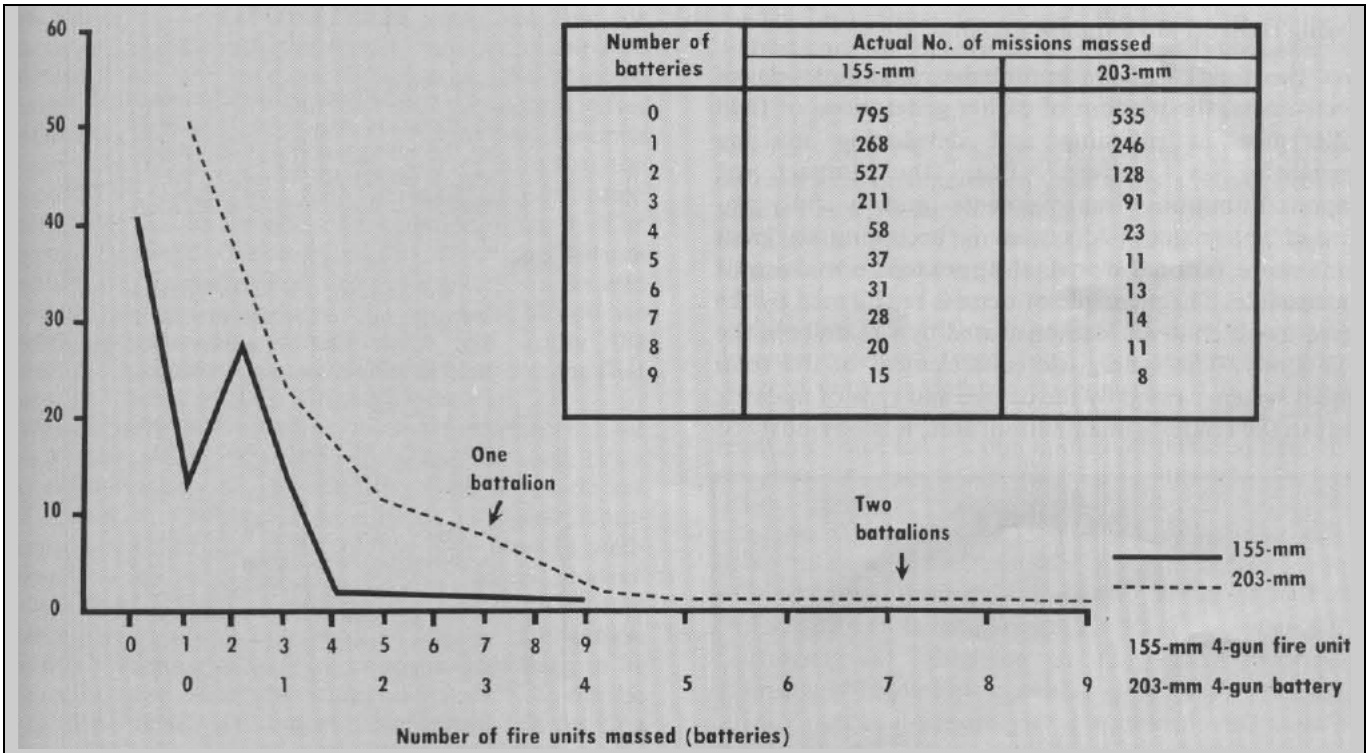


Figure 4. Massing performance, required mix, with 32-gun direct support battalions, 1981.

Perspectives

Before summarizing these impressive results, a few words of caution are prudent for the more impulsive reader who would leap upon this data as a rationalization for heavy division slices containing only two battalions. These data merely reflect the degree and extent of massing accomplished by fire units. The data does not reveal the total effects produced against the various target categories, nor the cost considerations for "best" mix selections. More importantly, they do not reveal the dynamic contribution of the field artillery mix to the overall combined arms battle. These massing data do not provide the answer to the questions, "How much FA should be contained in a division slice?"

What *do* these massing performance data tell us? They emphatically indicate that the requirement for multiple battalion massing is clearly dependent on effectiveness. Massing is not, and should not be, done just because we can. Even with the inadequate number of fire units in today's field artillery, multiple battalion massing against a European threat would be minimal. Today, massing more than one battalion may be required about 30 percent of the time. With the expected fielding of TACFIRE, improved ammunition and weapons, and, most importantly, new cannon battalion organizations with a greater density of fire units, the requirement for multiple battalion massing will be further reduced. The new perspective should be *fire unit* massing rather than *battalion* massing.

As the field artillery approaches higher levels of effectiveness, the wisdom of earlier generations of field artillerymen in pursuing and deve7loping massing capabilities is evident. But, the impact of weapons/munitions improvements and a fully integrated/automated FA system is becoming so great that a more rational doctrinal approach to massing is now feasible. The principle of mass is reaffirmed by the degree to which it was demonstrated by fire units in the LMV study. The synergistic enhancement of the total combat system caused by the degree and type of massing is left to the reader's imagination. But, it is obviously of great magnitude. The proper direction for materiel development and training and a more correct doctrinal basis must now consider important technological changes in the field artillery system. These changes are intrinsic to the improvements in munitions and weapons capabilities and battlefield automation. The "why" and "how" of massing is only one of many manifestations of a dramatically improved FA System.

It is high time for field artillerymen to appreciate the doctrinal implications of significant technological innovation and improvement, and their promise on the modern battlefield. Giulio Douhet said that "victory always smiled on one who was able to renew traditional forms of warfare, and not on the one who hopelessly tied himself to these forms." A more insightful statement of what "mass" means to the field artillery might now be that "mass" is the aggregate of firepower needed to produce enough effect to allow the attack of the NEXT target.

Both authors are assigned to the Directorate of Combat Developments, USAFAS. LTC (Ret) Ernest B. Dublisky is chief of the Systems Management Office and MAJ Richard D. Moyer is assigned to the Doctrine Team as a senior military research analyst.

New AC

BG Robert W. Sennewald has been named to be the new Assistant Commandant of the School. General Sennewald is currently the Deputy Director of Political-Military Affairs, Plans and Policy Directorate (J5), Organization of the Joint Chiefs of Staff. He is expected here in July.

Reunions

The 6th Field Artillery Veterans Association will meet July 14-16 at the Sheraton Inn. Gettysburg, PA. Contact Joe Gobrick, RD 2, Box 94C, Weatherly, PA 18225.

The 142d Field Artillery Association, to include the 936th and 937th FA Battalions, will hold its eighth biennial reunion at Fayetteville, AR, 23-25 June 1978. Contact Gene Locklar, PO Box 742, Little Rock, AR 72203.

The 7th Field Artillery Association will hold its 11th annual reunion 15-16 September 1978 at the New Hampshire Highway Hotel in Concord, NH, For further information contact Mr. Warren N. Caldwell, 51 South Street, Milford, NH 03055.

The *Journal* interviews . . .

BG A. Bar-David

BG A. Bar-David, Commander of the Israeli Artillery, visited Fort Sill recently and agreed to an interview. General Bar-David commanded an artillery battalion from 1969 to 1971. Following his command, he attended the US Field Artillery Officer Advanced Course. During the Yom Kippur War, General Bar-David was Artillery Commander at Northern Command. In 1974 he assumed command of the Israeli Gunnery Officers School and in 1976 was given his current assignment.

Journal: Sir, in recent action in southern Lebanon, you made the first combat use of the M109A1 self-propelled 155-mm howitzer. How did it perform?

Bar-David: That action was not our first use of the M109A1. We started getting the weapon in early 1974 when we were fighting in the Golan Heights. This was not an intense combat environment, but we got some firing experience. Mainly we are very satisfied with it, but we have made some minor modifications for our own particular needs. You design your weapons for general use throughout the world, and we wanted to optimize it for our own particular area. We want to maximize the rate of fire and the range capability. After the Golan action, I sent a team of officers to all the units to interview the gun crews to get their opinions of the weapon. The team found that the M109A1 performed perfectly — we are very, very satisfied with it. The weapon has much more capability than the formal specifications indicate. You can get greater ranges and increased rate of fire and it is very accurate. If you are careful in using the firing tables and apply the corrections properly, you can hit the target with the first round, and that's the goal of the artilleryman.

We can compare it to many other systems because we have Russian weapons, French 155s, and our own. It's a very reliable weapon. The modifications we made are well-known in your research and development community, but I was surprised to find they are not well-known here at the School. For instance, on the modern battlefield you have to engage tanks for your own protection, not simply because you *want* to fight tanks. You don't have a choice. To fight tanks you have to be able to shoot in a very short time — in seconds, maybe 10 to 12 seconds. It is impossible to track a moving target with the two-gunner system, so we made modifications to use the one-gunner method. In the direct fire system, the crewman on the right side of the weapon is in control since that is where the sight is. We are also using the one-gunner method for indirect fire. In this case we are using the crewman on the left side of the weapon to lay the weapon for elevation *and* deflection. Also, we do not use the spades during firing. They are not necessary. Because we do not have enough artillery, we find we must shift fires across wide areas very quickly, and often throughout 360 degrees. Using spades only slows us down. We are also firing the highest charges that we have — charges higher than you have — and we are reaching almost 20 kilometers.

Journal: Has the greater effectiveness of modern air defense weapons increased your army's reliance on field artillery as a fire support means?

Bar-David: Yes. That was the major thing that we found in the last war. We also found that, close to the FEBA, the line of forces is so irregular and changing so rapidly that it is difficult for the fast moving aircraft to determine friend from foe. This area is so heavily covered with air defense systems that it is almost impossible to get close air support. The confusion of the frontline trace causes our maneuver commanders to be reluctant in requesting close air support. The only reliable means of fire support — day and night — is the artillery. What this means is that the artillery will be firing more and the accuracy and speed requirements will increase. You will need more rounds, more tubes, and more artillery units.

Journal: In the 1973 war, what types of targets received priority of fires?

Bar-David: Fixed-position type targets are seldom found on today's battlefield. The battlefield is moving,

fluid. We found that close to 40 percent of our fires went to suppressing enemy artillery. The enemy we face outnumbers us so greatly that he can mass great amounts of artillery anywhere he wants. This concentrated enemy fire has the capability of stopping our mechanized infantry maneuver force. So we found that instead of providing close support for maneuver, we were called on *by maneuver commanders* to support them with counterfire. We found that artillery units were pulled from missions of direct support of maneuver to provide counterfire as their primary mission. The reason for this is that when the armored force is attacking, it must be accompanied by infantry, lest the tanks be destroyed by antitank guided missile teams. The infantry, even mechanized, is vulnerable to artillery fire. Therefore our maneuver attack plans were being slowed by the enemy artillery fire. You don't have to stop a tank to stop a tank attack. You can stop him by suppressing his supporting infantry, attacking his fuel and ammo supplies, or impeding his command and control, and you can do this with artillery.

Journal: What about the antitank guided missiles as priority targets?

Bar-David: In the last war the ATGM was a real surprise to us — the quantities, the efficiency, and the capability of almost every soldier to fire them accurately enough to destroy a tank with the first shot.

The battlefield is developing in a very strange way. The tanks are becoming heavier, more sophisticated, and very accurate, have high speed, and are less vulnerable (as a tank). The same is true for aircraft. Yet the weapons against these forces are developing in such a way that any soldier can destroy one of those major weapons. You can kill a million dollar tank or a multimillion dollar plane with a missile that only costs several thousand dollars. But this single soldier with these missiles is not a target for the tank or aircraft — he is too small. He is too small to be seen and is not a cost-effective target for these major weapons systems. We found the most effective way to save the tanks and planes from this type attack is with artillery.

Not only does the artillery need to suppress enemy fire at the tank's ultimate objective, but we must provide continuous suppressive fire along the attack route. This means far more firing at *possible* enemy locations. And we do not have to hit the ATGM gunner. All we have to do is distract him enough that his tracking [guiding] of the missile is interrupted.

Journal: Could you describe the severity of the counterfire your artillery batteries received?

Bar-David: We experienced a lot of heavy counterfire. One reason for our receiving so much counterfire was that the enemy weapons at comparable levels outranged our guns, so they could fire at us without fear of being fired on by us in return.

Counterfire was the main reason we began switching to the more mobile self-propelled artillery weapons long ago. We have even mounted almost all our short range mortars on tracked carriers. The battery position is a very vulnerable place with ammunition and powder all over, so trying to get trucks into a position to move towed weapons while under fire is almost impossible. I'm sorry to say that the Russians have learned this same lesson and that is the reason they are moving to more self-propelled weapons. I was reading your article on Soviet SP artillery [March-April 1978 *FA Journal*]. The Soviet SP artillery developed before 1973 was not "artillery," but more like assault guns. The new 122-mm and 152-mm are the Soviet's first truly SP artillery, and these were most likely copied from your M109.

Our enemies' artillery outnumbers ours by a ratio of 6:1 or 8:1; therefore, they can afford to fire anywhere they think we are located. We have to move frequently and we need to pre-survey our positions to save time and increase first round accuracy. That's the only way to survive on the modern battlefield. We received a lot of counterfire, but we were not hurt because the fire was not accurate. I don't know why it wasn't accurate, but even when the fire is not very close, you cannot continue to fire from that location. That is an important point about modern warfare — you do not have to destroy a target, all you need to do is disrupt the target's action by making them stop firing and move. That's enough in many cases, because maybe two hours later the battlelines may have changed so much that the target is no longer important. For instance, during Yom Kippur when we crossed the Suez Canal and our crossing site was finally located, the enemy concentrated more than 20 rocket battalions but they didn't fire. Within a short time we had advanced so far that the crossing site was no longer critical to them. Time is so essential. You must suppress the right targets at the right time or it will do no good.

Journal: Were there any things you did to increase your firing unit survivability?

Bar-David: We are putting a lot of emphasis on putting the first rounds on the target to reduce the time we waste in adjustment. As I said earlier, we pre-survey our positions so that we do not lose accuracy while moving frequently. We calibrate frequently. We do all the things we can to improve first round target hits so we have minimum exposure to enemy sound and flash ranging as well as countermortar radar detection. We are also working on improving the forward observer's target locating ability. We find that he is a great source of error in the firing accuracy area. It is not his fault. Moving with tanks in combat and in the unmarked desert terrain, using a map and compass is not easy. There is no time for adjustment and no time for registration, so our efforts are being directed at first round accuracy.

Journal: We've read of the massive quantities of ammunition expended in the Yom Kippur War. How did you maintain the required rate of resupply?

Bar-David: Our problem is greater than yours because we not only have all the calibers you use, but we also have other systems such as 120-mm and 160-mm weapons. We shortened the distances involved, unified ammunition stockage by type, and changed charges so there are only one or two types of charges for all our weapons. We are just getting this system finished up.

Journal: Would you comment on the value of smoke on the modern battlefield?
Bar-David: I don't know why, but neither we, nor you, nor any other Army has a real appreciation for what smoke will be used for in modern warfare. Smoke will have a tremendous impact in future combat. We used all we had in the last war and are now getting much more. Smoke is used for two major reasons. First, it is used for screening — day and night — to limit the effectiveness of the enemy's infrared sighting devices. Just because you are not "illuminated" by flares does not mean the enemy can't see you. There is the other side — the same smoke will limit *our* infrared, but it is one more decision that must be weighed by the commander. The second use for smoke is as a coordinating and control measure. The battle is so fluid, and units are moved about and arrive in new areas under fire, not allowing time for detailed map and terrain studies. Colored smoke serves as an immediate way to mark assigned sectors, targets, objectives, enemy positions, etc. This must be *colored* smoke because so much white phosphorus is used on the battlefield for other purposes.

Journal: How big were your crews for the M109? Was that adequate for round-the-clock operation?
Bar-David: I think seven is the correct number. The M109 is simple to operate. It has automatic ramming — this is another thing we do differently — we load and ram at any elevation to increase our firing rate. What we are looking at is to *decrease* the number of people in the firing battery area because, as I said, that is a dangerous place. We are thinking of putting the people who usually work with ammunition into the system that brings up the ammunition from the stockpiles. This speeds up the resupply process and gets unnecessary soldiers out of the position in case of attack.

Journal: Can that size crew operate for extended periods round-the-clock?
Bar-David: No unit will fire that much. True, you must be *ready* at all times, but there is not enough ammunition available to let a unit fire round-the-clock. There will be rest periods. Besides, with our geographical situation, any war we fight will have to be short. During Yom Kippur I went for six days without sleep. It can be done.

Journal: What do you think is the most effective command level for exercising tactical control of artillery fires?
Bar-David: The artillery battalion must fight as a unit. Under our system of tactical deployment, our artillery does not support other artillery — we assign the fires of an artillery unit to a maneuver element — usually the brigade commander. The *units* still belong to the artillery commander, but the fires are directed by the maneuver commander. In our system, a battalion can be in direct support of a brigade and two minutes later be in direct support of another brigade, and 10 minutes later be supporting elements of another *division* — from the same position. You must be that flexible when you don't have enough fire units.

Journal: Were you able to use FM radio communications satisfactorily or did you have to use other means?
Bar-David: We found jamming to be a major problem on the modern battlefield. Artillery cannot be used without radios. You must find a way to get through the jamming. We are far less worried about giving away our location to direction finders than we are about simply getting firing data and tactical orders transmitted through massive jamming. Our enemies copy the Soviet systems, and we found that they monitored our frequencies and that the monitors were located in the artillery fire direction centers. If we violated security and announced a location in the clear, enemy fire followed in less than 10 minutes.

Journal: Are you making any major use of captured Soviet materiel?
Bar-David: Yes. We are using everything we have captured. We have to decide which to use in combat units and which to use just for training. We are using the towed 130-mm cannon in some battalions. We modified it somewhat. We captured a lot of that ammunition. We made some changes so that fuzes are interchangeable between Soviet projectiles and our own. We are using the 122-mm rocket — it is a very good and very accurate weapon. We are using their 240-mm rocket launchers. We are not using the other weapon systems in our units because we were not satisfied with their performance, so these are used for training — mainly for forward observer training. We use the 120-mm mortar and the M38 122-mm short-barreled howitzer for training.

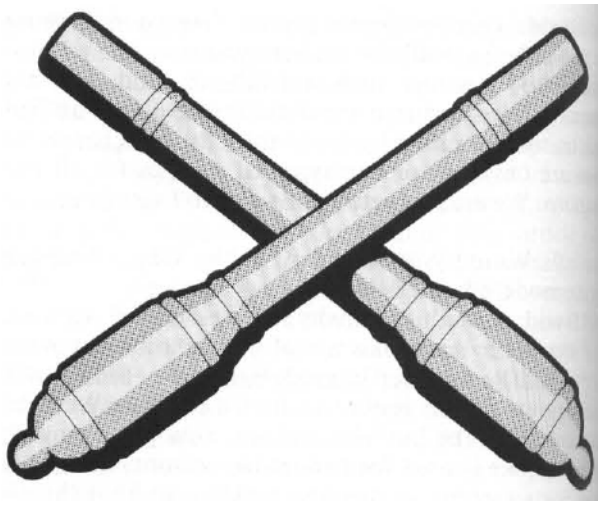
Journal: Is there anything else you would like to comment on?
Bar-David: Yes. We have talked a lot about the M109. The Israeli Army still has some 175-mm battalions, and we are very satisfied with their performance, especially-in counterfire. These are the only guns in the Western world that can reach the enemy's 130-mm and 180-mm Soviet weapons. So I say to critics of the 175-mm, we are *very* satisfied with that weapon.

Journal: Thank you.

North Korean Artillery

Part One: Background and Organization

by CPT J. D. Schnabel



Military tensions continue to exist on the Korean Peninsula. Today, a large number of armed forces face each other along the demilitarized zone (DMZ); unfortunately, the promising South-North dialogue which began several years ago has withered away. North Korea remains committed to unification on its own terms. Even though neither side favors an outbreak of hostilities, the atmosphere for continued incidents remains.

Even with the announced withdrawal of US ground forces from South Korea over the next four to five years, the United States still has a clear, single objective — TO PRESERVE PEACE AND SECURITY ON THE KOREAN PENINSULA. The US continues to maintain a mutual defense treaty with the Republic of Korea, has a military assistance relationship, and will keep adequate American forces there. President Carter stated during a press conference on 26 May 1977, "We will leave there adequate intelligence forces, observation forces, air forces, naval forces, and a firm, open commitment to our defense treaty, so there need not be any doubt about potential adversaries concerning our support of South Korea."

The military balance in Korea is a function of the North Korean threat, the ability of the South Korean forces to meet that threat, and the prevailing international situation. This article deals with the North Korean threat portion of this balance and, specifically, the North Korean artillery threat.

Background

After more than 35 years of Japanese domination, North Korea proclaimed itself the Democratic Peoples' Republic (DPR) of Korea in 1948 and established a unitary system of government.

On 25 June 1950, the North Koreans launched a full-scale invasion across the 38th parallel with seven reinforced infantry divisions and some 2,900 artillery pieces. On 15 September, United Nations forces counterattacked by landing at Inchon, breaking the North Koreans' extended supply lines and later crushing their forces in the south. The complete defeat of the North Koreans was averted only by the massive intervention of the Communist Chinese on 25 October 1950. By mid-June 1951, the battlelines were more or less stabilized along the 38th parallel. After two years of prolonged truce discussions, marked by bitterly contested battles for possession of tactically important hills, an armistice was signed on 27 July 1953 by representatives of the United Nations Command, North Korea, and Communist China. The Republic of Korea (ROK) (South) refused to sign or recognize the validity of the agreement. Of the 1,500,000 casualties in the Korean conflict, 33,692 Americans and 140,000 South Koreans were killed.

Incidents

Since the end of hostilities, North Korea has sent agents to the South on missions of sabotage, terrorism, propaganda, and intelligence gathering. These incidents reached their greatest intensity from 1967 to 1969 and have since been relatively low. Major incidents included the attempted assassination of ROK President Park Chung Hee and seizing the USS Pueblo in January 1968, shooting down a US Navy reconnaissance plane in April 1969, building tunnels under the DMZ which were discovered in 1974-1975, and killing two US Army officers near Panmunjom in August 1976.

Kim Il-Sung

Command of the North Korean armed forces is exercised by the Premier and Supreme Commander of the Armed Forces, Kim Il-Sung. Kim makes all decisions in the Communist party, the government, and the armed forces. Kim claims to be the legitimate leader of all Korea. After serving as a major in the Soviet Army, Kim returned to Korea in 1945 and became the leader of North Korea at the age of 33. Step-by-step, he eliminated all competing factions and established control over North Korea society to insure that no voice of dissent could be raised against his leadership. Because of Kim's harsh rule, 20 percent of the North Korean population fled southward between 1945 and 1950. Kim tried unsuccessfully to unify Korea by sending his armed forces across the border in June 1950. The Korean war stalemate shattered Kim Il-Sung's dream of achieving unification by military means, so he turned to psychological warfare and underground subversion. Kim began rebuilding North Korea's military and economic might, aided generously by the USSR and Communist China. In the 1960s he moved toward a more independent foreign policy. In December 1962 the North Koreans developed a new "military line" setting forth the following principles:

- Make a cadre out of every soldier.
- Modernize the army.
- Arm the entire people.

The Democratic Peoples' Republic of Korea.

North Korean army is predominately light infantry.

- Turn the entire country into an impenetrable fortress.

In 1965 Kim started a three-stage "advance-to-unification" program:

- Removal of US troops from the South under pressure of the united front.
- Seizure of power in the South by the "people."
- Peaceful unification through negotiations.

As a result, incidents involving North Korean agents increased drastically from 1967 to 1969.

In the early 1970s, Kim was able to maintain cordial relations with, and receive aid from, both the USSR and Communist China despite Sino-Soviet conflict. In 1972 Kim Il-Sung began talks with South Korean officials to find a way of unification. On 4 July 1972, the first North-South joint communique established three Principles of National Reunification:

- Reunification should be achieved without outside force.
- Unification should be achieved by peaceful means.
- Both parties should accentuate the cohesiveness of the Korean people.

Both also agreed to ease tensions, create a climate of mutual trust, prevent inadvertent armed clashes, and established a "hot line" to expedite official communications.

Since then negotiations have broken down. Kim Il-Sung cannot be expected to relinquish his obsessive dream of being the leader of all Koreans.

Military balance

The following is a strength comparison between North and South Korea and a short analysis:

	North (DPR)	South (ROK)
Population	16.3 million	34.6 million
Armed forces	495,000	600,000
Paramilitary force	1.8 million	2.7 million
Army	430,000	520,000
Divisions* and separate units	20 Inf Divs 3 MTZ Divs 2 Tank Divs 4 Inf Bdes 5 Tank Rgts 7 Lt Inf Bdes	18 Inf Divs 2 Armd Bdes 30 FA Bns 1 SSM Bn (HJ)
Tanks	100 (T34) 1,850 (T54/T55/T59)	1,000 (M48/M60)
APCs	750 (BTR 40/60/152)	400 (M113/577)
Assault guns	100	–
Arty pieces	3,000	2,000
Rocket launchers	1,300	–
Mortars	9,000	unknown
FROG 5	12	–
*About 15 North Korean divisions are within short striking distance of the DMZ.		

These statistics show that South Korea has twice the population and twice the paramilitary force that North Korea has, giving it a quantitative advantage in a protracted war. Both armies are predominantly infantry because of the rough Korean terrain. North Korea's 47,000 square mile area is 80 percent mountainous. The South has a slightly larger ground force and a substantial number of personnel with combat experience gained from Vietnam.

The two navies are essentially coastal defense forces. South Korea's marine force, a component of its navy, has no known equivalent in the North. On the other hand, North Korea has superiority of numbers in patrol and torpedo craft.

North Korea has superiority in airpower, both from a quantitative standpoint and sophistication of weaponry. As South Korea receives additional US aircraft, this imbalance will lessen.

North Korea's paramilitary force includes security and border guards and a civilian militia which is an important civil defense organization, composed of people from all walks of life. Approximately 50 percent of the members have prior army service and presumably furnish the core of the unit leadership. About 20 percent of this force is female.

It is difficult to arrive at a definitive evaluation of the military balance because of such intangibles as leadership, discipline, morale, and political ideology. Additionally, Seoul, South Korea's capital, is only 30 miles from the DMZ, which increases the South's vulnerability to a surprise attack by the North. Neither country could engage in sustained combat without foreign support.

Training

The North Korean Army has a continual training mission. North Koreans are staunch, tough fighters when properly trained and led. They are accustomed to hardships and capable of conducting sustained operations with meager rations. Trained from childhood to fit into a hierarchical society, they adjust readily to military discipline.

Because rural youths are sometimes exempt from military service to work on the farms, the North Korean soldier comes primarily from urban areas. At age 17, all males are registered and begin military training.

Male students in colleges are required to undergo a minimum of 200 class hours of military training per year. Those who fail must drop out of school. Those not attending college receive militia unit training four hours each week.

Selected North Korean males (18 to 21 years of age) are inducted into the Army and serve approximately seven years. Women are drafted to be nurses, telephone operators, antiaircraft crew members, and clerks.

The usual route to a commission is via officer candidate schools or academies, but some officers rise from the ranks. Many officers attend Soviet and Chinese communist military schools. The North Korean rank structure is similar to that of the US except that there are three lieutenant and three colonel ranks.

The officer corps is well paid (probably better than their civilian counterparts). Pay in the lower ranks is meager, although there is extra income for technical specialists, hazardous duty, sea duty, forward area assignment, and longevity. Food, clothing, housing, and medical care are provided to all ranks.

Training emphasis is placed on physical conditioning, night operations, mountain warfare, winter operations, CBR, political indoctrination, and guerrilla and infiltration techniques. It should be kept in mind that the

Korean War was characterized by the North Koreans marching hard and long, mostly at night, and resting only in well-camouflaged bivouacs by day. This practice facilitated immediate troop concentrations on the battlefield. Cover and concealment are stressed in all training.

Each commander is responsible for the political indoctrination of his troops from battery to army level. He is assisted in this task by his political officer.

The North Korean soldier is a well-trained, politically motivated, rugged individual. A weakness in his training, however, is that he generally lacks initiative because he is often oversupervised.

Doctrine

North Korean tactics are derived from Soviet and Chinese communist tactical doctrine. In conventional warfare, stress is placed on detailed reconnaissance, hard-hitting offense, envelopment techniques, and pursuit. The "human wave" concept, used during the Korean conflict, will not be employed. The defense, which is adopted only when necessary, features counterattacks and the use of extensive passive defensive measures, such as field fortifications, cover and concealment.

In a static defense, such as the North Korean Army maintains along the DMZ, doctrine stresses extensive use of caves for storage and living quarters. Artillery positions are dug into hillsides for protection. This underground protective defense technique also shields industrial complexes throughout the country.

Organization and mission

North Korean artillery includes various calibers of antiaircraft guns, mortars, howitzers, assault guns,

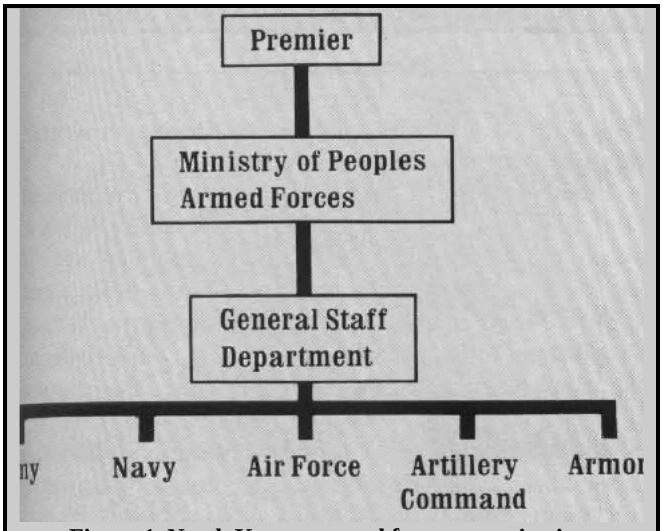


Figure 1. North Korean armed forces organization.

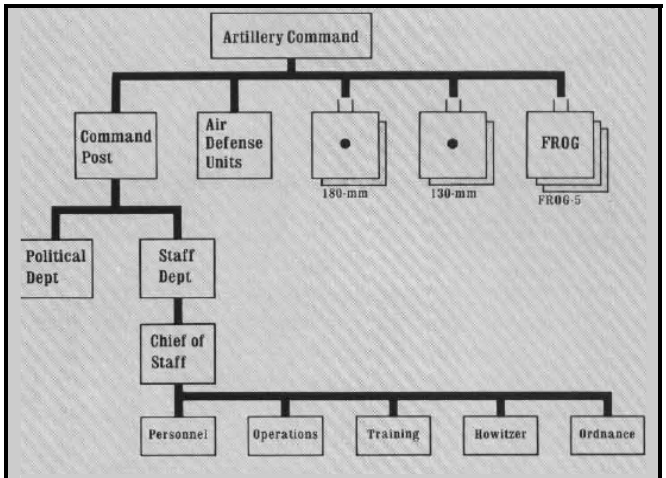


Figure 2. Artillery command.

antitank guns, guided missiles, and free-flight rockets. This discussion is limited to tube and missile artillery units.

On the Korean battlefield, field artillery will be the principal means of combat support. The North Korean artillery is organized to provide fire support to the entire North Korean Army and to supply and repair all types of weapons.

The *mission* of the North Korean artillery is to provide ground combat units (including guerrilla units) with fire support by neutralizing or destroying ground targets. The artillery also provides counterbattery, direct fire, antiaircraft, smoke, and illumination support as required.

The highest North Korean artillery organization is the Artillery Command under the General Staff Department. This strategic command has status equal to the Army, Navy, Air Force, and Armor commands and contains long-range artillery and air defense units (figures 1 and 2).

Tactical artillery organizations (figures 3 through 5) include army/corps, divisional, regimental, and battalion artillery.

The organization of the artillery units in infantry divisions, tank divisions, and separate infantry brigades is tailored to suit each particular requirement and mission. A tank division, for example, has one artillery regiment, consisting of one 120-mm mortar battalion and two 122-mm howitzer battalions. It also has one assault gun battalion and one antiaircraft battalion. A separate infantry brigade has one 122-mm howitzer battalion, two 76-mm artillery battalions, and one antiaircraft battalion.

Other pertinent data concerning artillery organization are:

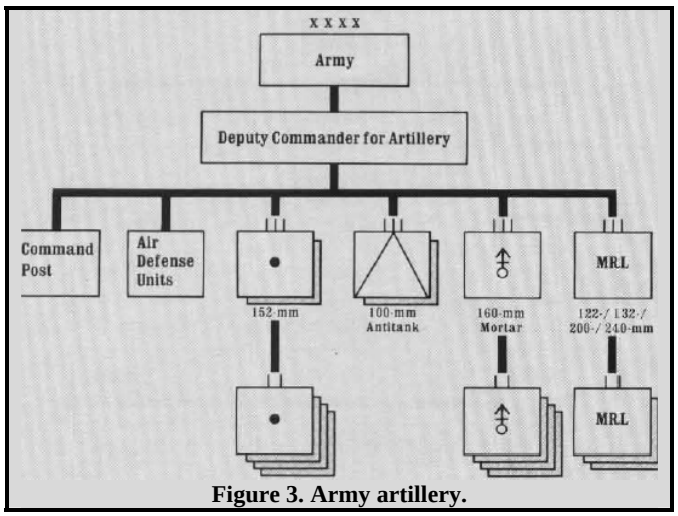


Figure 3. Army artillery.

- A battery of nine 82-mm mortars is organic to each infantry battalion.
- Each artillery battalion has a chemical warfare section charged with chemical survey, decontamination, and training.
- Each artillery battery has at least one observation team.

Chain of command

Each tactical unit down to maneuver regiment has a deputy commander for artillery who organizes artillery units for combat, advises the tactical commander concerning artillery support, plans artillery fires, and *commands* all subordinate and attached artillery units. He is also responsible for supply and repair of weapons and ammunition.

In regard to the relation between maneuver staff officers and subordinate artillery commanders, instructions to the Army Deputy Commander for Artillery

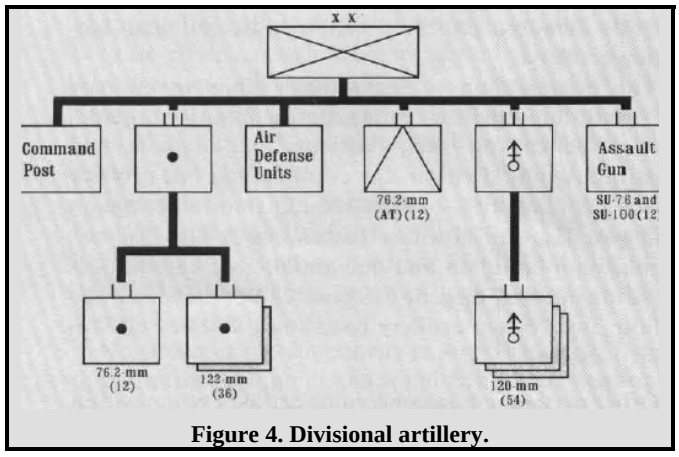


Figure 4. Divisional artillery.

are prepared by the Artillery Command and are delivered in the name of the minister of the Peoples' Armed Forces. Likewise, instructions to the divisional artillery units are prepared by the Army Deputy Commander for Artillery and are delivered in the name of the Army Commander. This system is necessary to command the different artillery units which are not under direct control.

Battalion and battery commanders exercise control from a command observation post (COP). Their duties include establishing and occupying main, secondary, or reserve COPs; observing the enemy situation; controlling firing; determining firing positions; establishing direction of fire; and computing firing data. The North Korean artillery system, like the Soviets, does not have forward observers with each maneuver company as is customary in the US artillery units. The COP is normally in the vicinity of the supported maneuver unit headquarters to maintain direct coordination.

The battalion commander establishes the general location of the firing positions to include two or three alternate positions. The exact locations are determined by the battery commanders.

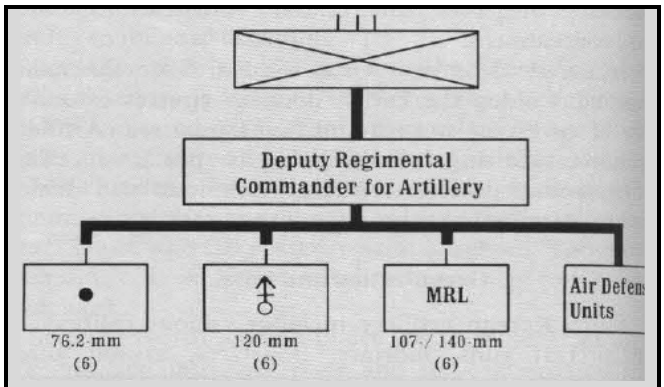


Figure 5. Artillery organic to an infantry regiment.

Weapon systems

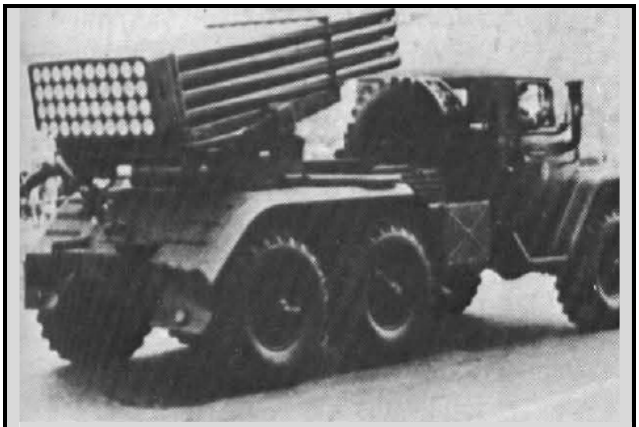
The various artillery weapons of the North Korean Army have the following functions:

- **Field artillery** — destroy or neutralize personnel and materiel targets and employ counterfire, smoke, harassing, and antitank fires. Field artillery will be positioned so that three-fourths of its maximum range will be forward of the forward edge of the battle area (FEBA). In time of war, artillery groups will be established for centralized control over the massed artillery units.
- **Antitank artillery** — primary mission is antitank defense and *indirect* fire missions as required. Antitank artillery pieces may be formed into antitank reserve units to meet a high tank threat.

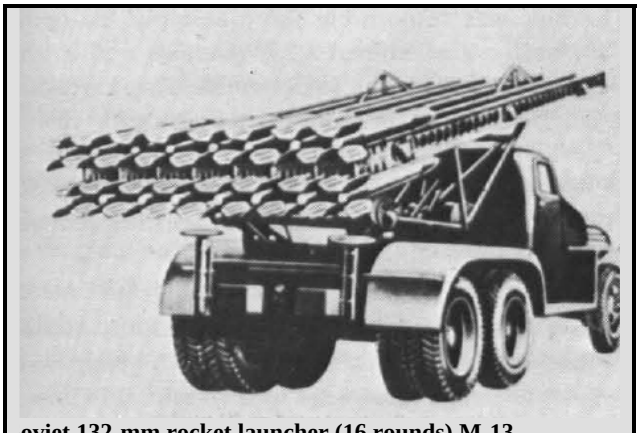
30-mm field gun M-46.

• **Assault guns** — provide close direct fire support to infantry units and may be attached to infantry companies, artillery batteries, or antitank reserve units.

• **Mortars** — destroy personnel and obstacles and reinforce artillery fires. Mortars are normally centrally controlled and participate in preparation fires. Usually Army and division mortars are attached to infantry regiments in battalions and may be further assigned to infantry battalions by battery. The 82-mm mortars support the maneuver companies at a distance of 300 to 800 meters behind the FEBA. The 120-mm and 160-mm mortars are one to two kilometers behind the FEBA.



122-mm rocket launcher (40 rounds) BM-21.



oviet 132-mm rocket launcher (16 rounds) M-13.

• **Multiple rocket launchers** (MRL) — conduct area suppression or harassing missions in general support of infantry divisions and regiments. The MRLs are highly mobile and can be assigned to artillery groups. MRLs leave such an easily identifiable signature of fire that they normally move immediately after firing.

• **Antiaircraft artillery** — protect unit facilities, troop concentrations, lines of communications, and artillery positions from air attack. They may be employed to engage *ground* targets as required.

• **Coastal artillery (130-mm guns)** — engage the enemy invading from the sea at long ranges (27 kilometers) and may be deployed elsewhere as required.

• **Free rockets over ground (FROG)** — attached to armies and provide reinforcing fires to infantry divisions. Firing positions are located 8 to 10 kilometers from the FEBA and normally change after firing.

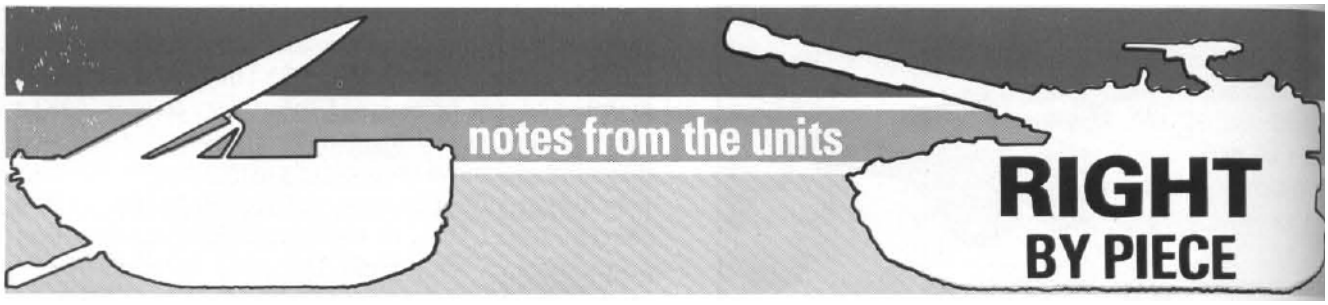
Table 1 shows most of the major North Korean artillery weapons and their characteristics.

Table 1. Characteristics of major North Korean weapons.

Category	Caliber (mm)	Model	Max range (meters)	Max rate of fire (rpm)	Muzzle velocity (m/s)	Remarks
Mortars	82	M1937	3,040	25	210	
	120	M1943	5,700	15	272	
	160	M1943	5,000	3	305	Breech loaded.
Tube artillery	76.2	M1942	13,300	20	965	Basic weapon used.
	122	M1938	11,800	5	515	
	130	M-46	27,000	5	930	Coastal defense weapon
	152H	M1943	12,400	4	508	
	152GH	M1937	17,265	4	655	
	180	S-23	30,000	3	790	
Assault guns (SU)	76	M1942	13,000	2	680	Both normally used for direct fire.
	100	M1955	21,000	8	900	
Multiple rocket launchers	107	Type 63	8,050		385	12 rkts/lchr.
	122	BM-21	20,500		450	40 rkts/lchr.
	132	M-13	9,000		350	16 rkts/lchr.
	140	BM-14	9,810		400	16 rkts/lchr.
	200	BMD-20	20,000		–	4 rkts/lchr.
	240	BM-24	10,200		–	12 rkts/lchr.
Free rocket over ground	400	FROG-5	35,000			

CPT J.D. Schnabel, MI, is assigned to the USASA Field Station, Okinawa. He branch transferred from the Field Artillery in 1972. When the article was written, he was an instructor in the Tactics and Combined Arms Department, USAFAS.

Part Two, which will appear in the next issue, will describe North Korean artillery tactics, to include organization for combat.—Ed.



FA for Army's 16 divisions is complete!

FORT POLK, LA — With the official "first round firing ceremony," the 3d Battalion, 19th Field Artillery, joined the 5th Infantry Division Artillery and became the last divisional field artillery unit necessary to complete the 16-division Army — planned by the late Gen. Creighton Abrams when he was Chief of Staff.

Pulling the lanyard on that significant round was gunner-for-a-day, MG William B. Steele, 5th Infantry Division Commander. Others in the "crew" were Assistant Division Commander BG Frank E. Serio, 2d Brigade Commander, COL John R. Westervelt, Divarty Commander, COL Orren R. Whiddon, 3d Battalion Commander, LTC Richard B. Hoogstraten and his CSM 1SG Thomas A. Rogers. Each of the honorary Redlegs were presented engraved 155-mm nose plugs to mark the occasion.

The first round is fired by the last Field Artillery battalion formed to complete the 16-division Army. (Photo by SSG Ron Hammeren)

FA battalion assigned to northern Germany

FORT HOOD, TX — The 1st Battalion, 14th Field Artillery, is scheduled for movement to Germany in February 1979 as one of six Fort Hood units that will form the 2d Armored Division (Forward), the first American tactical unit to be permanently assigned in the northern sector of Germany.

Brigade headquarters will be located at Garlstedt approximately 30 miles south of Bremerhaven.

Soldiers taking their families to Garlstedt will serve a 3-year tour in USAREUR. Modern housing and all the essential facilities will be provided. Under construction are more than 1,000 housing units, a major school complex, and recreation facilities.

M198 field evaluation

FORT BRAGG, NC — A field evaluation of a prototype M198 155-mm towed howitzer was conducted last summer by the 1st Battalion, 73d Field Artillery. The unit was responsible for evaluating the operator (-10) and organizational (-20) manuals and a limited field use of the weapon to determine design weaknesses and deficiencies in the maintenance allocation chart.

Several equipment difficulties were discovered, most of which had been identified in other phases of testing. These should be eliminated in the first production models of the weapon.

Unanimous approval was given the manuals, especially the -10 which is written in more easily understood style than previous editions and includes clear and detailed illustrations.

The battalion encountered no difficulty in its assignment to determine whether a unit, given no instruction

or assistance other than that contained in the manual, could become familiar with the weapon, its nomenclature, characteristics, operation, and maintenance requirements.

Maintenance of the M198 was found to be much less complicated than that of the M114 towed 155-mm howitzer. For example, the breech can be disassembled by a moderately trained cannoneer, using no tools, in less than one minute, as compared to the 12 minutes allowed in the gunner's test of FM 6-50. Other design features, such as the enclosed gears on the elevating and traversing mechanisms, reduce maintenance problems.

Hydraulic system deficiencies such as fluid leakage were apparent in the test weapon and the system failed to develop enough pressure to force the wheels down and raise the carriage off the base plate for displacement. In addition, the crew could not change a tire on the weapon since the wheel nuts require a torque wrench rated at 450 foot-pounds, which is available only at battalion level maintenance.

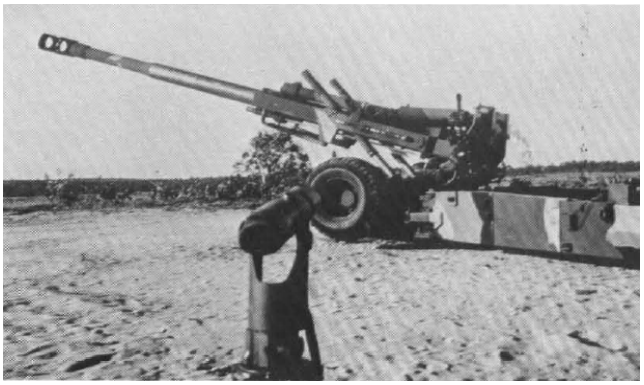
While they were at first intimidated by the size of the M198 (a 155-mm M114 will fit inside the spread trails of the M198 version), the crew soon found that, because of its better balance and hydraulic system, it was more easily emplaced than the M114.

Once emplaced, the weapon presents a lower, more easily camouflaged silhouette than the M114. The low silhouette also facilitates firing as the crew need no longer climb on the trails to reach the sight and quadrant seats.

Prefire checks were all conventional except for boresight checks. A special alignment device on the M198 provides a target upon which the panoramic telescope is zeroed, disposing of the need for the standard test target. Tritium gas vials illuminate all scales and bubbles to facilitate night firing.

Among the less satisfactory features of the M198 during testing was the traversing handwheel which is too small and too close to the sight mount. Test crews were unable to obtain a good realtionship between the equilibrators and the elevating mechanism. The clutch required excessive pressure and, at higher elevations, when the clutch was depressed, the tube had a tendency to elevate itself.

Hookup of the howitzer to its 5-ton truck prime mover requires lifting the trails to chest height. This is done with difficulty by four men. Redesign of the trails, the lunette, or the handling bars could solve the problem.



M198 155-mm towed howitzer

The combined length of the prime mover and howitzer exceeds 70 feet. This makes maneuvering difficult in close quarters, and more planning is required before all displacements.

Durability of the test weapon was reduced by efforts to decrease weight. Several brackets and welds cracked or broke during normal operations.

Overall, the weapon is considered to be a great improvement over previous towed 155-mm howitzers. All of the deficiencies identified are readily correctable, and many have been corrected in later prototypes and incorporated in plans for the production model.

A prototype is being evaluated at Fort Sill to verify if all detected deficiencies have been corrected. —Ed.

MEMPHIS, TN – Following removal of the "Memphis Belle," a WW II B17, from its 27-year home on display pedestal dominating the Army National Guard armory, Redlegs of the 3d Battalion, 115th Field Artillery, replaced the bomber with a German 105-mm field gun of WW II vintage which they dedicated to those battalion members who have been killed in action. Battalion motor maintenance technician W02 Albert C. Forrest directs SSG Robert P. Mercer in moving the gun.

"Monarch of the Plains"

Wildlife painting to aid FA Museum

FORT SILL, OK — "Monarch of the Plains," a limited edition color print of the American buffalo, from an original by artist Ray Harm, is being offered by the Field Artillery Association to aid the Army Field Artillery Museum. Only 2,200 of these prints will be made.

Four hundred of the exclusive 24- by 30-inch prints will be issued in June. Each will be signed by the artist and bear the "First Day of Issue" seal at a cost of $100. An additional 800 signed prints will be available with the museum seal and inscription at $75. The remaining 1,000 prints (not inscribed) will be sold through the publisher.

Artist Ray Harm is known in Army circles for his painting of the West Point eagle. Prints of Harm's West Point eagle sold for $60. By the time they were released, they were selling for $700. Harm's name is one of the most recognized in the area of wildlife art. He works only from life, never from photographs or dead animals.

Banker's magazines have described Harm's wildlife art as one of the best investments since one of his paintings increased 3,000 percent in value within a year's time.

The buffalo was chosen for the painting as being representative of this part of the country. The American buffalo provided food, shelter, and clothing for the Indians and early settlers and is both a national symbol and a symbol of the West.

Funds raised from sales of the print will be used to buy vitally needed environmental control equipment for the museum's conservation laboratory. The laboratory is used to preserve and study the museum's collection of perishable artifacts.

Orders for the prints may be placed by calling area code (405) 351-5123/3703/4775 or AUTOVON 639 plus the same extensions, or by writing the Field Artillery Association, Fort Sill Museum, Fort Sill, OK 73503.

Reserve unit provides bright training program

LAS VEGAS, NV — A display at a tourist information center in Las Vegas proclaims that city to be "By night, a dazzling, jeweled oasis that blazes like a multicolored bolt of neon lightning across the valley floor."

Competing with the brilliance of the city about once a month is D Battery, 29th Field Artillery, 63d Army Reserve Command. The Las Vegas-based Army Reserve unit is the only one of its kind in the western US and would be called upon in case of war to provide searchlights to ground and air forces for battlefield illumination.

Most of the unit's weekend drill exercises are performed after dark. The battery usually moves out at sunset, and on some weekends has a continuous 16-hour mission from 4 pm Saturday to 8 am Sunday. Operating from a mountain, the battery can light up a battlefield with a spread beam from seven to 12 miles on a clear desert night.

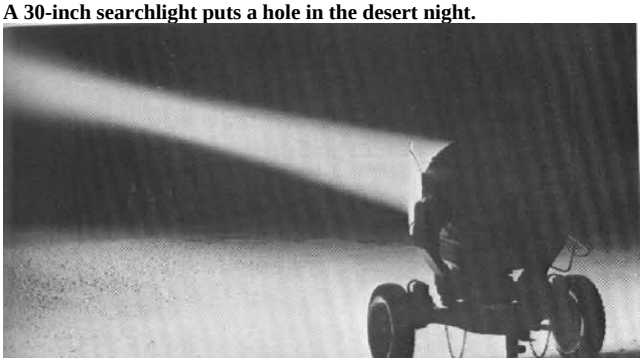
The unit has an infrared capability for use with infrared binoculars for a range of three to five miles. Light can also be reflected off clouds and water or around mountains. A forward observer controls the lights through the light direction center. If the center goes out of action, the lights can compute coordinates independently.

Battery D is organized into three 24-man platoons. Six men are required to operate a searchlight; one on azimuth, one on elevation, a radiotelephone operator, a section chief, a generator operator and an alternate. Crews must wear asbestos gloves and face masks for protection from the heat and glare of the lights.

World War II vintage searchlights had a burning carbon arc that had to be changed every hour. The unit's lights have a xenon (gas) bulb that can run indefinitely. The new lights are more sophisticated than the WW II version which did not have infrared or a means for diffusing the beam and was not air transportable by helicopter. The 30-inch searchlight weighs 1,500 pounds and has a candlepower of 800 million minimum to 1.5 billion maximum with a 25-kilowatt generator.

With two officers and 103 enlisted men, the battery has a problem filling its ranks due to the transient nature of the community.

A 30-inch searchlight puts a hole in the desert night.



Perched atop a howitzer, members of the 1-3d FA prepare to fire a .50 caliber machinegun at a radio-controlled target during aerial gunnery training. (Photo by Miguel Casanova)

Artillerymen learn antiaircraft techniques

FORT HOOD, TX — Second Armored Division Redlegs put up a wall of steel against "enemy" aircraft during small-arms aerial gunnery training here recently. The 1st Battalion, 3d Field Artillery received, what was for some, first time experience in small arms aerial gunnery . . . not against real jets but at a swooping, diving model airplane used to simulate a supersonic aircraft.

Since howitzers are of little use against attacking aircraft and are most vulnerable to air attack while in convoy, artillerymen are equipped with M16 rifles and .50 caliber machineguns mounted on the howitzer for use against enemy aircraft.

The 1-3d FA received classroom instruction on aircraft identification and engagement in which they learned to fire a large volume of ammunition and aim ahead of the attacking plane. They were told that a whole battery firing at once has a good chance of knocking down or scaring off an attacking aircraft.

During the field training, each battery positioned its howitzers on line. Each crew had one man poised with the .50 caliber machinegun and around him were crew members armed with rifles. At a signal from the battery commander, the soldiers commenced firing and continued until they had to reload or were told to cease firing.

The massed small-arms fire was thrown up against a radio-controlled model airplane which angled in at the artillerymen as if attacking. Flying at 100 knots and at a distance of 330 meters, the small aircraft simulated a life-size jet flying at greater speed and distance.

The instruction given the artillerymen paid off when, seconds after the shooting began, the small plane tumbled to the ground.

FORT KNOX, KY – Major General Moshe Peled, commanding general of the Israeli Armored Corps is assisted in the use of a hand-held, card-programable calculator by SP4 Larry Criss of the 3d Battalion, 3d Field Artillery, 194th Armored Brigade. General Peled made a recent visit to the unit which claims to be the first to use the calculator in firing exercises. (Photo by Lovelace Lee III)

Bad winter provides good training

FORT DRUM, NY — For some units the weather is a minor problem, but for Battery B, 1st Battalion, 321st Field Artillery, operating in three to four feet of snow is something else. The battery supported the 2d Brigade Task Force of the 101st Airborne Division during "Empire Glacier '78" cold weather exercises here.

The snow and cold combine to slow things down, and it takes two or three times as long to do something up here as it does in Fort Campbell, according to LTC Herbert S. Simmons, battalion commander.

"We have a big problem just getting into position," commented SGT Joseph Holcombe, a battery section chief. "It usually takes us 10 to 15 minutes to get set up, but it takes a lot longer here because you have to dig through three or four feet of snow to get firm ground to place the gun on. Things also take longer because of the cold weather clothing we wear. The mittens we have hamper our movements some, but when you're working around metal in this kind of weather, you have to protect your hands."

Despite overnight bivouacs and day-long firing exercises in field locations throughout this northern New York installation, morale stayed high according to Simmons.

"We're finding out that we can operate out here," said Simmons, "and most important, the men are making it work by sheer dedication."

2d Armored Div Arty leads in FAA memberships

FORT SILL, OK — Congratulations are in order for the 2d Armored Division Artillery which leads all US Army Field Artillery units in Field Artillery Association memberships. In one month's time, more than 150 officers and men of the 2d Armored Division Artillery joined the Association.

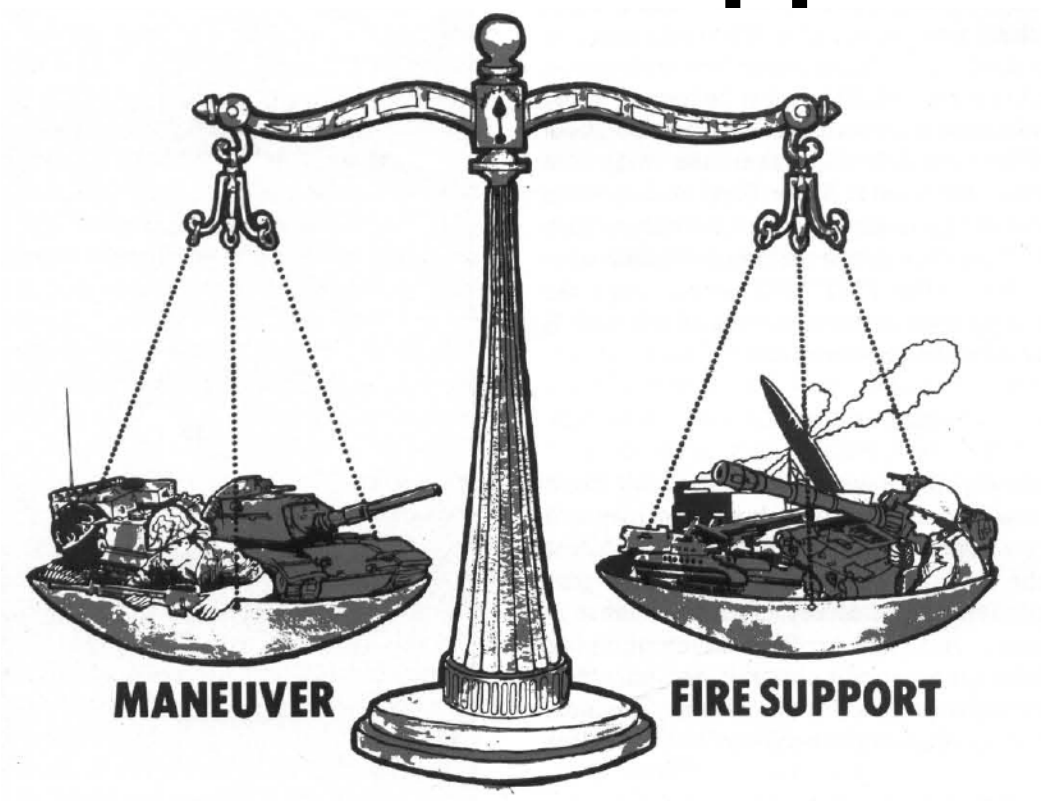
Association President COL James W. Wurman offers a highly prized award to every unit that tops 100 memberships. Dues for Association membership are $9 annually and include, among other benefits, an individual subscription to the *FA Journal*.

Lance battery back from Korea

FORT SILL, OK — Soldiers of B Battery, 6th Battalion, 33d Field Artillery returned to Fort Sill recently following participation in a joint service military exercise in Korea. The reinforced Lance missile battery spent 14 days supporting exercise "Team Spirit" in which men and equipment had moved to Korea under simulated wartime conditions.

The move to Korea was made in nine flights over three days. Men and equipment were airlifted on C-141 Starlifter jets where they joined units from the Navy, Marine Corps, Air Force, and other Army units already stationed in Korea.

Effective Fire Support —



A balanced combined arms team

by LTC Carl S. Taylor

"A close working relationship."
"Rapport."
"Get in bed with the maneuver commander."
"Travel in his hip pocket."
"Know how your commander fights."

These are phrases every Field Artilleryman has heard at one time or another. Does the Field Artillery really do these things; or, are these concepts given more "lip service" than action? During garrison training, how many forward observer/fire support teams and fire support sections report for duty at their supported maneuver units on a habitual basis? How many young FA officers *really* understand company, battalion, and brigade maneuver tactics?

Do we really train our officers in the basic and advance courses to "sell" their fire support product and to "push" fire support at every opportunity? Do the maneuver arms service schools teach their company commanders to understand fire support concepts and procedures and how to give proper guidance to their fire support agents? Do maneuver commanders include their fire support personnel in the early planning sequence, or does the old technique of "Here's the maneuver plan; you support it by fire" still exist?

These are hard questions and the answers vary from individual to individual and from unit to unit. However, the message is clear — it takes concern and expertise on both sides of the maneuver/field artillery team to effectively train as a combined arms team.

The 1st Cavalry Division believes that we (the Field Artillery) have underestimated the FIST/FSO training problem. For this reason, the 1st Cavalry Division Artillery sponsored a two-day Fire Support Seminar in September 1977.

The seminar, which was conducted by both Field Artillery and maneuver personnel, was aimed at the fire support team (FIST) personnel and battalion and brigade fire support sections. Both officer and enlisted members of these sections attended. The Field Artillery personnel in these teams must serve two masters — maneuver and fire support. They must be trained to ply their trade in a rather disorderly maneuver environment where immediate reaction may mean the difference between success and failure. These Field Artillerymen do not operate in the relatively calm atmosphere of a fire direction center where actions largely follow step-by-step procedures. The FIST/FSO people forge the link between supported and supporting. If this link is weak, so is the combined arms team.

1st Cav plan

The sessions (figure 1) were seminars in the truest sense. There was give and take from both maneuver and Field Artillery and nobody was awed or remained silent because of the rank or experience of the other participants. This atmosphere is key. The free exchange between maneuver and Field Artillery, which started in a relatively calm seminar, will continue and hopefully improve when representatives of the Infantry, Armor, and Field Artillery must make decisions in the heat of battle.

The tone of the seminar was set by the first sessions. In his introductory remarks, the Division Artillery Commander placed fire support in its proper perspective on the battlefield. His remarks were followed by an excellent presentation by the Division G2 concerning the potential Warsaw Pact threat. Although the briefing focused on enemy artillery forces and capabilities, a case was also made for the massive armor threat.

The stage was now set. The attendees understood the importance of integrating fire support into the battle plan and also the formidable threat posed by our potential adversaries. The remainder of the seminar was devoted to discussing *how* to make maneuver and fire support a better team.

The Assistant Division Commander for maneuver (ADC-A) followed the G2 presentation and outlined the 1st Cavalry Division fighting philosophy and tactics. His presentation centered around the very difficult task of *target servicing*. Given the number and types of weapons systems used by the enemy and considering their tactics, how can a friendly force which is outnumbered, outgunned and, in some cases, outranged, hope to win? By the use of a simple scenario and some basic drawings, the ADC-A outlined a situation in which the friendly forces, attacked by a representative

First Day

Hours	Subject	Speaker
1/4	I. Introduction	Div Arty Cdr
	A. Where the fire support system fits into the "big picture".	
	B. The importance of fire support coordination to the accomplishment of the Division mission.	
1 3/4	II. The Threat	G2
	A. Soviet weapons capabilities.	
	B. Expected tube ratio and battlefield target array.	
	C. Soviet order of battle.	
1	III. How the 1st Cavalry Division will fight	ADC-A
	A. Division level philosophy and tactics	
	B. Target servicing and fire support	
	C. Fire support coordination	
3	IV. How the brigades will fight	
(1)	A. Company/Platoon level	Bde Cdr
(1)	B. Battalion level	Bde Cdr
(1)	C. Brigade level	Bde Cdr
3	V. FIST	Div Arty

Second Day

4	VI. Battalion and brigade fire support (to include mortars)	DS Bn Cdr
3	VII. Other fire-support assets	
(3/4)	A. Air Force	Div ALO
(3/4)	B. Attack helicopters	Atk Hel Unit Cdr
(3/4)	C. Naval gunfire	USMC Rep
(3/4)	D. FATAB	TAB Btry Cdr
1/2	VIII. Summary	Div Arty Cdr

Figure 1. 1st Cavalry Division fire support seminar schedule.

threat force, were placed in a defensive posture. It was very apparent that the friendly force would have to make the maximum use of all weapons to win the battle. The TOWS, DRAGONS, tanks, mortars, field artillery, attack helicopters, machineguns, and even the individual weapons would have to be employed in such a way that the majority of the targets could be engaged to blunt the threat force attack.

It was now very apparent why the seminar was so important. How does the commander plan for the use of all these weapons systems? After planning, how does he insure a coordinated and integrated execution of the plan? Where does indirect fire support fit in? How much field artillery must be devoted to the direct support of the maneuver forces and how much should be used to engage the enemy indirect fire systems (counterfire)? For the next day-and-a-half the seminar participants sought answers to these questions.

The next sessions involved presentations by the three 1st Cavalry Division brigade commanders and some of their subordinate commanders. These commanders explained maneuver tactics from company through brigade level. Simple scenarios were used and each commander gave examples of the guidance he would give to his fire support coordinator for the operation. These sessions were most productive because they resulted in effective dialogue between the maneuver and field artillery attendees. Various means of fire support were explored and reasons were given for why they would or would not be employed. Planning sequences were followed and the scenarios were played to completion. The physical locations of the fire support personnel during the fight were discussed. It was interesting to note the different preferences of the maneuver commanders in locating their fire support personnel. Some preferred them always with them, others always located their fire support personnel at their tactical operations center, and others based their decision on the situation. For the field artillery attendees the message was clear — be flexible! Be able to react to your supported commander's desires. Be able to explain the advantages or disadvantages of each location in a given situation. Be able to explain your communication and fire support coordination capabilities in each situation. Consider splitting your team in certain situations. In other words, know your options, make recommendations, respond to your supported commander's desires, and *execute*.

Following the discussion of maneuver tactics, participants reviewed the new FIST concept to include organization, equipment, communications options, and employment. FIST has been implemented in the 1st Cav Div in one FA battalion for the Division Restructure Study and will be implemented division-wide very soon.

After the FIST discussion, the seminar attendees focused their attention at the maneuver battalion and brigade fire support section level and discussed employment responsibilities, control of the FISTs by the battalion fire support officer, and advising the commander on fire support matters.

The use of mortars was emphasized during these discussions. Both FIST and FSO personnel must know mortar capabilities and limitations, employment considerations, resupply constraints, and available munitions. Since most 1st Cavalry Division Artillery units are involved in mortar training for their supported brigades, this mortar knowledge becomes increasingly important. FIST personnel were encouraged to use mortars to engage targets where appropriate, especially for illumination and smoke missions. This frees the longer range artillery tubes to engage deeper targets and to devote more assets to counterfire, if appropriate.

During the discussions of the FIST and FSO sections, there was not a rehashing of doctrine and "approved solutions," but rather a good exchange on techniques for fire support integration (e.g., how to simultaneously employ field artillery and tactical air in the same target area; "tools of the trade" such as charts, fire capabilities overlays and maps; how to "listen" to what your supported commander is telling you; and how to anticipate the needs for fire support). Many problems were surfaced and potential solutions were explored. All agreed on one point — it takes a technically proficient and dedicated professional to provide good fire support.

The last sessions of the seminar dealt with various means of fire support other than field artillery. Experts explained the capabilities, limitations, availability, and employment considerations of each weapons system.

A most successful seminar was closed by remarks from the Div Arty commander. He emphasized several points:

- Be *technically* proficient concerning fire support systems.
- Be *tactically* proficient in both the maneuver and fire support areas.
- Learn to "listen" to your supported commander and pick out the key phrases which tell you what he wants in the area of fire support.
- "Push" fire support by:

  1) Making sure you provide input early in the tactical planning sequence.

  2) Educating supported personnel on fire support.

  3) Constantly revising your fire support planning as the situation develops.

  4) Offering advice and suggestions — *don't wait to be asked*.
- FSOs have three basic functions:

  1) Manage FISTs.

  2) Provide fire support coordination for current operations.

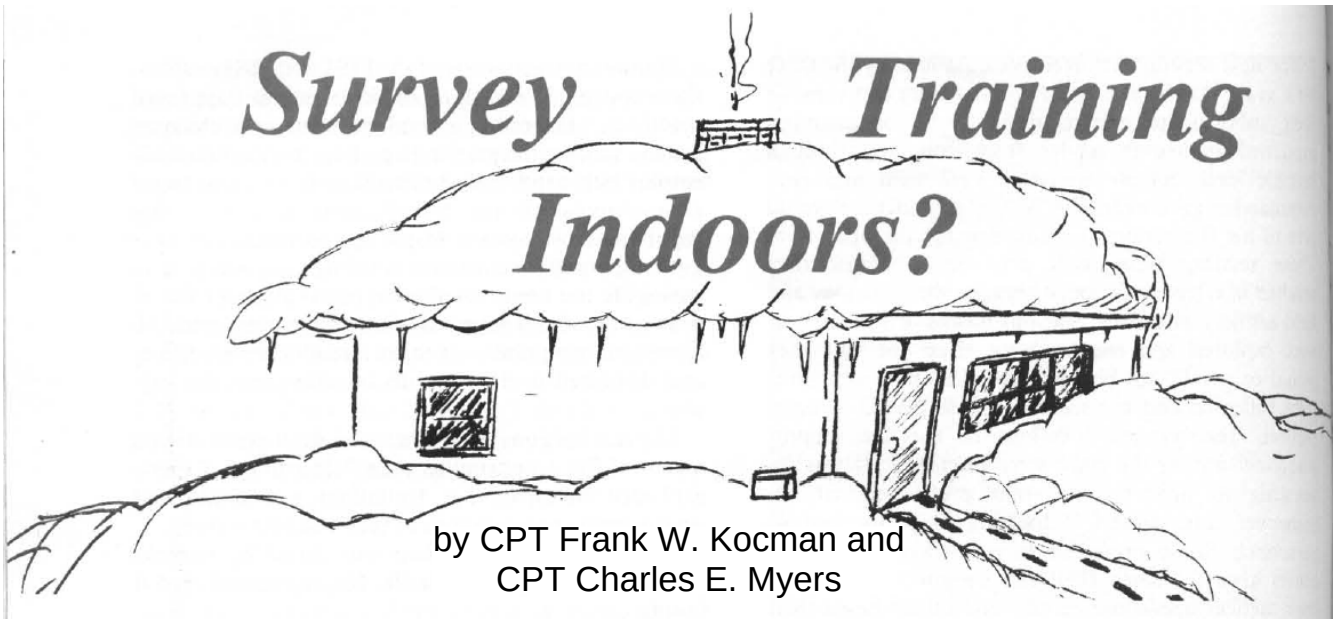
  3) Provide fire support planning for future operations.

At the completion of the seminar, each attendee was handed a draft "Fire Support Handbook." This handbook was designed to be a quick reference for both FIST and FSO personnel. It provides information in the following areas:

- Fire support weapons systems capabilities.
- Warsaw Pact fire support weapons systems.
- FIST.
- Responsibilities of the FSO.
- Fire support coordination.

Personnel were told to take the draft handbook, look at their applicable areas, and offer suggestions for

(Continued on page 49)



Survey Training Indoors?

by CPT Frank W. Kocman and
CPT Charles E. Myers

Does inclement weather stop your survey section from effectively training outdoors? When the wind chill factor drops below zero degrees, realistic field training quickly moves into the category of survival rather than training.

The Counterfire Department has developed an indoor training environment which can be used by any unit to maintain basic survey skills during periods of bad weather or simply when post support requirements leave you only a handful of men from the survey section. A training environment can be developed in a unit at minimal cost and adapted to your unit's available space.

Sun observation

For training on sun observation you must have a sunny day. Without the sun you cannot do a sun shot or simultaneous observation. However, you *can* simulate the sun observation indoors using an ordinary wall clock.

1) Buy the ordinary wall clock from self-service ($4 to $6).

2) Select the area you want to use for training. It can be a room, storage area, or barracks bay.

3) Set up your survey instrument (normally a T16 theodolite) on one side of the room.

4) Remove the glass cover from the face of the clock and then remove the hour, minute, and sweep-second hands. You may throw away the glass cover and sweep-second hand as they will not be needed. Now punch or drill two small holes in the pointed ends of the hour and minute hands (figure 1). Then rivet or bolt the two hands together (figure 2). Reinstall the two hands on the clock at the minute hand end. Your clock should now look like the sketch in figure 3.

5) Mount the clock on a wall opposite your instrument and focus on the end of the clock "hands."

6) Have someone hold up different size discs (start with a 1-inch disc) at the clock until you find one which completely fills the solar circle in the reticle of your instrument.

7) Punch or drill a hole in the center of the disc and attach it to the end of the hour hand. Your clock should look like the sketch in figure 4.

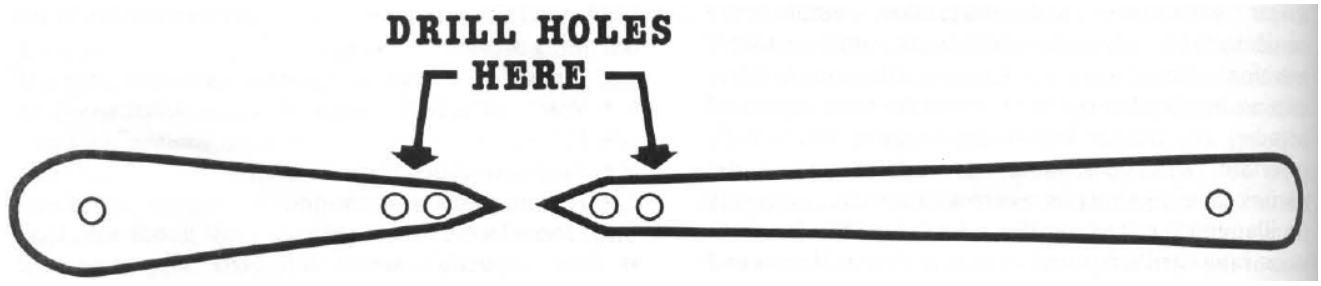


Figure 1. Punch two small holes in the hour and minute hands.

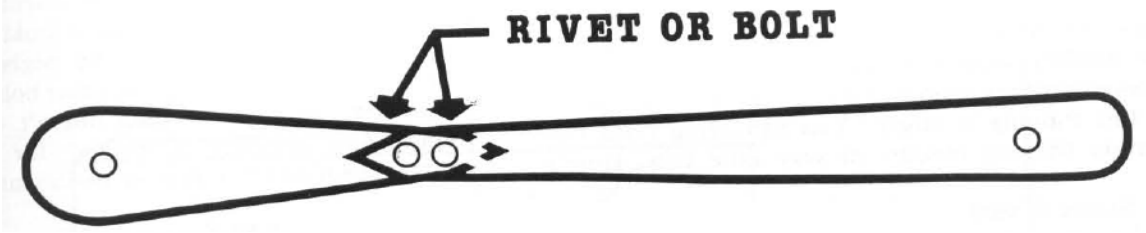


Figure 2. Bolt or rivet the hour and minute hands together.

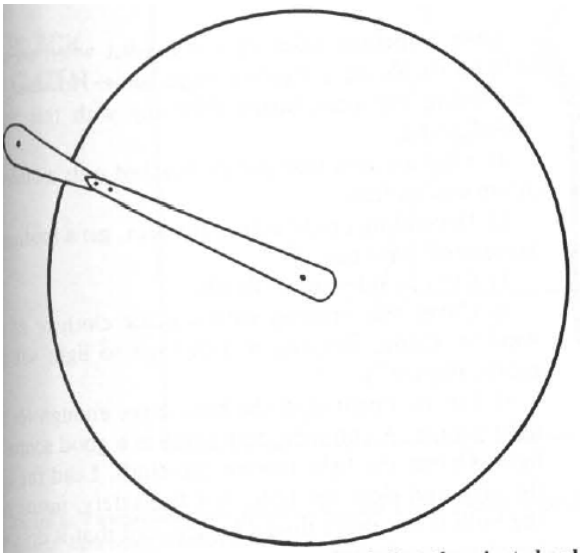


Figure 3. Reinstall the two hands on the clock at the minute hand end.

8) Plug in the clock and see if the hand will move under its own power. If not, then the added weight of the hour hand extension may need to be counterbalanced. You can use a piece of heavy cardboard and tape. You can color your "sun" orange or red to make it easier to see.

9) Make a tick mark on a piece of paper and tack it to a wall visible from the theodolite. This becomes your azimuth mark.

10) You are now ready to do a sun observation. Plug in the clock. The "sun" on your clock will now move through the reticle of your instrument at approximately the same rate as the real sun would (during the 15 minutes or so that you should need to view the sun). Sun observation training can now be done anytime. All you need is your tick mark, the artificial sun/clock, and your theodolite.

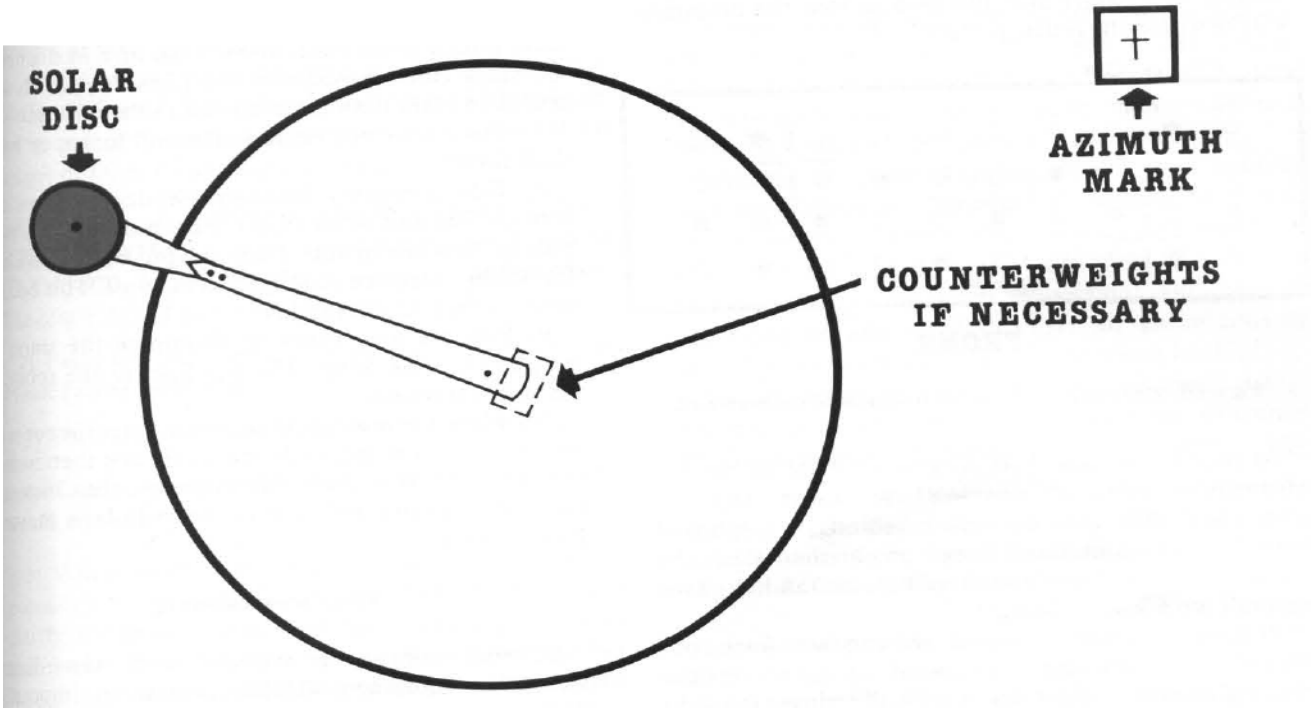
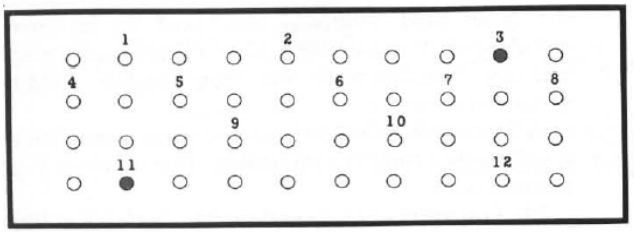


Figure 4. Punch or drill a hole in the center of a disc and attach it to the end of the hour hand. If the hand will not move under its own power, add counterweights as necessary.

Flash

Flash observation isn't hard to do; all you need is some artillery support to put rounds out to observe. However, artillery support may not always be available, and this training is costly. You can bring flash observation training *indoors* at very little cost. Here's how.

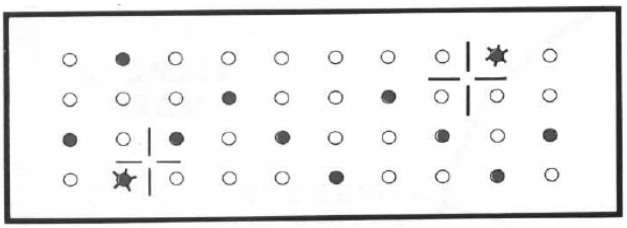
1) Secure a section of standard pegboard; the size will depend on how much space and money you have. Number any quantity of holes on the back side of the pegboard — we recommend 12 (figure 5).



BACK

Figure 5. Number about 12 holes on the back side of the pegboard.

2) On the front side of the board, place a target tick mark in the approximate center of the illuminated holes (figure 6). This allows for a "looking azimuth" in the vicinity of a target and also assures that the deviation will be within the reticle pattern.



FRONT

Figure 6. Place tick marks on the front side of the pegboard.

3) Mount the board on a table in front of the instrument.

4) Have your recorder stand behind the pegboard with the theodolite hand lamp, prepared to flash the hand lamp through the numbered holes at random. Two seconds is a normal "flash."

5) Now you are prepared to conduct flash observation. Orient the instrument operator on the looking azimuth (target tick mark). Illuminate the light quickly in the vicinity of the target to simulate an exploding artillery round. The instrument operator gets practice reading deviations from a looking azimuth. A scene or mural painted on the pegboard can add realism, and moving the light to other holes gives variety to the training. This method doesn't waste artillery rounds and provides a method for personnel to maintain proficiency at reading deviations.

Night observation

Even a fortune teller cannot predict when the stars will be visible on a night-to-night basis. However, you can bring the stars inside everyday with this simple training idea.

1) Find an area that can be blacked out; a closet or room will do fine.

2) Depending on the size of the area, get a medium to large cardboard box.

3) Cut one side out of the box.

4) Cover this opening with a black cloth or an old window shade, securing it with tape so light will not escape (figure 7).

5) Cut an opening in the box, large enough for the light source. A common desk lamp is a good source of light. Orient the light toward the cloth. Lead the wire through and close the hole. For fire safety, insure that the bulb is not more than 25 watts and that it does not touch the cardboard.

6) You are now ready to make the stars. With a map tack, punch seven holes about 1/16 inch in diameter in the black cloth to resemble the Little Dipper. It is not crucial to place the stars in an exact relationship.

7) Place your box on top of a wall locker or build a shelf for it.

8) Take a military flashlight (90-degree elbow type) with the red and white filters. Punch or drill a 1/8-inch hole in the white opaque filter and put both filters in the flashlight. Tape the flashlight to the wall. This becomes your initial azimuth mark.

9) You are now ready to illuminate the stars; just plug in the desk lamp. The less light in the room, the better the training.

10) Have the instrument operator enter the room and set up his instrument in the dark. He can then measure the stars. There is little difference between measuring the stars indoors and outside since Polaris moves so little at night.

Distance measuring

Distance measuring indoors with the distance measuring equipment (DME) is next to impossible. With a minimum range of 200 meters, an indoor facility that large is difficult to find. You can train on the DME

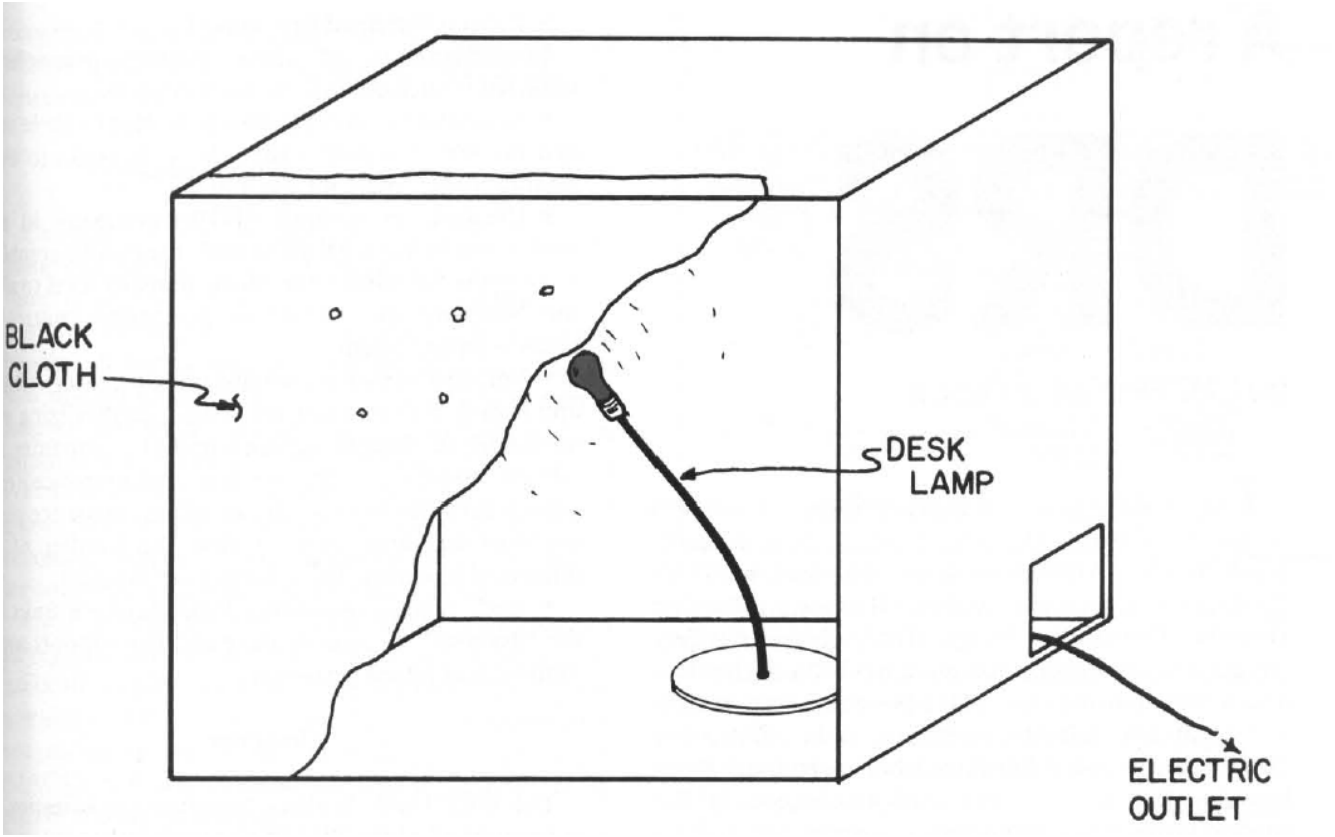


Figure 7. To simulate night observation, use a box, a piece of black cloth with holes punched in it to resemble the Little Dipper, and a desk lamp. A dark room is required.

indoors at very short ranges by the use of a handy item used by your maintenance support unit to bench-test DMEs. This item is an absorbing board which reduces the frequency distance of the two sets. You can set up an indoor distance measuring area with minimal cost.

1) Request an absorbing board, microwave, NSN 6625-00-928-1795; it is an expendable item found in CTA 50-970. It can be ordered on an as-needed basis. The cost is $13.20 per item.

2) Place the measurer and responder instruments on a table facing each other.

3) Place the absorbing board between the two sets.

4) Conduct normal operations with the DME as you would outdoors.

5) When using the field record to make computations, refer to FM 6-2, paragraphs 6-54 and 6-55, to clarify the nonstandard readings. When the measurer and responder instruments are set up facing each other on a table, the distance readings with the selector in the M2 position will be the actual distance between the two instruments.

Indoor training with the SIAGL (surveying instrument, azimuth gyro, lightweight) or the DM-60 (distance-measuring equipment — infrared) can be done any time since there is only a 3-meter minimum distance for the DM-60s and no minimum for SIAGL.

With the exception of taping, all skill level 1 survey training outlined in Commander's Manual MOS 82C can be brought indoors. The methods described have been tried, and they do work. Most of the materials are readily available to a survey section; and, with a minimum of additional expense, an entire training environment can be developed at the lowest level.

Indoor training is not as realistic as outdoor training, but it does enhance the surveyors' capability to remain proficient in their jobs during inclement weather.

CPT Frank W. Kocman is attached to the Counterfire Department, USAFAS, awaiting assignment. CPT "Slim" Myers is Chief of Survey Branch 2, Counterfire Department, USAFAS.

This indoor training environment was developed by SFC James J. Terry, Survey Division, Counterfire Department, USAFAS. For assistance or questions call him at AUTOVON 639-3216/5597.—Ed.

A report on

DRS

by LTC Homer J. Gibbs

The 1st Battalion, 77th Field Artillery ("Falcons") of the 1st Cavalry Division Artillery, is a uniquely organized Field Artillery battalion. Why does the 1-77th FA have this unique organization? Because it is the first Division Restructure Study (DRS) Field Artillery battalion in existence. It has more tracked vehicles than a tank battalion and more M113 personnel carriers than a mechanized infantry company. Other important differences are that it has three (soon to be four) 8-gun batteries, five battalion fire support officers, 15 fire support teams, and a maintenance battery.

What is DRS? Why do we have this new organization? What exactly does DRS consist of? What is the unit's mission? How does DRS operate and what lessons have we learned to date? These are questions that will be answered in this and subsequent articles on DRS.

The DRS

The Division Restructure Study was developed by the TRADOC Community in 1976 to provide a clear alternative to the existing armor/mechanized division organization to optimize weapon systems that will enter the Army inventory in the 1980-85 time frame. For the first time in its 203-year history, the US Army decided to develop organizations designed to maximize the capabilities of new weapon systems concurrent with developing the hardware, rather than developing a new weapon and incorporating it into an existing organization. In formulating this new organization, TRADOC developed the following guiding principles:

- Create smaller, faster units.
- Improve mobility/countermobility.
- Provide a single weapon system at the maneuver company level.
- Relieve company/battery commanders of the administrative and logistical burdens to allow them to concentrate on training personnel and fighting.
- Provide increased fire support.

Implementation of these guiding principles is relfected in such organizational changes as:

- Reducing the tank platoon from five to three tanks and the armor battalion from 54 to 36 tanks to create smaller, faster, more mobile units.
- Creating an antitank (TOW) company in each armor/mechanized battalion and integrating combined arms at the battalion rather than company level to allow the company commander to personally control his single weapon system.
- Forming personnel administration centers (PACs) and supply activities centers (SACs), centralizing mess personnel in combat service support companies and service batteries, and creating maintenance companies/batteries to take care of all maintenance above the crew/operator level to ease the burden of the maneuver company/firing battery commander.
- And, finally, organizing Field Artillery units like the "Falcons" to provide increased fire support with a minimum of added personnel.

Firepower

The DRS Field Artillery battalion organization incorporates all of the TRADOC principles except smaller units. There is a need for increased firepower to:

- Overcome the current adverse force ratio of 3:1 (8:1 at the breakthrough point).
- Attack the multitude of targets present on the modern battlefield.
- Take maximum advantage of new artillery ammunition such as the Copperhead, dual-purpose ICM, scatterable mines, etc.
- Achieve effective first-round target hits.

Based on the requirement that battalions be larger, rather than smaller, and the requirement to increase firepower, the guiding principle was to develop an organization that possessed maximum lethality with a minimum increase in personnel.

The DRS FA battalion

The organizations for a four-battery DRS direct support (DS) battalion and a current DS battalion are shown in figure 1. At first glance, the major differences appear to be the addition of one firing battery and a maintenance battery. However, there are significant internal changes that are designed to achieve maximum lethality with minimum additional personnel.

The S1, S2, S3, S4, and executive officer battalion staff has been replaced by a bifunctional staff consisting of an operations intelligence (ops/intel) officer (O4) and a personnel/logistics officer (O4). This change

recognizes habitual combat relationships—the S3 became the ops/intel officer and the XO became the logistician.

Headquarters and headquarters battery

Changes in the headquarters and headquarters battery are shown in figure 2. In the ops/intel platoon, there is a TACFIRE computer in an SB280 shelter mounted on the back of a 5-ton truck. The computer handles all tactical and technical fire direction, as well as a myriad of other functions. The backup system is another TACFIRE computer of a reinforcing or GSR battalion. A variable format message entry device (VFMED) mounted in an M577 command post carrier allows the ops/intel section to interface with the computer. Approximately 80 percent of all operations are done by digital traffic rather than by voice.

There is little difference in the communications and survey platoons, except that there is no longer a communications platoon leader (one Signal Corps captain now does it all) and the survey platoon is equipped with one surveying instrument, azimuth gyro, lightweight (SIAGL) and one DME60 distance-measuring set in each of the survey sections.

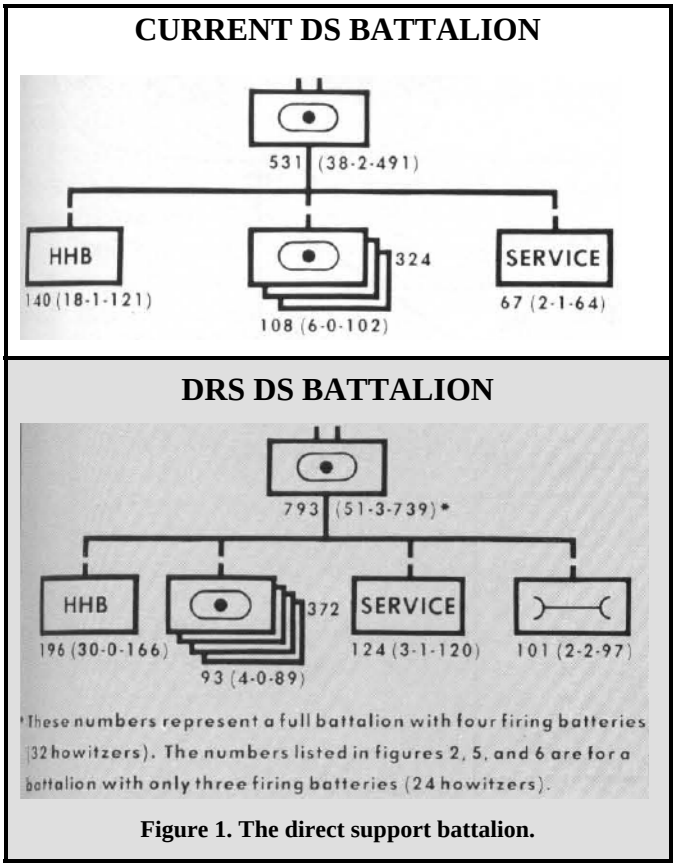


Figure 1. The direct support battalion.

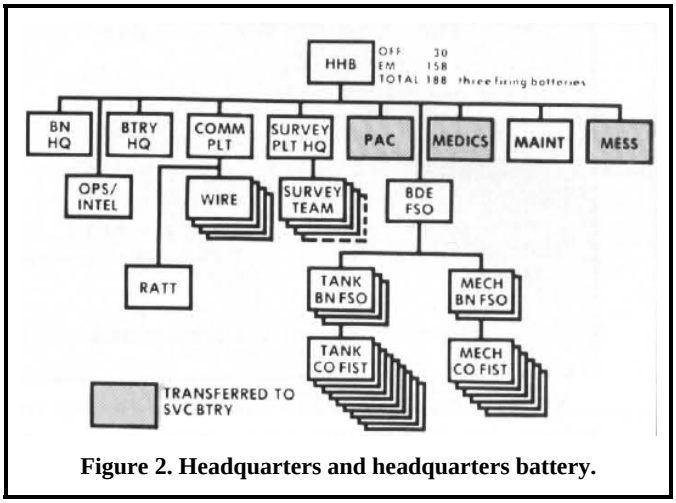


Figure 2. Headquarters and headquarters battery.

The major changes are:

- Movement of the PAC, medical section, and mess section, to the service battery.
- Loss of a maintenance section, which is reconstituted as a maintenance battery.
- Addition of two battalion fire support sections.
- Formation of 15 fire support teams (FISTs).

In keeping with DRS, there are five maneuver battalion fire support sections. The DRS direct support battalion has the mission of providing close indirect fire support for a DRS maneuver brigade consisting of three tank and two mechanized battalions. The brigade fire support officer (FSO) is a major. Equipment changes with the fire support sections are the addition of a TACFIRE VFMED (mounted in the M577) and one 1/4-ton truck which allows the FSO to get away from his M577.

The 15 FISTs are organized as outlined in previous *Field Artillery Journal* articles except that DRS reduced the number of personnel in a mechanized company FIST from nine to seven and TACFIRE added three digital message devices (DMDs) to each mechanized FIST and two to each tank FIST. This device allows the FIST headquarters and FO parties to communicate digitally with the battalion fire direction center (FDC) TACFIRE computer as well as with their respective FSOs.

DRS firing battery

A DRS battalion will contain four firing batteries, each with eight M109A1 155-mm howitzers. In keeping with the DRS principle of providing increased fire support, this is a 78 percent increase in firepower per DS artillery battalion with 49 percent more manpower. Everyone agrees more artillery is needed, and this approach yields the most cost-effective way to get more firepower.

FDC	BOC
Assistant XO (LT)	Assistant XO (LT)
Fire direction sergeant (E6)	Two battery display operators (E5s)
Battery display operator (E5)	TACFIRE operations specialist (SP4)
TACFIRE operations specialist (SP4)	Fire direction specialist (SP4)
Radiotelephone operator (E3)	Radiotelephone operator (E3)

Figure 3. Fire direction section personnel.

Not only did DRS add two howitzers to each firing battery, but it also introduced other major organizational and operational changes. Each of the eight howitzer sections has nine personnel, a loss of one cannoneer per section. The battery headquarters consists of the battery commander, first sergeant, two drivers, one 1/4-ton truck, and one 2½-ton truck with water trailer.

Firing battery headquarters is composed of the executive officer, gunnery sergeant, two fire direction officers, 10 MOS 13E fire direction personnel, two switchboard operators, one 1/4-ton truck, one "Gama Goat," and two M577 command post carriers for the battery operations center (BOC) and the FDC. Both the BOC and the FDC are equipped with a TACFIRE battery display unit (BDU) for receipt of fire commands generated by the TACFIRE computer located with the battalion. In addition, the FDC has the FADAC and the BOC has a manual fire direction capability. One FDO supervises the operations of the BOC while the other operates the FDC (figure 3).

That's the entire firing battery—a total of four officers, 89 enlisted personnel, 18 tracked vehicles, and four wheeled vehicles. There is no mess section, no ammunition section, no wire section, and no maintenance capability above the crew/operator level. This is in keeping with the DRS principle of allowing the battery commander to focus his time and efforts on training and fighting. The battalion commander, through his staff, service battery, and maintenance battery, becomes the resource provider.

The Restructured Division Operations Manual (RDOM) 6-50 (test) envisions that the firing battery will

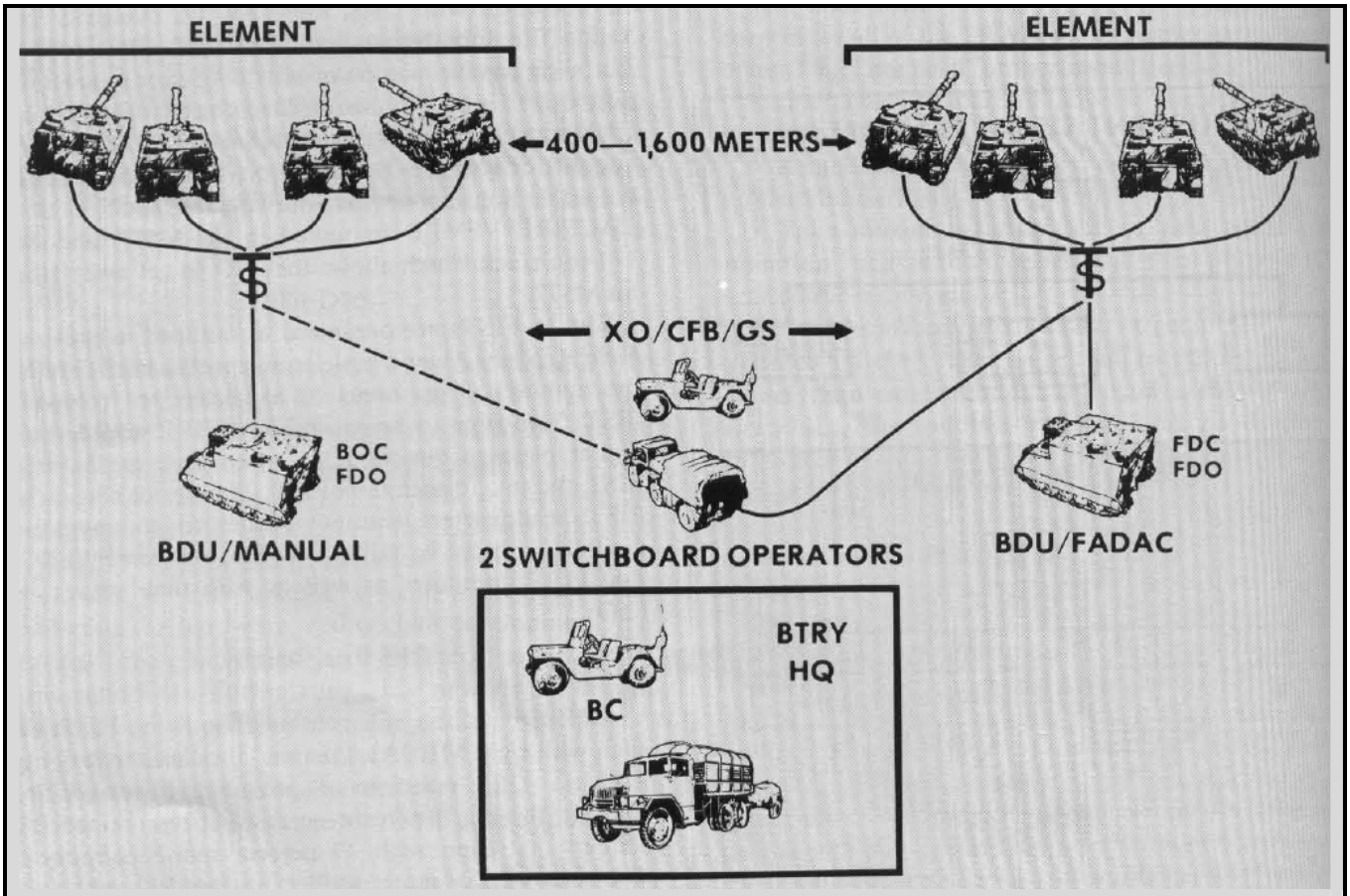


Figure 4. DRS firing battery.

normally operate in two four-gun elements separated by 400 to 1,600 meters as shown in figure 4. The elements rely primarily on the use of wire for communication with the guns and between BOC and FDC. However, the RDOM calls for the eventual issue of one small unit transmitter/receiver per howitzer section to facilitate immediate intrabattery communications prior to the establishment of wire.

Fire commands are generated from two sources—the battalion TACFIRE computer and the firing battery using either FADAC or manual computations. When TACFIRE is used, each element is considered a fire unit—the BOC controls the fire of one element and the FDC controls the other element. However, when the battery is generating its own firing data, the FDC is the controlling agency and will normally generate fire commands for both elements. This *modus operandi* is an interim solution until receipt of the battery computer system.

DRS service battery

All administrative and logistical support (except maintenance) for the battalion is provided by the service battery (figure 5).

The personnel administration center performs all the administrative activities, such as SIDPERS, finance, legal actions, mail, publications, reproduction, etc. Required information from the batteries is received either verbally or handwritten. No typewriters or clerks are authorized at battery level.

The supply activities center performs the same type services in the supply field as the PAC does in the administrative field. For example, it:

- Maintains all individual clothing records.
- Prepares, updates, and maintains hand receipts for both TOE and station property.
- Requisitions all Class II, III, and IV supplies.
- Prepares and processes all reports of surveys, inventory adjustment reports, cash collections, etc.
- Prepares all required reports pertaining to supply activities.

Based on our experience, the POL section is capable of carrying 3,600 gallons of fuel by using tank and pump units mounted on three 5-ton trucks and three 1½-ton trailers.

The ammunition platoon is a large organization consisting of 63 personnel, 32 drop-side trucks, and 32 1½-ton ammunition trailers. The platoon is capable of carrying 3,840 complete rounds of 155-mm ammunition. Common ammunition such as HE and ICM will be picked up from an ammunition transfer point (ATP) located in the brigade trains area and delivered to the firing batteries. The use of 5-ton trucks and the

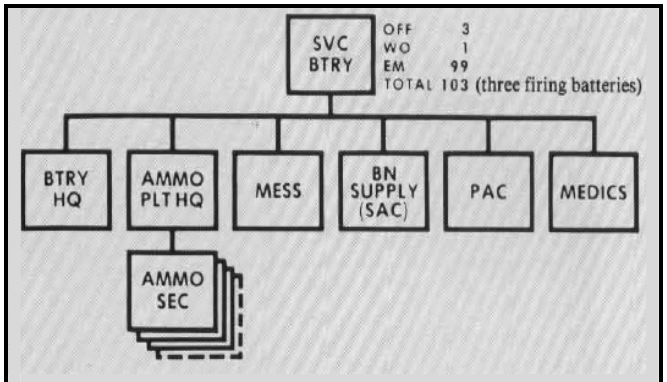


Figure 5. Service battery.

shorter hauling distances resulting from the use of an ATP more than double the ammunition resupply capability of a DRS battalion as compared to the current DS artillery battalions.

The mess section is composed of 12 personnel—a 50 percent decrease of mess personnel compared to current DS battalions. All food preparation is done in a single field kitchen located in the brigade trains area and "mermited" to the batteries. This organization is designed to feed two B ration meals and one C ration meal per day. The section is to be equipped with a mobile field kitchen mounted on two 1½-ton trailers. The mobile kitchen has undergone field tests with DRS maneuver units in the division. If this concept is adopted, artillerymen can turn in their mess gear because feeding is accomplished with disposable plates and utensils.

The service battery also owns the medics who formerly belonged to headquarters battery. The medics' important mission and method of employment have not changed.

Maintenance battery

Last, but certainly not least, is the maintenance battery (figure 6). This organization incorporates two very key DRS principles—relieving the firing battery commander of maintenance support responsibilities and "fixing forward." The battery has four officers—the battery commander (an Ordnance captain), a maintenance platoon leader (an Ordnance lieutenant) an automotive maintenance warrant officer, and an armament maintenance warrant officer.

The main support section is composed of track and wheel vehicle mechanics, artillery repairmen (MOS 45L10), automotive repairmen (MOS 63H10), and a welder. In keeping with the "fix forward" concept, the artillery repairmen and the automotive repairmen with their accompanying tool sets provide the section with a limited DS capability. The DRS divisional maintenance

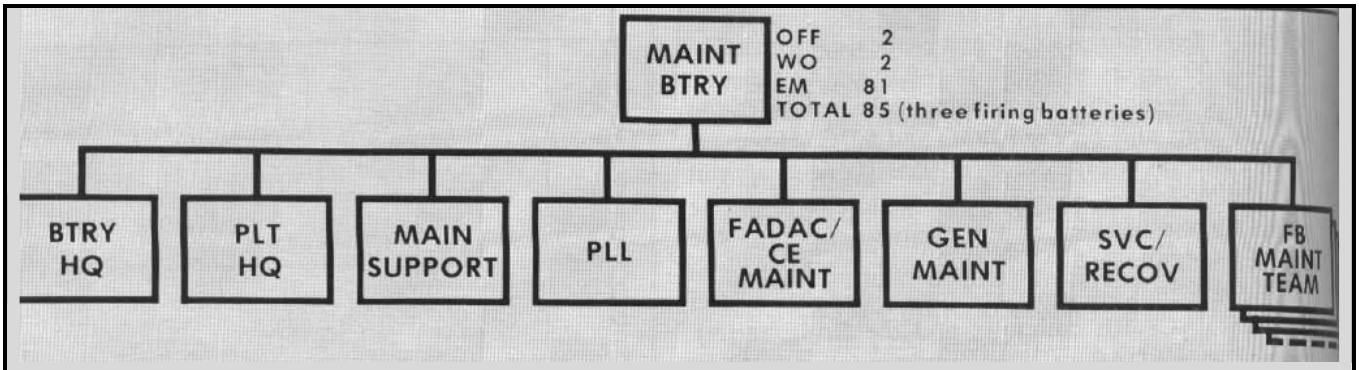


Figure 6. Maintenance battery.

armament and automotive battalion's forward support company is also organized to provide DS contact teams to assist in performing on-site support maintenance repairs. The main support section also provides organizational maintenance support for headquarters battery and service battery.

The service/recovery section provides the necessary recovery and lift capability to support the organizational and DS effort of the main support section. It contains two M578 tracked recovery vehicles and two 5-ton wreckers for recovery of wheeled vehicles, as well as providing the lift necessary to pull the power packs of the 101 tracked vehicles authorized the battalion.

The heart of the maintenance battery is its firing battery maintenance teams. The authorization is one team per firing battery. Each team consists of the personnel and equipment shown in figure 7. The 63Z E8 master mechanic will eventually be trained in both armament and automotive repairs. With the 45L and 63H and their own recovery/lift capability, these contact teams are capable of making on-site repairs and/or major component replacements. Each of these teams will carry necessary prescribed load list (PLL) repair parts.

MOS	Personnel
13B	Two E4s
45L	One E5
52B	One E4
63B	One E4
63C	Two E3s, one E4, one E5
63F	One E3, one E4
63H	One E4
63Z	One E8

Figure 7. Firing battery maintenance team.

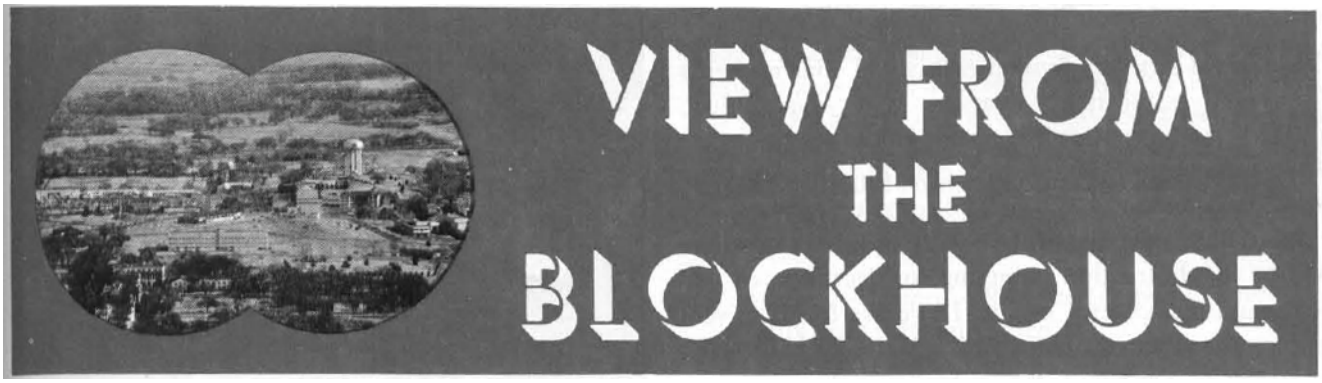
Conclusion

The DRS Field Artillery direct support battalion is designed to increase lethality, firepower, sustainability, and serviceability. It is also designed to efficiently employ new artillery munitions in a combat environment fraught with complex target servicing problems. It is designed to do all this with an absolute minimum increase in personnel.

How will it work? That's what DRS testing will determine. The "Falcons" organized a test TOE consisting of three 8-gun batteries on 21 June 1977. In November 1977, the three firing batteries underwent a DRS evaluation conducted by TRADOC Combined Arms/Test Activity. Our (the "users") findings, as a result of training and evaluation, will be published in a future issue of the *Journal.*

In addition, the battalion will receive a fourth 8-gun battery and related support personnel and equipment in April to evaluate the entire DRS direct support battalion TOE. Training will begin immediately thereafter and will culminate in an evaluation of the battalion's ability to support a five-maneuver battalion DRS brigade in September. The "Falcons" of the "First Team" are looking forward to the exciting challenge of trying to "put it all together" to assist decision makers in determining how the direct support battalion of the 1980s should be organized.

LTC Homer J. Gibbs is the commander of 1st Battalion, 77th Field Artillery, 1st Cavalry Division.



FADAC tapes

The January-February 1978 issue of the *Journal* contained an article in "View From The Blockhouse" entitled "Revision 5A FADAC Tapes Updated." The NSNs appearing in that article for the three 5A FADAC tapes (M109A1, M110, and M110A1) are in the process of being changed or have been changed. Any unit which has requisitioned tapes under those NSNs should cancel their requisition immediately.

Requisitions for those part numbers will be filled with the non-updated tape. The new NSNs identifying the 5A update tapes for the M109A1 and M110 will be published as soon as they are available. The correct NSN and part number for the M110A1 are 1240-01-054-6528 and P/N 8213330-124, respectively. The estimated cost is $125.00.

Intelligence reference packet prepared

The Counterfire Department has nearly completed work on a reference packet for the Field Artillery intelligence officer (FAIO) and the corps Field Artillery Section's assistant intelligence officers.

As the resident artilleryman inside the Electronic Warfare and Intelligence Operations Center (EWIOC), the FAIO expedites the flow of target information and provides fire support expertise to the center. The EWIOC is the nucleus of the all-source intelligence (ASI) activity at division level and the importance of the FAIO grows with ASI in the targeting process.

The packet, designed to answer questions of and about the FAIO, should be distributed this summer. Some of the topics discussed in the packet are TAC-FIRE, event-triggered reporting, and interface and the mechanics of exchanging information between Intelligence and the Field Artillery.

SQT update

The Skill Qualification Test period for Career Management Field (CMF) 13, Field Artillery, has been changed for initial testing from April-September to July-December 1978. This slippage of initial testing, by one quarter, will allow additional time for training managers to review and more fully implement their training programs.

This provides units with added time to insure that all personnel have their proper Soldier's Manuals and that unit reference libraries have been fully updated. Updating of available library sources is a must because the additional references listed at the bottom of the training and evaluation outlines in the Soldier's Manual are important to the soldier since he must refer to these for specific procedures on how to perform a task. Additionally, the SQT notice will also cite those references required to perform a task.

Each soldier in CMF 13 scheduled to be tested should have received his SQT notice by 1 May 1978 (60 days prior to the beginning test date of July). The soldiers who will be tested during the July to December time frame are skill levels 10, 20, and 30 of each MOS in CMF 13.

Skill level 10 (E1-E4) soldiers will take SQT 2; skill level 20 (E5) soldiers will take SQT 3; and skill level 30 (E6) soldiers will take SQT 4. Soldiers in skill level 40 (E7) will take SQT 5 but will not be tested until April-September 1979.

Testing of skill level 50 (E8-E9) has been delayed, at least until SQTs for lower grades have been developed. MOS 13F, Fire Support Specialist, skill levels 1 through 3 (E1-E6) will be administered their SQT for field validation purposes in October 1978. Skill levels 1 through 4 (E1-E7) will be tested for record in the April to September 1979 time frame.

More range from your radios

The Field Artillery System consists of four elements — target acquisition, weapons and ammunition, gunnery, and the fourth element which ties the other three together, command and control. The everyday word for command and control is communications.

In another war, one of the enemy's primary missions will be the destruction, jamming, or deception of our command and control means. If we are to effectively employ the other elements of the system, we must learn how to protect communications from this threat.

Additional and more powerful radios will help, but they are in the future; therefore, we must learn and employ every available technique to overcome enemy efforts. One such technique is the long wire antenna.

When the FIST chief is beyond the rated range of his AN/PRC-77 radio, he can extend its range by using a long wire antenna. If the distant station is using a standard vehicular whip antenna or RC-292, the long wire antenna will increase the FIST chief's radio range from eight kilometers to approximately 19 kilometers.

Because of its directional characteristics, the long wire antenna can also be used to overcome jamming and will reduce the enemy's electronic warfare capability. If the jamming signal is perpendicular to the long wire antenna, there won't be any appreciable disturbance, since the long wire antenna is relatively insensitive to non-parallel signals.

We have an FM long wire antenna, the AT-984/G, in the inventory. The direct support 155-mm battalion TOE authorizes 18 of these antennas, and the FIST TOE will also include them.

In the absence of the AT-984/G, a field expedient is easily constructed. A length of field wire WD-1/TT, from 100 to 150 feet long, is prepared and attached to the antenna connector of the radio set. The other end is then fully extended toward the distant station. The end is then moved in a circular motion until the distant station comes in clearly. The end of the antenna should then be secured to a tree or post.

By using a long wire antenna, the FIST chief can maintain necessary communication and complete his mission of putting steel on the target.

Nonnuclear Lance to Europe

Lance units in Europe will begin receiving nonnuclear warheads this summer following Congressional funding of the M251 nonnuclear Lance warhead. As a result, the corps commander will be able to deliver conventional fire and maintain a long range nuclear capability, ready to be used if necessary.

FORT SILL, OK – Two of the first four women to be assigned as Lance missile crewmen listen attentively to the instructor on their first day of training for the 15D MOS. From left are Privates Linda J. Sellers and Lisa R. Smith. The women join 12 male students for the four-week and four-day Lance missile course which has just recently been opened to women.

This dual capability will provide increased flexibility in the corps area of operation. By launching conventional strikes against the opposing forces' second echelon and rear support areas, the corps commander can add depth to the battlefield, relieving some of the burdens of frontline maneuver units and cannon artillery.

Lance can deliver its 1,000-pound nonnuclear warhead to ranges of 8 to 65 kilometers. Over the target area, the M251 warhead skin separates, releasing 836 bomblets that disperse over the target and explode on impact.

The nonnuclear warhead is particularly effective against soft targets such as surface-to-air missile sites, FROG and SCUD missiles and launchers, communications complexes, command posts, forward airfields, and logistics centers.

FIST shootoff postponed

The proposed FIST shootoff, tentatively scheduled for the fall of 1978 at Fort Sill has been postponed to allow units sufficient time for more operational experience. Although the idea for the shootoff was well received by the field, the staggered schedule for FIST implementation does not facilitate an equal competition.

A key principle in making the FIST organization proficient is the close working relationship between the FIST members and their respective maneuver units. The postponement will allow all units time to develop the required relationships.

8-inch howitzer improvements added

The product improvement program (PIP) for the M110 howitzer is progressing and involves six separate kits that are applicable to both the M110 and the M107 175-mm gun. Kits 1 and 2 consist of 18 automotive and armament changes designed to improve reliability, availability, maintainability (RAM) characteristics and crew safety.

Kit 3A replaces the current M110 short tube cannon and M116 direct fire telescope. Kit 3B converts the M107 175-mm gun in the same manner. The application of kit 3A redesignates the weapon as the M110A1 8-inch howitzer. The M110A1 howitzer accepts the new zone 8 (M188) propelling charge and will fire the M106 HE projectile to a range of 20,600 meters.

Several battalions in USAREUR and some FORSCOM and TRADOC units have already converted to the M110A1 configuration.

A muzzle brake has been developed for the M201 cannon assembly and is being tested for safety certification and type classification which is expected soon. When type classified and released for production, the muzzle brake will be installed as PIP kit 4.

Installation of the muzzle brake will redesignate the M110A1 as the M110A2 which in turn will accept and fire the zone 9 (M188A1) propelling charge. The muzzle brake is expected to be in production by October 1978 and installed during 1979.

PIP kit 5 consists of 10 items designed to further improve chassis RAM. This kit has been engineered and trial installation by the contract developer is in progress. Acceptability of kit 5 will be determined by the end of this year with application expected in late 1979 if accepted.

Five modifications to improve RAM of the gun mount assembly comprise PIP kit 6 which is in the early design stage. When application of the PIP is complete, the Field Artillery will have a heavy howitzer that will shoot farther with a higher degree of reliability than any US self-propelled howitzer previously fielded.

PIP kits include the following changes:

Kits 1 and 2 — Improve RAM and Operator Safety

1. Aux drive magnetic clutch
2. Traversing mechanism
3. Elevating mechanism
4. Loader-rammer
5. Hatch cover hold open latch
6. Gun tube retraction valve
7. Spade control valve & lever
8. Idler arm and hub assembly
9. Low coolant warning device
10. Intercom box protective cover
11. Throttle control yield link
12. Deck stiffener
13. Hydraulic tube guard
14. Master relay quick disconnect
15. Voltage regulator
16. Fuel system air purge
17. Fuel cell modification
18. Gun travel lock

Kit 3 — Improve Range and Direct Fire Capability

1. M201 cannon assembly
2. M139 direct fire scope

Kit 4 — Add Zone 9 Capability

Low efficiency muzzle brake

Kit 5 — Improve Chassis RAM

1. Lockout cylinder isolation
2. Improve parking brake
3. Add hydraulic relief valve
4. Add vertical adjustment to gunner's seat
5. Add torsion bar, driver's hatch
6. Add above deck warning light
7. Improve hydraulic water drain line
8. Improve firing spade ammo racks
9. Add hydraulic filter remote indicator
10. Improve elevating/traversing slip clutch

Kit 6 — Improve Gun Mount RAM

1. Improve regulator assembly
2. Redesign index pin assembly
3. Redesign recoil piston and control rod
4. Improve replenisher assembly
5. Relocate return line shut off valve

FM 6-40 updated

Two separate field manuals are forthcoming to replace the current FM 6-40, Field Artillery Cannon Gunnery.

- FM 6-30, The Field Artillery Observer, includes technical aspects of fire support for artillery, mortars, close air support, and naval gunfire. The new MOS 13F and the FIST will have a manual containing the technical reference material to perform their missions.
- FM 6-40, Field Artillery Cannon Gunnery, is designed as a teaching vehicle for manual computations in a fire direction center. FADAC step-by-step procedures are not addressed, but the integration of FADAC and manual procedures is discussed at the end of each chapter. Step-by-step procedures for FADAC will be covered in the FADAC user's manual. Many of the computations in the manual are explained with illustrations.

Three new forms are introduced in the new FM 6-40 — Section Chief's Card, Registration/Special Corrections Work Sheet, and 8-Inch Nuclear Computation.

The new nuclear computation form combines the computations of two DA forms previously required for computations. This form is needed for use with the new FT 8-R-1 for the M110A1.

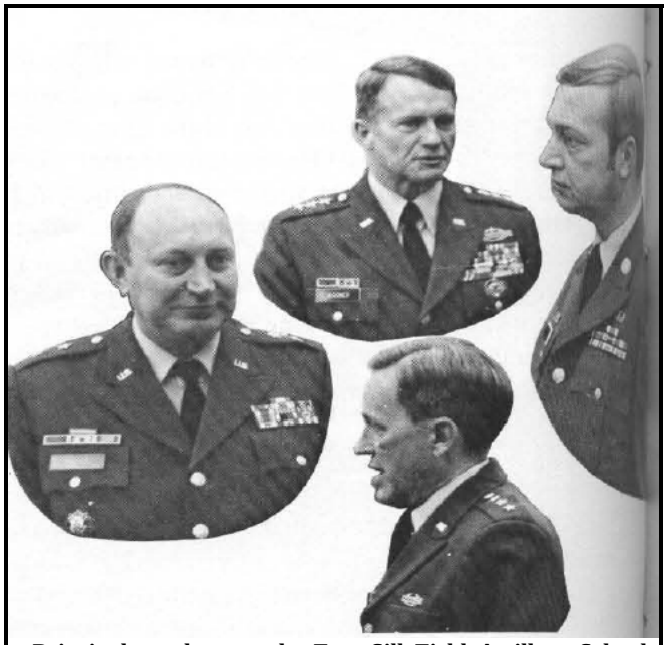
Both of these manuals are being prepared by the Directorate of Training Developments. Fielding is anticipated in December 1978.

Symposium highlights advanced course

Students of the most recently graduated Field Artillery Officer Advanced Course have unanimously voted the 2-day leadership symposium as the highlight of the course.

The symposium affords students an opportunity to listen to successful military leaders and discuss moral or ethical leadership problems that exist in the Army. Panel discussions and guest speakers orient students to leadership needs at the troop level.

Students are Army and Marine Corps captains with four and five years of service. The leadership symposium was initiated to compensate for many of the "whole man" courses that were discontinued when the course was shortened from 39 weeks to 26 weeks in 1975.



Principal speakers at the Fort Sill Field Artillery School Officer Advanced Course leadership symposium were, clockwise from left, LTG Richard G. Trefry, Inspector General of the Army; LTG Volney F. Warner, Commander, XVIII Airborne Corps; CSM Thomas J. Piasecki, SGM Academy; and LTG Dewitt C. Smith Jr., Deputy Chief of Staff, Personnel, Department of the Army.

Ammo CTA change

Development and fielding of the 105-mm howitzer ammo handler's training round introduces a requirement for a 10-gauge blank cartridge. To meet this requirement, CTA 23-100-6 dated 30 July 1976 has been changed, adding line 1535.

If there are questions at your local ammunition point, the authority for the CTA change is TRADOC message 301328Z, December 1976.

FA Commanders' Conference

The biennial Field Artillery Commanders' Conference will be held at Fort Sill 14 to 16 November 1978. Invitations are being prepared for Colonels commanding Active Army Field Artillery units. The most recent conference, held in 1976, received laudatory comments as a valuable forum for the exchange of ideas and an opportunity for receiving the latest information on training, materiel, and doctrinal developments.

Range quadrant problems with M102 howitzer

Units equipped with the M102 105-mm howitzer should be aware of a potential accuracy problem with the M14 range quadrant. The problem is caused by damage to the elevation counter mechanism and is the result of one or more of three malfunctions, any of which will prevent the counter from tracking or synchronizing with the actual elevation of the tube. These malfunctions are:

- Bending of the pick-up gears shaft.
- Stripping of the plastic pick-up gears.
- The counter stops not stopping the counter at minimum or maximum elevation.

The problem is difficult to detect since errors induced are random rather than consistent.

Bending of the shaft is a critical malfunction. The probability of this malfunction occurring can be reduced by a relatively simple "fix" done by support maintenance. The fix involves fitting two spacers into the counter housing to support the counter shaft. Procedures to fabricate and install the spacers are contained in TB 43-0001-36-1, dated December 1974. The TB should be available at your DS maintenance facility.

Malfunction of the counter stops is caused by excessive force applied to the elevating hand crank. Excessive force either bends or breaks the stops. This is a personnel-induced malfunction that can be corrected through training. Personnel should be trained and cautioned to turn the hand crank at a slow or moderate speed when operating within 200 mils of minimum or maximum elevation limits. This procedure should also aid in correcting the problem of stripping the pick-up gears.

The US Army Armament Materiel Readiness Command has been asked to issue an urgent compliance modification work order to require inspection and modification of the M14 quadrant. In the interim, units are encouraged to perform fire control alinement tests of the M14 quadrant to verify its accuracy. If there is any doubt of quadrant accuracy, USAFAS recommends use of the M1A1 gunner's quadrant on the first round of each mission and whenever there is a quadrant change in excess of 100 mils between rounds.

Data gathered with a laser target locater at an artillery forward observation post is computed by SSG Henry Warren as GEN John Guthrie, Commander of the Army Materiel Development and Readiness Command watches. The General recently inspected the TACFIRE computerized artillery system at Fort Sill. (Photo by SSG Ron Hatcher.)

COUNTERFIRE SYSTEMS REVIEW

Savings possible with MET

It was not unusual during the Vietnam conflict for fire direction centers to experience met corrections of 1,200 to 1,400 meters. During a normal firing day at Fort Sill a 500- to 700-meter correction is expected.

Since the cost of a met flight is approximately $75 and most commanders feel that a met flight is required every two hours, it is evident that a unit's budget cannot handle this expenditure of funds. On the other hand, most units feel they can afford the firing of extra ammo at $50 to $150 per round, required when firing is done "cold stick."

Using an average of three rounds for adjustment instead of having more accurate first round fire, it is evident that the use of current met data is cheaper than ammo. Ammo saved can be used to enhance the training of the entire unit by firing more missions from the same amount of ammo. With this in mind, it is possible during periods of weather stability to increase time between met messages from every two hours up to four to six hours.

Units should refer to DFM 6-15, chapter 2, paragraph 2-4, for a full explanation of this subject. If artillery firing is required throughout the entire 24-hour day, a quick conference between the met warrant officer and div arty operations personnel can very easily establish a met schedule that will not only provide the firing unit with valid met data, but do so in the most conservative method.

Five CFD courses self-paced

Five specialist courses in the Counterfire Department have been self-paced. These are 17B10, FA Radar Crewman; 17C10, FA Target Acquisition Specialist; 26B10/1T and 26B30/3T, FA Radar Maintenance; 82C10, Artillery Survey Specialist; and 93F10/H1, Artillery Ballistic Meteorology.

These courses have been correlated with corresponding Soldier's Manuals, Commander's Manuals, and the Skill Qualification Test. Included in each course are only those critical tasks that have been identified for training in the service school.

Any student failing to demonstrate proficiency in performing a task is eliminated from the course after his third attempt. Students frequently receive appropriate remedial training using different media before their second and third attempts. Evaluation of the student is performance oriented and rated as a "GO" or a "NO GO." Because of this, students are no longer ranked by academic averages.

At present, work is progressing to realign the instruction given in MOS 26B, 35D, and 93F courses to meet changes made in MOS structure and to include basic electronics training in the maintenance courses.

Improved radar sets arriving

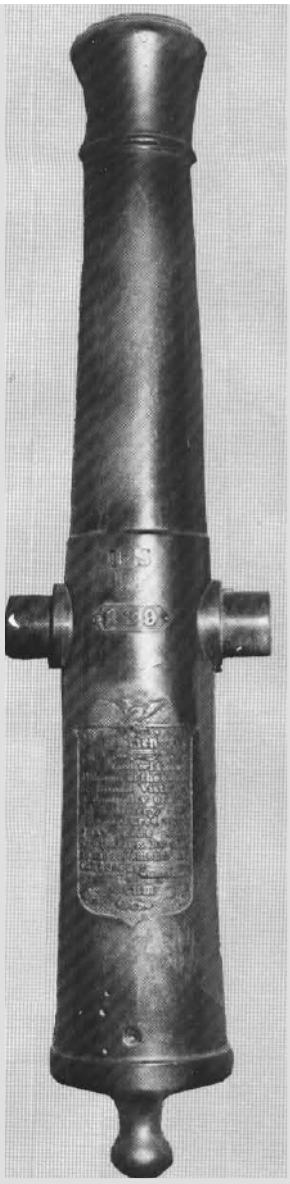
The first of the product-improved AN/TPS-58B, moving target locating radar sets, arrived at Fort Sill in March from the Sacramento Army Depot. All of the AN/TPS-58 radar sets will be cycled through the product improvement program (PIP) and be converted to B models before deployment to Europe, Hawaii, Fort Bragg, and Fort Lewis. Sets already deployed in Korea will have the PIP performed at a later date.

Major changes in the sets involve the power requirements. The new AN/TPS-58B requires only 28 volts DC. All AC input power sources have been removed, including the AC/DC converter. The air conditioner is also gone, further reducing power requirements. The primary power source is a 1.5-kilowatt generator that is stowed inside the shelter for movement. The radar can also be operated from vehicle batteries for brief periods of time.

Additional improvements include remote controlled radome selection, higher quality cable connectors, and elimination of the electrical equipment pallet. Further details are contained in Change 2 to TM 11-5840-348-12.

John Paul Jones O'Brien

by COL (Ret) Robert M. Stegmaier



The O'Brien guns are mounted in the foyer of Building 600, Headquarters, at West Point. (Photos courtesy of SP5 Roger L. King)

O'Brien, John Paul Jones; class of 1836, USMA; born in Pennsylvania; Florida Indian Wars 1836-38; one Brevet Mexican War; wounded at Buena Vista, died in Texas 31 March 1850 as a Brevet Major at age 32.

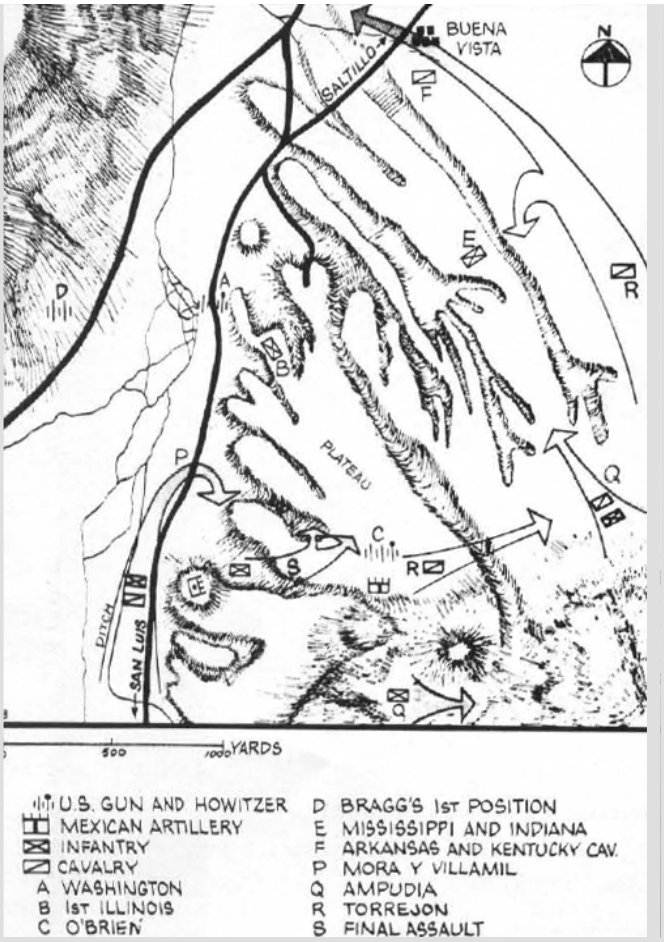
The above succinct paragraph in the USMA Register of Graduates is the only detail on the military career of this outstanding artilleryman. The brief account hides O'Brien's courage—courage worthy of the illustrious sea captain whose name he bore. The words "wounded at Buena Vista" only scantily cover his brave deeds on that battlefield.

At Buena Vista, 3,000 Americans, mostly volunteer infantrymen reinforced with four Regular artillery batteries and two small squadrons of dragoons, faced the cream of Santa Anna's Mexican army, 16,000 strong.

The Mexican Army was described as: "All the colors of the rainbow—red, green, yellow, crimson, sky-blue, turkey-blue—clothed the troops. Even the horses appeared to be in uniform, for those of a corps were alike in color. Silken banners and plumes of many bright hues floated in the breeze. Handsomely dressed aides dashed from point to point. Tremendous *vivas* rolled in mighty echoes from the mountains."[1] As one opposing dusty denim-clad Mississippi riflemen remarked, tongue in cheek: They were "too pretty to shoot."

Santa Anna, the Mexican commander, felt overly confident. A captured document told him that on the

[1]Fairfax Downey, *Sound of the Guns*, p. 101.



Battle of Buena Vista (sketch by Cindy Burleson).

heights ahead reposed an inexperienced group of soldiers. The document, General Winfield Scott's orders for the transfer of General Zachary Taylor's Regular infantry units, gave the Mexican leader exact information on what he anticipated to be an easy kill. Now was the time to show these brash North Americans the strength and elan of the forces south of the border.

The key to the battleground was the road leading south to Saltillo. CPT J.M. Washington's B Battery, 4th Artillery, consisting of four 6-pounders, two 12-pounders, and two captured Mexican 4-pounders, was directed to protect against an enemy advance along this road. On the left of this road, LT John P.J. O'Brien was charged with protection of the 2d Indiana and the 2d Illinois volunteers. He was assigned four guns—one 6-pounder, one 12-pounder, and two 4-pounders. On 22 February 1847, colorfully attired lancers attacked the left flank. Accurate rifle and B Battery artillery fire broke up the threat.

During a truce, the Mexicans took advantage of the lull to move their main army across the intervening river. During the night, the Americans consolidated positions with the Mississippi Rifles and the 2d Indiana, guarding the main avenue of advance. Three of Lieutenant O'Brien's guns were stationed out in front of the infantry. On 23 February, the 2d Indiana broke before the onrushing assault, leaving the supporting guns stranded. Two horses were shot from under the Lieutenant. By the time the Mexican infantry reached the 4-pounders, every cannoneer, driver, and horse attached to them had been killed or wounded. The 6-pounder and the 12-pounder were withdrawn to the front of the 2d Illinois. Now, painfully wounded, O'Brien took personal charge of the 12-pounder. His gun continued to fire canister, causing terrific gaps in the approaching mass, but still the Mexicans came. O'Brien declared after the battle that he could have saved his two last guns "But in such a case the day might perhaps have been lost."[2] At the last moment with the enemy at the muzzles of his guns, the Lieutenant and a few other B Battery survivors escaped capture but lost the guns.

Of their valor in this encounter, COL William R. Morris declared he had "never seen officers and men stand by their guns like O'Brien and his men stood by B Battery at Buena Vista."

Immediately after the battle, O'Brien secured a horse and reported to Captain Washington for further duty. He was given two 6-pounders and ordered to silence three Mexican guns in enfilade position to the right. Rushing once more to the forefront of battle, he commenced counterbattery fire from an exposed location in front of the infantry. Colonel Bissell of the supported 2d Illinois said, "Give it to the artillery, Mr. O'Brien, and we will take care of the infantry." Both carried out their assignments fully. Within 10 minutes the Mexican artillery was silenced.

In the meantime, CPT Braxton Bragg with C Battery, 3d Artillery, rushed into the void left by the loss of O'Brien's guns. With the enemy attacking both flanks, Bragg placed his guns near the front lines, only 50 yards from the Mexicans with one section firing left and the other enfilading the right. In complete compliance with GEN Zachary Taylor's instructions: "A little more grape, Mr. Bragg," Mexican valor and overwhelming strength were overcome. Artillery had helped materially to win the battle.

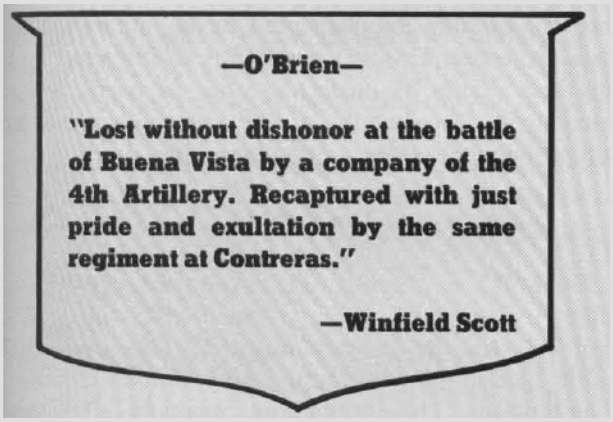
In his official report, General Wool stated, "Without our artillery, we could not have maintained our position a single hour."[3]

[2] *Ibid*, p. 103.
[3] *Ibid*, p. 104.

Of O'Brien's courage on that day, Fairfax Downey in his *Sound of the Guns* wrote: "How he kept on firing with enemy infantry mere yards from the muzzles stands as one of the most heroic exploits in artillery annals."[4]

At the battle of Contreras, six months later, the 4th Artillery, acting as infantry, led the assaulting advance. Captain Drum detected two familiar-looking guns in the Mexican lines. Could they be O'Briens lost at Buena Vista? He relayed the thought to his men and ordered a charge. His men responded enthusiastically. Sergeant Goodwin, carrying the regimental standard was killed; LT Calvin Benjamin grabbed the falling banner and stormed into the opposing ranks. O'Brien's guns, overrun, were reclaimed by the victors.

Today, those guns reside at West Point. Their accompanying plaque reads:



For outstanding valor at Buena Vista, Lieutenant O'Brien was brevetted major. Three short years later, at age 32, this promising officer's career was terminated by death.

GEN D. Antonio Lopez de Santa Anna (from a lithograph by Ackerman).

COL (Ret) Robert M. Stegmaier, author of the "Winning the West" series published in the Journal from March 1976 through June 1977, lives in Sun City, AZ.

Effective Fire Support *(Continued from page 31)*

revision. Based on the suggestions from the seminar participants, Div Arty revised and published a "Fire Support Handbook." Units wanting to obtain a copy of the handbook may write to:

COMMANDER
1st Cavalry Division Artillery
ATTN: AFVA-AT-C
Ft Hood, TX 76544

The seminar and the compilation of the "Fire Support Handbook" were major steps in upgrading fire support in the 1st Cav. They were not "end all" measures. Providing good fire support means constant attention and *training*. The 1st Cavalry Division is attacking this problem to produce a more combat-ready organization. The techniques advanced are not necessarily the way to upgrade your unit's combined arms expertise, but are ideas you may want to consider.

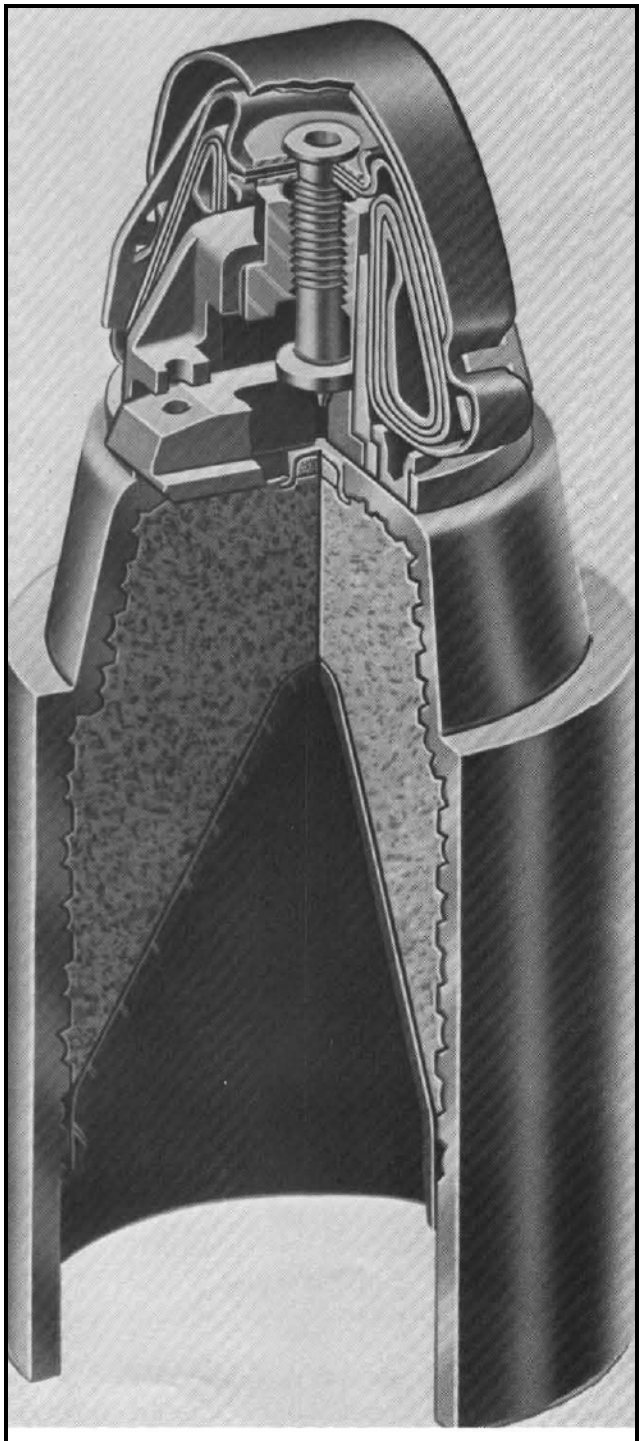
The 1st Cavalry Division Artillery hopes to share additional techniques with *Journal* readers in the future.

LTC Carl S. Taylor, who is currently serving as the Division Artillery Commander's Support Assistant for TACFIRE, is the Commander designate for the 2d Battalion, 19th Field Artillery, 1st Cavalry Division.

[4] *Ibid*, p. 103.

Submunitions of the Future

by MAJ William Whelihan



Cutaway of the M42 grenade. The recently fielded M483A1 dual-purpose ICM contains 64 M42 grenades, each weighing less than half a pound.

Grenades, mines, and other lethal devices have been receiving expanded use as submunitions in artillery weapons systems. The success of the first generation improved conventional munition projectile has led to the development of subsequent systems that are just now beginning to be introduced to units in the field.

Artillerymen will soon have in their hands the initial issue of the second generation improved conventional munition — the dual-purpose ICM (M483A1). Following close behind will be two scatterable mine projectiles that will give the field artillery an entirely new capability. These three projectiles are ballistically similar, a characteristic that allows us to use a common firing table — the firing tables for the M483A1 — for all three projectiles, supplemented by an addendum for each projectile. This article presents an introduction to this new family of projectiles and, in particular, an introduction to what the artillerymen will deliver but will probably never see — the submunition itself.

The M483A1

The M483A1, recently sent to the field, provides the Field Artillery with an improved (dual-purpose) ICM projectile for the 155-mm howitzer. This new round carries 88 dual-purpose (antipersonnel *and* antimateriel) submunitions. The antimateriel capability is provided by a shaped charge within each submunition. This shaped charge is enclosed in a scored fragmentation body that gives it the antipersonnel capability.

The submunitions themselves, the M42 and M46 grenades, are contained in a nested and unarmed configuration within the projectile. The submissiles are base-ejected from the projectile at the desired point in the trajectory and are dispersed by projectile spin, armed mechanically, and oriented for impact by a stabilizing ribbon attached to the top of the grenade. Immediately upon impact, the grenade fuze sets off the high explosive charge which produces an armor-penetrating core from the shaped charge and a large number of lethal high velocity fragments. The M42 and M46 grenades, which number 64 and 24 per projectile respectively, weigh approximately 0.4 pound each (36 pounds total weight). Each 1½-inch diameter grenade consists of a lead cup assembly, an explosive charge, a 60-degree, 0.05-inch thick cone with a 0.75-inch fixed standoff, an inertia type fuze, and a nylon ribbon stabilizer. The grenades are arranged in 11 layers, with eight grenades per layer. Although the two grenades are

basically identical, they do differ slightly in the way they are constructed. The body of the M46 is heavier and thicker than that of the M42. Also the M46 body is smooth internally — that is, it is not scored to facilitate fragmentation. The first three layers of grenades within the projectile are of the heavier constructed M46 so that the submunitions are able to withstand the expulsion force of ejection.

The projectile itself is 35.4 inches long and weighs approximately 103 pounds. It consists of a body assembly, an expulsion charge assembly, a pusher plate, individual submunitions (grenades), and a base plug. There are no special organizational maintenance requirements for the projectile. The same care, handling, and firing methods that pertain to standard projectiles are applicable to ICM rounds.

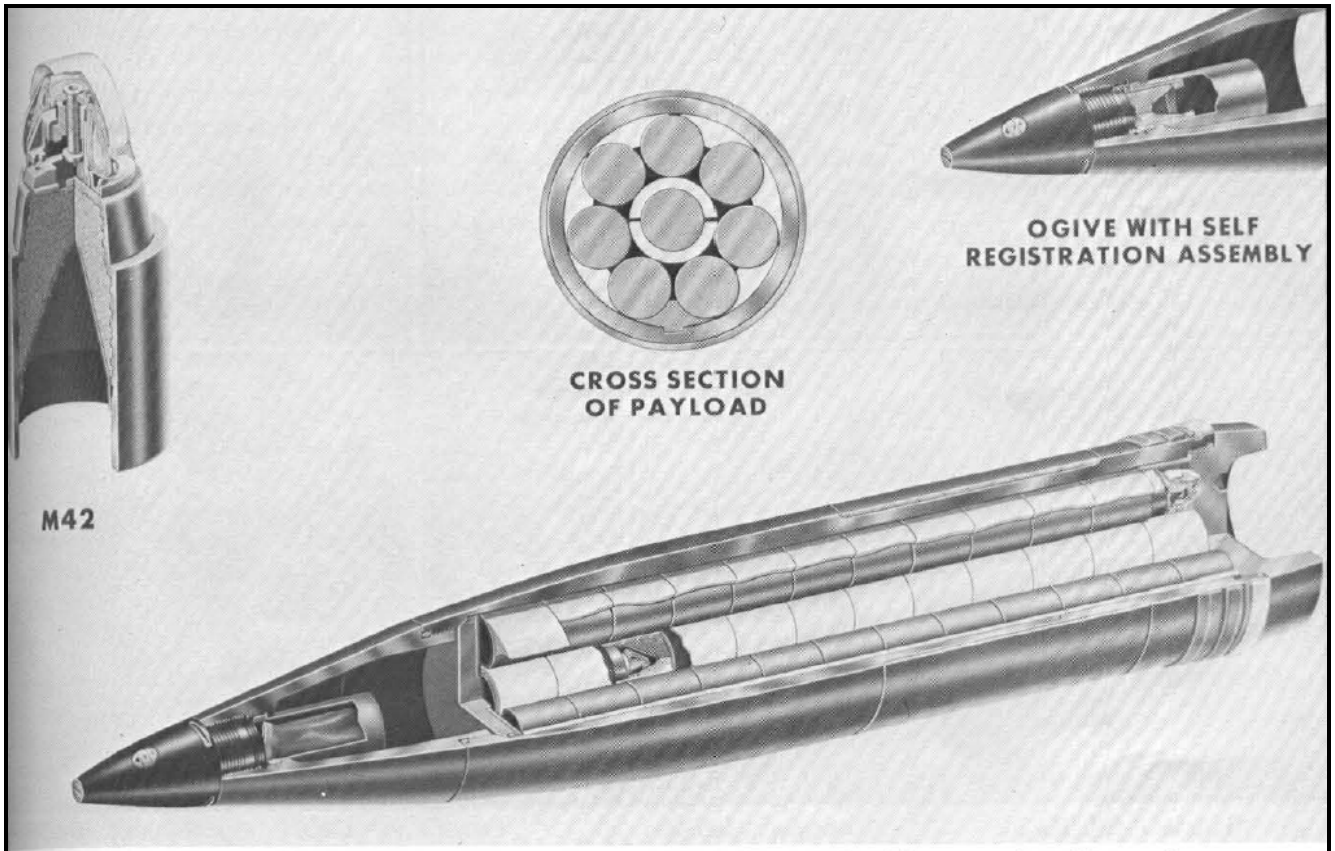
The "A1" suffix indicates that there has been a modification to the basic M483 projectile. During the testing cycle, a problem with stability at transonic velocities arose. The required ballistic stability was achieved by shortening the projectile (taking 1½ inches from the boattail) and by redistributing the weight.

The projectile may be fired in either of two modes. In the fire-for-effect mode, the cargo is ejected in the air and is dispersed into the target area. In the self-registration mode, the expulsion charge assembly is replaced by a spotting charge (45.5 grams of composition B) which is attached to the M577 fuze, causing a high-order detonation.

Other munitions

Two family-of-scatterable-mine (FASCAM) concepts that have progressed from the concept stage to "type classification" are the antipersonnel (ADAM) and antitank (RAAMS) mine projectiles. These artillery-delivered mines are designed to meet the threat of the post-1980 time frame and to provide a capability that is compatible with the tactical concepts envisioned for that period. The field commander will have quick-reaction, artillery-delivered, defensive or offensive, antipersonnel, and tank killing mine systems to throw against enemy armor and mechanized units at ranges compatible with the dual-purpose ICM projectile.

Both the antipersonnel and the antitank mines have factory settable, self-destruct timing mechanisms which will allow the movement of friendly troops through the mined area after a predetermined time. These will be the first non-hand-emplaced mines and, along with the dual-purpose ICM projectile, give us a mutually



Cutaway, showing components of the recently fielded 155-mm M483A1 HE projectile. Other new submunition carriers are constructed similarly.

complementary system that provides for antipersonnel, antitank/antivehicle mining followed by highly lethal indirect fire to further enhance the effect of the minefield. Both mine projectiles will use standard propelling charges and the mechanical time fuze (M577).

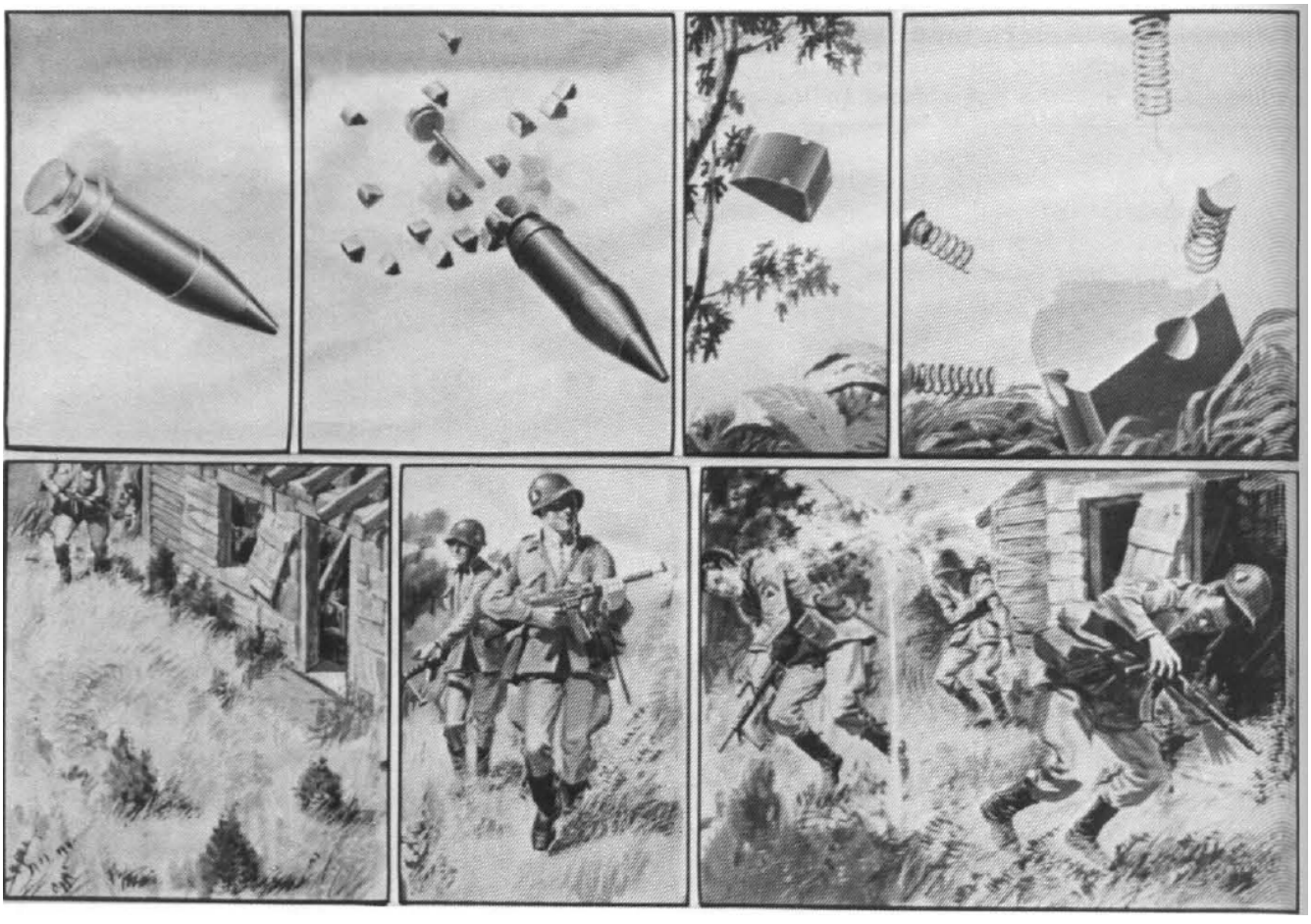
ADAM

The area denial artillery munition (ADAM) (M692 and M731) is a projectile containing 36 (M67 and M72) antipersonnel mines. The M692 projectile contains the M67 mine set for a long duration self-destruct time, and the M731 projectile contains the M72 mine and has a short duration self-destruct time. The wedge-shaped mines are dispersed upon projectile fuze functioning at the desired point in the trajectory and become armed upon impact. Impact causes deployment of sensor wires which, when tripped, cause a small charge to propel the mine into the air where it detonates, spraying casualty-producing fragments. A self-destruct mechanism is activated which detonates the mine after a predetermined time if the munition has not been triggered by trip wire or disturbance.

RAAMS

The remote antiarmor mine system (RAAMS) (delivered by the M718 or M741 projectiles), which has just recently been "type classified" as standard, contains nine M70 and M73 antivehicular/antitank mines. The M718 projectile contains the long duration M70 mines, and the M741 projectile contains the short duration M73 mines. The cylindrically shaped, five-pound mines are dispersed in the same manner as the antipersonnel mines and become armed shortly after impact. They, too, self-destruct if not activated within the predetermined time.

The US Army Engineer School at Fort Belvoir, VA, is the responsible agent for development of the two mine projectiles and has worked closely with the Field Artillery School in developing employment tables and



Terminal sequence for the area denial artillery munition (ADAM) showing base ejection, dispersal of the 36 antipersonal mines, sensor wire deployment, and detonation of the mines. The same sequence is employed in the RAAMS projectiles.

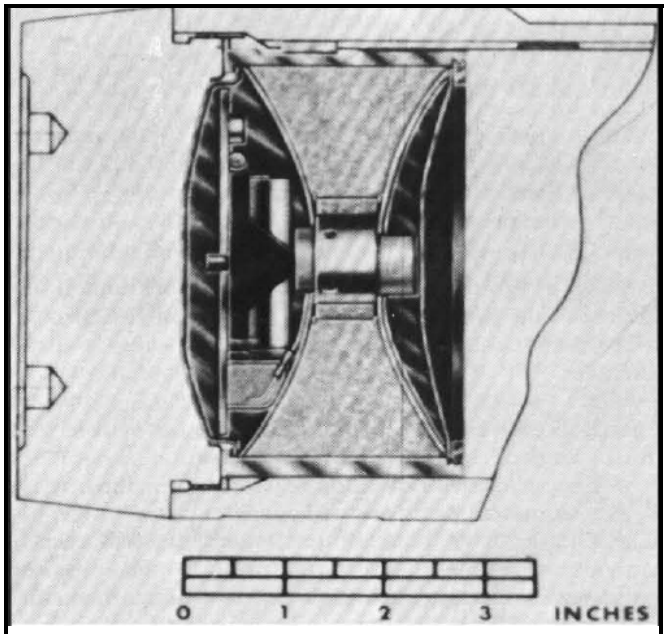
procedures for artillery fire direction centers to permit effective minefield planning (location, size, and density) by the engineers.

In the future

Two concepts that are in the early stages of development are terminally guided submissiles (TGSM) and artillery-delivered multipurpose submunitions (ARDEMS). The TGSM concept uses the delivery of one or several submissiles with infrared seekers that will home in on hard targets that have an infrared signature, such as self-propelled artillery, tanks, armored personnel vehicles, etc. Although the development of this concept has been made a component of the general support rocket system program, use of the TGSM as a submunition for cannon systems will be explored.

The ARDEMS concept presents an improved version of the M42 grenade, the submunition carried in the new dual-purpose ICM projectile. Basically, it is a multipurpose fragmenting submunition that is designed to be effective against personnel, light materiel, and lightly armored targets. The submunition expands the dual-purpose capability of the M42 grenade by using a sophisticated fragmentation configuration along with an antiarmor shaped charge. At the present stage in its development, it has potential use with a variety of weapons systems.

As technology improves we can expect a concomitant increase in the potential for field artillery delivered submunitions. Projectile proliferation, cost, and operational effectiveness constraints have postponed a number of possibilities that are based on this concept — ideas that may resurface later when the state-of-the-art catches up. A random delay type submunition, for example, is one of several possibilities that we may see in the future.



Cutaway of one of the nine antitank mines carried by each RAAMS shell.

MAJ William Whelihan is assigned to the Weapons Team, Directorate of Combat Developments, USAFAS.

Commanders Update

LTC Ronald F. Massey
3d Battalion, 9th Field Artillery

COL Donald L. Burton
46th Field Artillery Brigade

LTC Richard W. Lind
1st Battalion, 31st Field Artillery

LTC James P. McGinnis
1st Battalion, 36th Field Artillery

LTC James C. Laslie, Jr.
3d Battalion, 37th Field Artillery

LTC Phillip Kitchings
1st Battalion, 38th Field Artillery

LTC Gerald R. Lauzon
1st Battalion, 41st Field Artillery

LTC Donald L. Peters
7th Battalion, 3d Training Brigade
Fort Dix

LTC Alex M. Holder, Jr.
3d Battalion, 1st Training Brigade
Fort Jackson

The *Journal* congratulates the following Field Artillery officers recently selected for command of Field Artillery units at the 0-6 level during FY 1979.

BELL, Leroy C.
BREEDLOVE, Joe J.
BROOME, James R.
DETRICH, Virgil D.
ECOPPI, Joseph
ELLIS, Donald R.
GLICK, Stephen A.
HOGLAN, Curtis F.
HOWERTON, William B.
JOHNSON, Ernest D.
JONES, Donald W.
MAUPIN, Joe S.
NAGEL, Joseph L.
OLSMITH, Edwin S., Jr.
PENZLER, Harry D.
SHALIKASHVILI, John M.
SHOFFNER, Wilson A.
STADLER, Gerald P.
STEVENS, Ronald B.
UDICK, Ralph A.

New PCS policy

New assignment policies to reduce personnel turbulence and permanent change of station (PCS) costs were recently announced by the Army. Key policies include:

- PCS moves in CONUS will not be based solely on the passage of a specific amount of time.
- Encouragement of voluntary tour extensions.
- Assignment decisions will consider cost.
- First-term (3 years or less) members will receive only one assignment after initial training unless required to serve a short tour, in which case two assignments are permitted. Those first-term members with a 4-year or longer commitment are eligible for two assignments after training.
- Emphasis will be placed on providing a home base or advanced assignment to career personnel on unaccompanied hardship tours.
- When possible, CONUS assignments will be for 3 years or more but a 2-year minimum assignment for officers selected to attend senior service college will apply.
- Promotion will not be the sole reason for PCS of officers through the grade of 05 and enlisted members through E8 prior to tour completion.
- Individuals declared excess at a particular installation will be reassigned at the same installation in a secondary or substitutable skill or, if not possible, to the nearest installation able to use their skills.
- Hawaii is not included as part of the CONUS sustaining base for purposes of selecting overseas replacements.

Sergeant missile MOS out

The Sergeant missile crewman MOS (15B) will be eliminated from the Army October 1 according to MILPERCEN. Sergeant missile crewmen now total only about 90 soldiers. The last Sergeant missile unit in Korea was deactivated last year.

Soldiers holding MOS 15B will be reclassified as Lance missile crewmen or another MOS if they have appropriate training or experience.

CGSC nonresident program changed

Liberal changes have been made in the Command and General Staff College nonresident program. According to the Department of the Army, the changes are to:

- Remove a requirement that nonresident students spend one week in residence at Fort Leavenworth, KS, and eliminate the maximum age limit of 42.
- Allow nonresident graduates to compete for selection in the resident course while leaving them the option of not attending the resident course if selected.
- Raise the requirements for length of commissioned service from a minimum of seven and a maximum of 17 years to eight and 18, respectively.

Company grade CGSC nonresident applicants must submit applications through their career management fields to verify their experience in alternate specialties.

FAOAC schedule announced

The Field Artillery Officer Advanced Course schedule for Fiscal Year 1979, recently announced by TRADOC, is as follows:

Class No.	Start Date	Graduation Date
79-1	4 Oct 78	27 Apr 79
79-2	8 Jan 79	12 Jul 79
79-3	1 Apr 79	3 Oct 79
79-4	8 Jul 79	1 Feb 80

Field Artillery branch input will be 120 students per class. An officer selected for FAOAC who is overseas can usually expect to be scheduled for the class following his DEROS and a CONUS based officer for the class following his completion of 36 months on station. Tour curtailments are granted only under exceptional circumstances.

Requests for orders are sent to the losing MILPO and the selected officer nine months prior to the advanced course for overseas returnees and six months prior for the CONUS based officer.

FA MILPERCEN phones

Telephone numbers for the Field Artillery MILPERCEN Team are listed below to supplement the photographic roster of the team in the previous issue of the *Journal*.

COMPANY GRADE ASSIGNMENTS

LTC James V. Slagle	**Chief**	**7817**
LTC Ronald E. Coleman	**LT CONUS**	**0116**
CPT Joseph W. Eszes	**LT CONUS**	**0118**
MAJ Glen D. Skirvin	**LT OVERSEA**	**0187**
MAJ James M. Glass	**CPT CONUS**	**0187**
MAJ Charles B. Tiggle	**CPT OVERSEA**	**0187**
MAJ William H. Ott	**Personnel Actions**	**0701**

MAJOR ASSIGNMENTS

MAJ Joseph A. Siraco	**CONUS**	**0686/7**
MAJ Ned W. Bacheldor	**OVERSEA**	**8858**

LIEUTENANT COLONEL ASSIGNMENTS

LTC Thomas P. Easum Jr.	**CONUS**	**9789**
LTC Leslie E. Beavers	**OVERSEA**	**9529/9793**

COLONEL ASSIGNMENTS

LTC Roderick L. Carmicheal	**A-K**	**7862**
LTC Uri S. French	**L-Z**	**7863**

PROFESSIONAL DEVELOPMENT DIVISION

MAJ Frank Laster	**Specialty Monitor 0250**

AUTOVON Prefix: 221; Commercial (202) 235-XXXX

Although telephone numbers are provided, you are encouraged to write to branch whenever possible. Please include your current telephone number in your correspondence.

USA MILPERCEN
ATTN: DAPC-OPF
200 Stovall Street
Alexandria, VA 22332

CSM assignments get priority

Command sergeants major with TOE unit specialities are now receiving priority assignments in their related fields. The policy allows a CSM in CMF 13, for example, to get a priority assignment in a field artillery battalion.

Previously, many CSMs were assigned to unrelated specialties.

Majors' assignments stabilized

With the continued reduction in PCS funds, Field Artillery majors may expect to remain on station for a minimum of two years with a DA objective of three years unless they are in an assignment status of "must move" (e.g., officers returning from overseas tours, completing civilian or military schools, completing four years on the DA staff, completing three-year ROTC and USARR tours without volunteering for a fourth year, and completing two-year USAREC tours without volunteering for a third year). This stabilization impacts on officers becoming qualified in both their OPMS specialties. Therefore, if you have not had an assignment in one of your specialties and there is an opening at the installation in that specialty, you should investigate moving to that position.

SRB multiplier update

Several artillery MOSs have been converted into new career management fields and MILPERCEN has updated its selective reenlistment bonus (SRB) lists to reflect these changes.

The following Zone A SRBs became effective 24 March:

SRB 1A: 13E
SRB 2A: 15D, 15J, 17B, 93F
SRB 3A: 17C
SRB 4A: 21G, 82C

A soldier must be reenlisting for between one and six years service to qualify for a Zone A SRB. A bonus is computed by multiplying a soldier's base pay by the number of years in a reenlistment. This figure is then multiplied by the SRB.

The following Zone B SRBs became effective 24 March:

SRB 1B: 13E, 17C, 21G, 82C

Zone B SRBs are computed the same as Zone A bonuses but are awarded to soldiers with six to 10 years service.

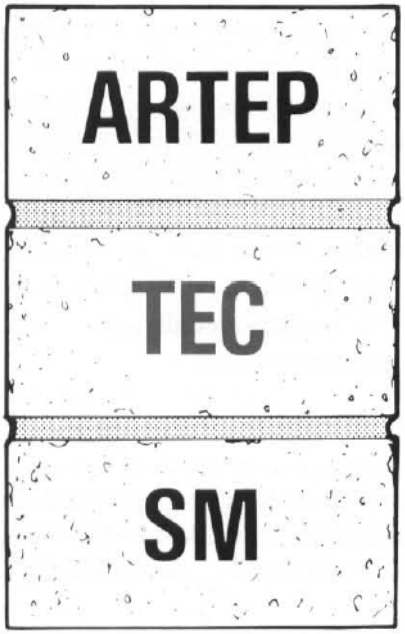
Five FA colonels nominated for BG

The *Journal* congratulates the five Field Artillerymen recently nominated for promotion to Brigadier General. The promotable colonels are:

Robert C. Forman
Charles D. Franklin
Eugene S. Korpal
Joseph J. Leszczynski
William H. Schneider

TEC — the indispensable aid

by MAJ(P) Ronald P. West



Evaluates performance

Teaches skills

Defines tasks

Sergeant Roberts was nervous. His palms were sweaty; his eyesight was blurred from strain. This was not the first time Roberts had been in a tight spot. His mind wandered. It was mid-1965. He was back in the Ia Drang Valley in central Vietnam. Incoming mortar fire was finding the range of the lead infantry elements. The radio crackled. The company needed steel on the target and they needed it now!

He snapped back to reality. "Got to keep cool," he mumbled. "Got to be ready." He deftly moved the range-deflection protractor and coordinate scale on the table in front of him. His pulse quickened. The time for action was rapidly drawing near. Would he be prepared to meet the challenge?

"Let me have your attention. At this station, you will be tested on your ability to plot targets and determine and announce chart data and angle T. You will be scored on your ability to plot the targets to the accuracy indicated in the call for fire, to determine and announce chart range to the nearest 10 meters with a tolerance of ±30 meters, to measure and announce chart deflection to the nearest 1 mil with a tolerance of ±3 mils, and to determine Angle T to the nearest 10 mils for the three targets you've been given. You will have 10 minutes to do this."

Because his unit had a well-organized program to use Training Extension Course (TEC) lessons, Sergeant Roberts was ready for the challenge of his Skill Qualification Test (SQT). Like many other soldiers, he found TEC to be the cornerstone of his SQT preparation. He knows that TEC holds the key to high scores on the SQT.

TEC/SQT/ARTEP

A high SQT score puts the soldier in position for promotion consideration and is also a good measure of his individual combat readiness and of the contribution he can make to his unit's performance on ARTEPs. The Soldier's Manual and the ARTEP, coupled with other evaluation data, form the basis for selecting which TEC lessons are to be integrated into the unit training programs. Since the commander knows which missions are required by his ARTEP, he can determine the tasks in which his personnel must be proficient to contribute to the unit's collective performance. Critical tasks required for individual MOS proficiency are included in the appropriate Soldier's Manual. Each TEC lesson provides training in a task listed in a Soldier's Manual.

Proficiency in many Soldier's Manual tasks can be gained through use of TEC lessons. Training in MOS subjects, such as surveyed firing charts, precision and high-burst registrations, as well as common subjects including first aid and land navigation, is simplified with TEC. TEC is a building-block philosophy, used by the soldier to assure his individual MOS proficiency. He then uses that proficiency, in conjunction with the other members of his unit, to perform the tasks required during an ARTEP. A large part of the unit's combat readiness can be traced to its use of TEC.

TEC is providing a new dimension in training

TEC materials emphasize performance — what the soldier will be able to *do* as a result of the training. The TEC system is designed specifically to assist individual soldiers and unit commanders in upgrading MOS/job proficiency. When used in an organized program as an integral part of unit training, TEC provides performance-oriented training in the subjects needed by soldiers. The soldier can train on the appropriate TEC lessons until he achieves the desired level of proficiency in the task. Of course, actual MOS proficiency will be measured through administration of the SQT.

TEC and the junior leader

With TEC, the first-line supervisor has an aid that enables him to conduct training whenever needed. He can conduct effective training even if only a limited number of personnel are available. Effective individual training can be conducted during slack times on the training schedule now thought of as "down time"; e.g., soldiers not required for post support details. Section chiefs use branch and MOS TEC lessons to overcome identified performance deficiencies or sharpen their soldiers' skills in using their primary weapons systems, as well as other critical individual skills which contribute to ARTEP performance.

TEC user techniques

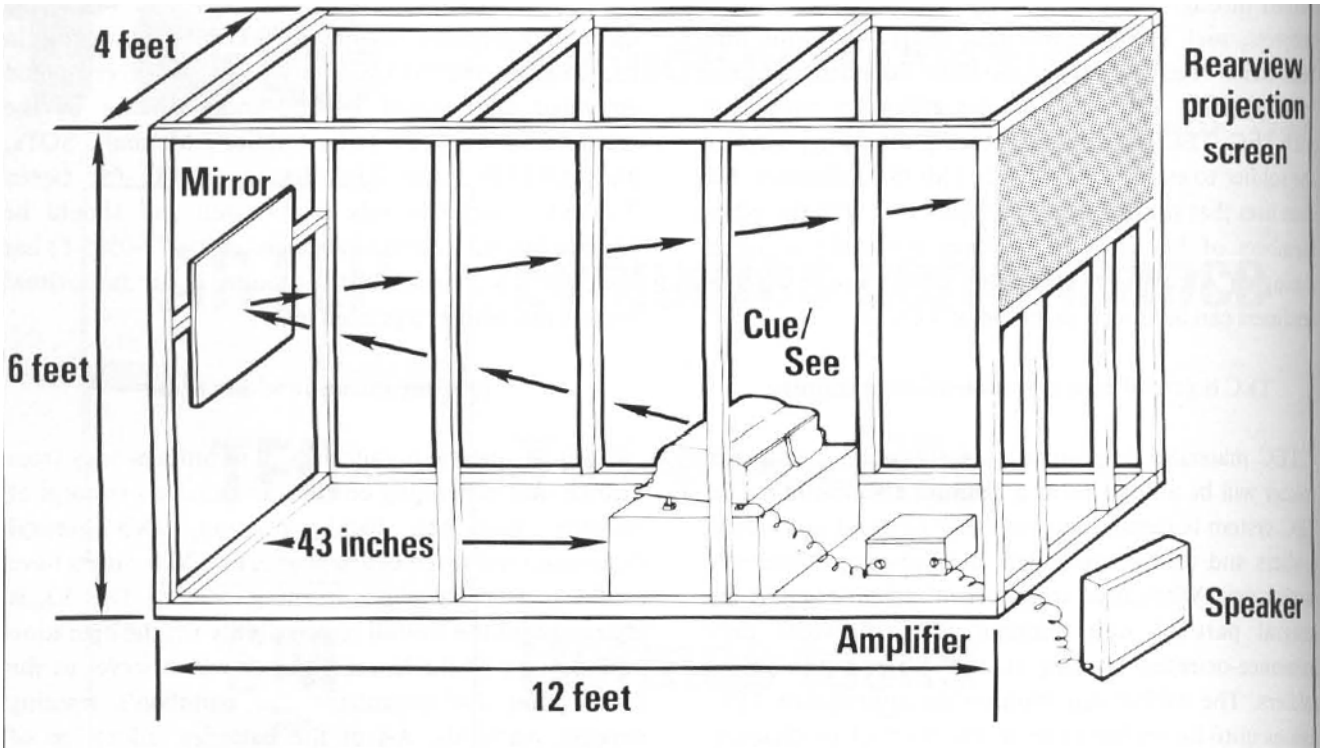
Techniques of successful users vary widely depending on the type of unit, its location, and the facilities available. However, two common factors are present. First, *TEC materials are used habitually to support regularly scheduled training* as opposed to solely a voluntary, after duty hours approach. Second, *the use of TEC is continually emphasized,* supported, and, in fact, required by all levels in the chain of command. Particularly successful units are those in which the command sergeant major has taken an active role in encouraging the NCOs to use TEC. This command emphasis is fostered by an understanding of the relationship between TEC, Soldier's Manuals, SQTs, and ARTEPs. The TEC lesson, "TEC for Green Tabbers," explains this relationship and should be reviewed by all leaders. The lesson (920-777-0505-F) has been provided to all TEC accounts in an audiovisual format and also as a printed text.

TEC organization within a unit

Though specific organizational techniques vary from unit to unit depending on the commander's concept of training and the local situation, two general organizational schemes are in wide use. Many units have established a battalion learning center. The S3 is charged with the overall responsibility for the operation and staffing of the learning center which serves as the focal point for organizing the battalion's training support materials. All of the batteries' allocation of TEC audiovisual devices and lessons are normally kept in the facility. Another common technique, found frequently in units with space limitations, is to keep the *lessons* centrally located while providing each subordinate unit with one or more audiovisual devices. In either case, the S3 designates an NCO to control the use and/or issue of TEC materials to users.

No requirement exists for the maintenance of TEC usage records. However, many commanders have found it helpful to accumulate data on TEC usage to gain the maximum benefit from their existing materials, to alter unit TEC management plans, or to justify requests for increased copies of lessons.

TEC, as a training system, is not limited to indoor use. The TEC hardware is rugged, compact, portable, and works well with a 1.5-kilowatt or higher powered AC generator. Whether the unit is in garrison or in a local or major training area, TEC plays an important role in training. The learning center, motor pool, weapons range, day room, CQ office, guard building, break areas in the field, or the privacy of a soldier's quarters can be the setting. Excellent TEC learning centers can easily be created in the field in small GP tents, on the backs of 2½-ton or 5-ton trucks, in command post carriers, or simply under shade trees. Almost any location where commercial or generator power is available can be turned into a learning center.



TEC is most effective when used by individuals or small groups. However, there are training situations where it is advantageous or necessary to project the picture image onto a large screen for viewing.

Several problems are encountered while enjoying TEC in this manner. For example, the picture fades when making it large enough for all to see, and the sound is distorted when turning up the volume loud enough for all to hear. Figure 1 shows a fairly simple and inexpensive system which will overcome these problems and allow effective use of TEC. Before starting, consult with your local TASC for help in construction, particularly the electrical hook-ups. The shadow box frame is constructed as shown and enclosed with plywood, metal, or four GI issue blankets. The mirror should be approximately two feet by two feet. Most units already have an amplifier and speaker. If not readily available, an amplifier can be obtained on temporary loan from the local TASC. The extension cord can be made from locally available wire and two standard jacks. The four foot by four foot projection screen is made from standard materials that may be available from the from the local TASC. Screen shades consisting of two GI issue blankets, are mounted on each side of the projection screen at 45° angles. The system operates in the following manner.

a. The Cue/See projector is placed on a stand in the shadow box.

b. The Cue/See is operated in the rear projection mode with the picture projected on the mirror at the rear of the shadow box.

c. The amplifier is connected to the Cue/See with the extension cord by inserting one jack in the Cue/See headset jack and the other jack into the microphone input of the amplifier.

d. The speaker for the amplifier is placed outside the shadow box, just in front of the screen.

e. The instructor operates the Cue/See projector using the remote control cord provided with the projector.

Figure 1. Shadow box (frame is constructed with 2- by 4-inch boards).

TEC benefits

Training deficiencies can be corrected the same day they are discovered. Observers who attack a target improperly because they did not understand how to apply correct artillery call for fire and adjustment procedures can be trained in these techniques in a field learning center and sent straight back to the OP to practice their newly acquired proficiency. Soldiers who have difficulty establishing aiming points or boresighting the panoramic telescope can work through the lessons on those subjects and then go back out to the guns to reinforce their training.

The effective use of TEC in the field or in garrison is limited only by trainer/training manager initiative and innovative thinking. Shortage of fuel, lack of adequate close-in training areas, severe weather, or other training constraints need not prevent realistic, performance-oriented training.

A training program with TEC will overcome individual deficiencies. Through planning, scheduling, and good management, effective training can be conducted. TEC offers a means of achieving this goal.

By identifying the deficiencies of the unit, a prescriptive approach to training can be taken, using a sequence similar to this one:

- Identify weaknesses.
- Select tasks for training.
- Identify applicable TEC lessons.
- Administer pretest.
- Develop personalized TEC training program for each soldier.
- Administer TEC lessons.
- Administer posttests.

Some units have planned the use of the pretests and TEC lessons during scheduled training periods, providing a testing day for those lessons relevant to the ARTEP or Soldier's Manual. Then the trainer is required to insure soldier use of lessons which will overcome the deficiencies identified. When used in this fashion, the appropriate TEC lessons are listed on the unit training schedule as a reference.

Many soldiers desire to prepare for their SQT or the next day's training by using the TEC materials during non-duty hours in the learning center or in their quarters, just as they would use a field manual or technical manual. Before using TEC in this manner, soldiers should be required to view TEC lesson 920-061-0500-F, "Introduction to TEC," which explains how to use the projector.

The best results are often obtained in supervised training sessions organized by grouping together a number of soldiers (usually less than 10), who need the same lesson. The maximum benefit is achieved when *each* soldier works through the requirements of the lesson. The group leader must be prepared to respond to questions and to assist those soldiers having difficulty.

TEC in the group mode

Because TEC is most effective when used by individuals or small groups, the rear screen projection capability is limited. However, there are training situations where it is advantageous or necessary to project the picture image onto a large screen. For example, land navigation lessons require a soldier to open up an entire map sheet and spread it out on a table. A training session for 8 to 10 soldiers on that lesson is better supported with rear screen projection (figure 1). The instructor operates the Beseler Cue/See using the remote control cord provided with the projector. Using the remote control, the instructor can set the pace for the class, interact with soldiers as desired, and insure that each soldier has completed each step before going on to the next point.

Cue/See projector.

The TEC pretest

Many units have found that a sure way to impress soldiers with the teaching ability of TEC is to administer the TEC lesson pretest that comes as part of the Lesson Administrative Instructions (LAIs). The test is designed to determine if the soldier needs the lesson. If the soldier cannot pass the test, he then works through the training. A soldier who fails the pretest will normally be motivated to pay close attention to the lesson. Using the pretest as a diagnostic tool can save valuable training time and insures that the soldier's time is not spent on subjects he has already mastered. Provisions must be made for those soldiers who "test out" of a lesson so that they can pursue other training, and they should be given some reward or recognition for demonstrating mastery of the lesson. In addition, most lessons should be followed as soon as possible with skill practical exercises to reinforce learning.

Training managers must be alert to the fact that retention erodes rapidly unless skills are practiced frequently. Thus, refresher training in many skills must be rescheduled periodically even though the soldier has been a "go" in previous tests. If 90 days or longer has elapsed since the last test on a given task, the soldier should be scheduled for retesting; then, if appropriate, he can review the TEC lesson.

Setting up TEC

Although many units have had TEC for several years, questions continue to arise on how lessons are distributed and how to organize the materials. When Active Army TEC accounts are established, the lesson distribution pattern is determined based on the MOSs in

Table 1.				
Type of lesson	Lesson sequence			Subject
25(	061	6339	F	Concurrent Met Plus VE Computations, Block 1, Part 1
25(	061	6340	F	Concurrent Met Plus VE Computations, Block 1, Part 2
25(	061	6341	F	Concurrent Met Plus VE Computations, Block 2
25(	061	6342	F	Concurrent Met Plus VE Computations, Block 3
25(	061	6343	F	Concurrent Met Plus VE Computations, Block 4
25(	061	6344	F	Concurrent Met Plus VE Computations, Block 5
25(	061	6345	F	Concurrent Met Plus VE Computations, Self-Evaluation
25(	061	6346	F	Subsequent Met: Met Plus VE
93(	071	0013	F	Introduction to Land Navigation
93(	071	0014	F	Measuring Distances and Azimuths
93(	071	0015	F	Converting Azimuths
93(	071	0016	F	Terrain Features
93(	071	0017	F	The Lensatic Compass
93(	071	0018	F	Navigating with Map and Compass

that account as identified in the post implementation plan. National Guard armories and USAR centers are provided lessons based on the MOSs of all soldiers using those facilities. As a new lesson is produced, it is automatically sent to each Active and Reserve Component account having the MOS for which that lesson is intended. A TEC lesson status list, showing all lessons in the field and under development, is mailed to each TEC account quarterly (monthly to Training and Audiovisual Support Centers).

When the initial shipment of TEC lessons arrives in several large boxes, it also contains LAIs, adjunctive materials, and three-ring binders. Sorting out the lessons and materials is the first step toward getting the most from TEC.

The LAI includes a brief outline that lists the objectives of the lesson and the skills the soldier should have prior to taking the lesson, materials required to take the lesson, and a test to determine if the lesson is needed. The LAI, which comes in five copies, tells how the lesson is presented (e.g., audiovisual, audio only, programmed text) and lists additional equipment or materials required.

The adjunctive materials (map pins, scales, slide rules, workbooks, etc.), required to support many lessons accompany the initial TEC lessons shipment. Instructions for each lesson requiring adjunctive materials are provided in the LAI and the student instruction sheet on the inside cover of the lesson box. Instructions for getting replacement materials for those expended during the course of lessons are also contained in the LAI.

Here are some suggestions for TEC employment:

• Establish a master LAI file which includes one copy of each LAI, with adjunctive materials, for reference and reproduction purposes. The recommended method is to use file folders. The top edge of the folder should contain the lesson number and title for identification purposes.

• Distribute the remaining copies of LAIs to subordinate units. They may use the LAIs for diagnostic testing, training evaluation, or planning. The learning center manager must insure that required adjunctive materials and LAIs accompany lessons which are signed out and that these materials are returned with the lessons.

• Arrange the TEC lesson library and prepare an inventory sheet which reflects all lessons received. The list of lessons on the inventory sheet should be in the same sequence as they are placed on shelves in the learning center. Copies of the inventory should be posted in the library/learning center, and copies should be given to trainers and commanders to keep them informed on lessons available to support training.

• Arrange lessons on shelves by MOS and by subject. Within the common subjects category, lessons should be organized in numerical order by subject. The TEC lesson numbering system is fairly simple. The first three numbers pertain to a particular branch or MOS. Lesson numbers beginning with a "9" are "common" lessons and generally apply to all soldiers. The next three numbers are service school numbers that identify the

proponent school for that lesson. The last four numbers identify the lesson. The letter following the last four numbers identifies the presentation media for that lesson; i.e., A — programed text; E — audio tape cassette; F — audiovisual; J — job aid. So, in arranging the lessons on the shelves, the key to organization is the first three numbers, the subject and the last four numbers (table 1). Indicate the cabinet and/or shelf number beside each TEC lesson number or major category of lessons shown on the inventory list for ease in locating lessons. Within each lesson category, there will be varying numbers of lessons developed. All of these lessons will not arrive at the same time. Space should be left on your inventory sheet for adding new lessons in order to keep them in numerical sequence and to avoid frequent retyping of your inventory list. As TEC lessons are received, the inventory list should be updated so it contains all lesson numbers and titles. Copies of the update should also be provided to subordinate commanders and trainers as well as the library.

Maintenance of the projectors

To receive the maximum benefit from TEC, the full basis of issue of audiovisual projectors should be available. Here are some tips which will help keep the equipment operable.

Over a period of time, tape oxide particles from the audio tape will collect on the Beseler Cue/See projector's tape player magnetic head, capstan shaft, and rubber pressure roller. Accumulation of these particles will cause a loss of volume. To prevent this situation, users should periodically clean the tape heads as illustrated in the operating instructions manual issued with each projector in the inner compartment of the carrying case.

> ***Caution:*** *Do not use commercially available head cleaning preparations because the solvents in these preparations may affect the material used in the playback and recording heads.*

New machines and lessons should be operated through the "fast forward" cycle at least once and then the lesson (tape/film) should be rewound. This procedure often eliminates problems with the non-synchronization of the audio and video tapes as well as exercising the projector's moving components.

TEC points of contact

All CONUS installations and major overseas areas have developed implementation plans with the goal of providing soldiers easy access to TEC materials. Prior to submitting requests for outside assistance or requesting an alteration of your account, coordination should be made with the responsible local project officer. On CONUS posts, this project officer is generally in the Office of the Director of Plans and Training, or, in some cases, the TASC. In overseas commands, the points of contact are as follows:

- USAREUR — Training Support Activity, Europe, ATTN: AETTG-TA-O, Roedelheim, FRG. Telephone: 2304-655/802.
- Korea — Eighth US Army, ATTN: J3, Yongsan, Korea. Telephone: Yongsan 6118/8066/6185.
- Panama — 193d Infantry Brigade (CZ), ATTN: AFZU-DPT-TA, Fort Clayton, CZ. Telephone: 487-4057/5759.
- Alaska — 172d Infantry Brigade (AK), ATTN: AFZT-PTS-TA. Telephone: 863-5118 or 862-1118.

If you have additional questions on establishing, managing, or training with TEC, feel free to write the US Army Training Support Center, ATTN: ATTSC-TP-FI, Fort Eustis, VA 23604, or call AUTOVON 927-2141/3728. Your views on the effectiveness of the TEC system, its value to trainers, and the amount and ways in which you use it are all used to improve the program and to publicize successful implementation techniques.

TEC updates

While the appropriate Soldier's Manual is the key to preparation for SQT and the continuous maintenance of individual combat readiness, TEC lessons can be extremely valuable to the commander and the soldier in accomplishing both objectives. Trainers are reminded, however, that while great care is taken to insure that Soldier's Manual tasks are accurately referenced to TEC lessons, the dynamic nature of both products may result in some omissions or incorrect references. Unit trainers should periodically check the Soldier's Manual references against the monthly TEC lesson status list (copy at every TASC) to update or correct the TEC references as required and pass the updated information to TEC users. Proper use of all available TEC lessons can help keep each unit combat ready and each individual better prepared for the SQT and better able to perform assigned jobs efficiently.

MAJ(P) Ronald P. West, AR, is currently assigned to the Training Support Center, Fort Eustis, VA, and has been in charge of field implementation of TEC since its inception. Major West has a graduate degree in education administration and supervision from Georgia State University.

The Safety NCO

by MAJ Craig C. MacNab and
CPT Frederick P.A. Hammersen

The use of command-certified NCOs to perform those safety duties, formerly performed by a commissioned safety officer, is now a reality in a number of Field Artillery units throughout the Army. In November 1977, the 1,500th round was fired at Fort Hood under the Post's version of the new, more realistic safety guidelines. Units around the world report positive results from the safety NCO program.

Attempts to revise safety requirements to bring them in line with the "train as we will fight" philosophy began with a study of safety officer procedures/requirements by an *ad hoc* committee at the US Army Field Artillery School in June 1975.

The committee recommended that—

- The requirement that personnel have no other duties while serving in a safety capacity be eliminated.
- The independent safety checks previously performed by the safety officer be performed by members of the chain of command commensurate with their duty position.
- Command-certified section chiefs be responsible for all safety checks on their weapons and ammunition.
- The battery executive officer (XO) and/or chief of firing battery be responsible for general safety checks of the battery during firing and assist the officer in charge (OIC) with prefire checks.
- The OIC remain responsible for establishing the overall safety system within the firing unit.
- The chain of command be responsible for command certification of personnel performing safety checks.
- At least one commissioned officer be present in each firing position during firing.

These recommendations led to a revision of the range regulations at Fort Sill to allow chiefs of section to be responsible for all safety checks within their sections, to include checks of weapons and ammunition, once the section chief had been command-certified. An interim change to AR 385-63 removed the requirement that the safety officer not to be assigned other duties while acting in this capacity. These new programs were implemented throughout III Corps Artillery and described in the *FA Journal* ("The Vanishing Yellow Helmet," March-April 1976).

In a letter to field commanders, the Commandant of the Field Artillery School, reviewed the findings and recommendations of the *ad hoc* committee and invited comments. Most reactions from the field indicate that these recommendations were very positively received and have done much to enhance training realism and the development of the professionalism of the FA NCO Corps.

One of the major advantages of using safety NCOs has been *increased realism in training*. Artillerymen have become more aware of safety requirements and are more precise in applying and checking firing data. The false sense of safety that was sometimes present when a safety officer was available to check the guns has been replaced by intense efforts by the crew members to insure that safety is a reality. The use of safety NCOs has increased realism by significantly reducing "safety time." This increases responsiveness in the delivery of fire and maintains exercise momentum at the crew level.

The second major advantage to be realized has been the positive response of NCOs to their increased responsibilities. Along with the responsibility for safe operation of his weapon, the section chief has acquired greater pride and greater confidence in his abilities.

As a result of this program, battery officers and senior NCOs are more willing to place greater trust and responsibility in their chiefs of section, and members of the chain of command have an added appreciation of the professional competence of their NCOs. The chiefs of section and chiefs of firing battery benefit from additional training pertinent to their responsibilities for SQT training.

Finally, commanders report that using safety NCOs allows them to use one of their limited resources—the officer—where his leadership and management talents can be better employed.

At the same time, significant problems have been encountered, which fall into two general areas:

- The inexperience and lack of training of junior NCOs.
- The limitations imposed by the available training areas and range regulations.

However, in many cases, command emphasis and the determination to train as we will fight have led to the solution of most of the problems, and efforts are underway at USAFAS to provide additional assistance to units in the field.

The inexperience of the section chiefs in matters pertaining to safety, coupled with the fact that many of the section chiefs are very junior (E4 or E5) or are recently reclassified from other MOSs, caused initial reluctance to assign them responsibility for safety checks on their weapons, despite the shortage of officers for safety duties. In some units, these problems have been countered by intensive courses of instruction at the battalion level to bring the section chief up to the level of knowledge necessary for command certification. Safety has not been degraded, since the requirements for accuracy have not been diminished. The training of junior grade and reclassified NCOs can be successful; in fact, some units have command-certified one NCO per gun section!

To assist units in this training, USAFAS is preparing a package of materials that can be used to conduct safety NCO training in the unit. The materials will reflect current Fort Sill policy and may require modification to meet local requirements. In addition, the FA Cannon NCO Course currently includes six periods of instruction on "Computation of Minimum QE" and "Duties of the Safety Officer." Units may take advantage of various current correspondence courses to develop a training program for their NCOs. (These include FA 329, "Duties of the Safety Officer"; FA 308, "Fire Direction Fundamentals"; and FA 310 "Fire Direction Special Applications.")

Limitations imposed by local training conditions such as high troop density in the maneuver area and limited impact areas, have compounded the inexperienced NCOs' difficulties in taking responsibility for their weapons. One innovative approach was to assign a command-certified E6 or above to make an additional, independent check of all weapons when the unit is firing "danger close" or close support exercises. This safety officer/NCO is assigned no other duties during the firing of the close-in missions. During other types of fire missions, the command-certified chief of section alone is responsible for the safety of his weapon.

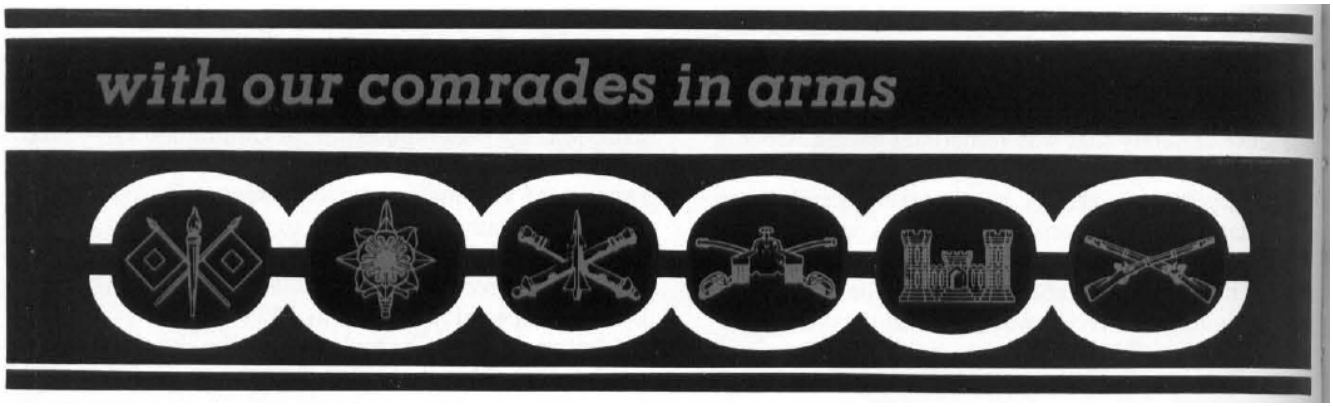
Efforts are underway to modify individual range regulations to bring safety responsibility in line with the recommendations mentioned earlier. Many posts have already modified their range safety regulations.

These new approaches to safety are not designed to diminish the responsibility of the battery XO, for the overall responsibility of running the firing battery remains his primary job. However, the delegation of responsibility for safety duties to command-certified section chiefs provides the XO and the commander with enhanced opportunities to develop their NCOs professionally to instill a sense of pride and accomplishment in those who have attended command certification, and to improve training realism.

The safety NCO program has proved to be successful in those cases where it was applied sensibly within the capabilities of the unit. Commanders must take positive steps to train their NCOs thoroughly to prepare them for command certification.

The advent of a Safety NCO Course packet for use in training section chiefs at unit level should provide additional assistance. The USAFAS is willing to assist commanders in overcoming specific problems wherever possible. Questions or comments on any aspect of safety are welcome and should be addressed to: Commandant, USAFAS, ATTN: ATSF-CT-TM, Fort Sill, OK 73503.

MAJ Craig C. MacNab and CPT Frederick P.A. Hammersen are assigned to the Professional Development Team, Directorate of Course Development and Training, USAFAS. Major MacNab is chief of the team and Captain Hammersen is working with the team awaiting assignment to the Field Artillery Officer Advanced Course.



GSRS to go standard

The Army's General Support Rocket System (GSRS) program is being redirected toward a standard NATO weapon that may be developed and produced in both the US and Europe according to the Army Missile Research and Development Command.

A declaration of intent to develop and produce a standard multi-launch rocket system has been signed by the US and the Federal Republic of Germany. Other European allies are being invited to participate. The two countries are currently forming a team to plan, develop, and share production benefits.

COL Barrie Masters, GSRS Project Manager, said "We anticipate signing a memorandum of understanding in August. We have set the stage for a standard NATO weapon and we are committed to a program of common development."

Changes planned to meet requirements of both countries would include bigger rocket motors and development of three warheads — a dual-purpose antimateriel/antipersonnel, a scatterable antitank mine capability, and a terminal homing antitank warhead.

Being developed to supplement cannon artillery when targets appear on the battlefield rapidly and in great quantities, GSRS will use conventional target acquisition and fire direction procedures. The Army plans to field the system in the early 1980s.

Antitank projectile "sees" and strikes

Concept demonstration tests of a smart target-activated fire and forget (STAFF) antitank weapon system are planned this summer by the Army Armament Research and Development Command.

The system is a variation of the relatively new technology of the target-seeking unguided munition as it combines mechanical scanning with sensors to seek out targets while flying over them. Upon detecting a target, a sensor fires the warhead to cripple or destroy the enemy armor.

The system is designed for use by infantry units for close support and defense against heavy tanks. According to project spokesmen, STAFF will be extremely fast and accurate, with a rapid rate of fire against multiple targets. No guidance is required after the projectile leaves the launcher.

Designed primarily as a vehicle-mounted 155-mm rifled gun system, STAFF will also be developed as a dismounted recoilless system with self-contained fire control. Advanced development testing could begin during fiscal year 1979 with the system ready for field use by the mid-1980s.

A-10s slated for Europe

The first overseas wing of the new A-10 close air support aircraft will be stationed in Europe in early 1979 to strengthen NATO's conventional defense. This move will be made by reequipping the 81st Tactical Fighter Wing, currently flying F-4s at Royal Air Force stations Bentwaters and Woodbridge, United Kingdom.

Transition training for A-10 pilots will begin in August 1978. There will be no significant increase in US Air Force personnel at the two British stations as the F-4s there are scheduled to leave.

New plant to make 155-mm projectiles

The first new Army ammunition plant to be built in 25 years is under construction at Picayune, MS. The facility is scheduled for completion in 1983 and is expected to produce a maximum of 120,000 rounds of the new M483 155-mm projectile per month. It is being built on 7,100 acres of Federal land and will employ 1,500 people.

Antitank weapon choices studied

Contracts of about $200,000 each have been awarded by the Army Missile Research and Development Command to five companies for their ideas on developing the Army's new advanced heavy antitank missile system (AHAMS).

Each company will perform a four-month study outlining technology approaches for developing the new tank killer. These studies will be used by a special Army task force on antitank weapon candidates to recommend to the Defense Department the system that best meets the Army's future antiarmor requirements.

The concept definition study contracts have gone to Ford Aerospace and Communications Corp., Hughes Aircraft, Northrop Corp., Martin Marietta, and McDonnell Douglas.

Recommended reading

Two articles in the January-February 1978 issue of *Infantry* provide a comprehensive explanation of the artillery role in combined arms operations, particularly in support of maneuver units. The first is titled *King's Men, Myth and Reality*, and the second, *King's Men, FIST*. In the first, the author explains exactly what artillery can and cannot do in combat support. The second explains the fire support team (FIST) concept and how it works.

Another in a series of critical reviews of our basic doctrinal guidance, FM 100-5, is contained in the February 1978 edition of *Military Review*. Dr. Archer Jones, a noted military historian, finds shortcomings in the manual in that it does not address what happens when things go wrong such as when the covering force fails in its deception mission or when communications are interrupted.

A comparison of man-portable air defense systems produced in the US, Britain, Sweden, and the Soviet Union is provided in the October-December 1977 *Air Defense Magazine*. Comprehensive information is provided on six man-portable air defense systems either fielded or under development.

The lead article in *Military Review* for March 1978, "Perspective and Patterns" contends that the terrain in Western Europe is, for all tactical purposes, urbanized and that our doctrinal response to this urbanization of terrain is deficient. The author writes that training on the rolling, open terrain of Forts Riley and Hood, among others, does not prepare us for a European war, and he suggests a new perspective for looking at European battle maps.

In the same issue is an article by Major General Tal, Israel's assistant minister of defense, who commanded the southern front in the 1973 Mideast war. Major General Tal explains the political and geographic factors that determine Israeli doctrine and briefly describes current strategy and tactics of his nation's defensive plans.

For readers interested in the latest thinking and activity related to the Opposing Force Program, the October-December 1977 issue of *Military Intelligence* magazine contains three articles and several short items on the subject.

Go-ahead asked for German gun

A Congressional go-ahead has been requested by the Army in the development and testing of the German-designed 120-mm smoothbore gun system to arm the XM1 main battle tank. Successful completion of development and tests on the 120-mm will determine when it is placed on production-line tanks. The 120-mm German weapon is the main gun on the German Leopard 2 tank.

The Army's first XM1 tanks, scheduled to roll off production lines in 1980, will be armed with the standard US 105-mm gun. Evaluations of the 105-mm have proved it adequate for any "near-term" threat according to Army officials.

A decision to begin production of the 120-mm guns, depending on Congressional funding authority, could be made by 1981, and production started in the mid-1980s.

Tabletop wargames for combat leaders

Beautiful, rolling countryside with finger valleys dotted by small villages, blotched with pastures and fields, and criss-crossed by primary and secondary roads, some paralleled by railroad tracks, is the scene that meets the eye. It is a peaceful scene, reminiscent of Western Pennsylvania, but the locale is in southern Germany and the activity is anything but peaceful.

A "Threat" motorized rifle division, not knowing the size, composition and disposition of NATO forces, and attacking on an 8- to 10-kilometer front has sent a motorized company of infantry, reinforced by a T-62 tank platoon and a section of vehicles mounting antitank guided missiles, forward to probe.

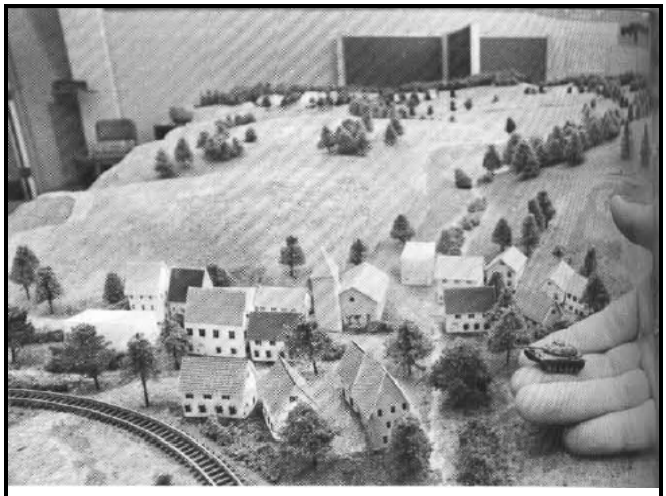
The "Threat" commander soon finds his opponent and the battle is joined; massed artillery comes into play, and smoke rounds scream in and blanket the battle area. US commanders worry about ammunition supplies and ponder key terrain decisions that were made before the engagement.

The action described illustrates but a few of the problems faced by field grade officers attending the week-long "Battle Captains" course taught at the Command and General Staff College (CGSC), Fort Leavenworth, KS.

As part of the curriculum, these men actually fight battalion-sized engagements using 1:285 scale model tanks, vehicles, and infantry squads on a terrain board model of actual European geography. These officers, who will soon command combat or combat support units throughout the Army, are getting an eagle's eye view of problems encountered in modern combat and, by making decisions themselves, are learning the strengths and weaknesses of both NATO and "Threat" tactical doctrine, force structure, and equipment.

The "Battle Captains" course is a commander refresher program designed for maneuver and artillery commanders. The course is one week in length and is a portion of a three-week-long course designed to sharpen command decision skills. Students attend one week at their basic branch school following a curriculum geared to a "How to Train" concept. The officers then go to Fort Leavenworth for the "How to Fight" portion and then to Fort Knox for a "How to Maintain" maintenance and supply course.

The battle course, according to CGSC instructors, is a high resolution, individual weapons system simulation which takes into consideration unit weapons organic to the battalion as well as mines, smoke, electronic countermeasures, command and control, suppression, and use of terrain; in short, all the dynamics of the modern battlefield.



The hand holding the M60A1 tank gives some indication of the size of the vehicles used in the BATTLE game. The scale is 1:285, making the vehicle shown roughly an inch long. (Photo by SP5 Jim MacNeil)

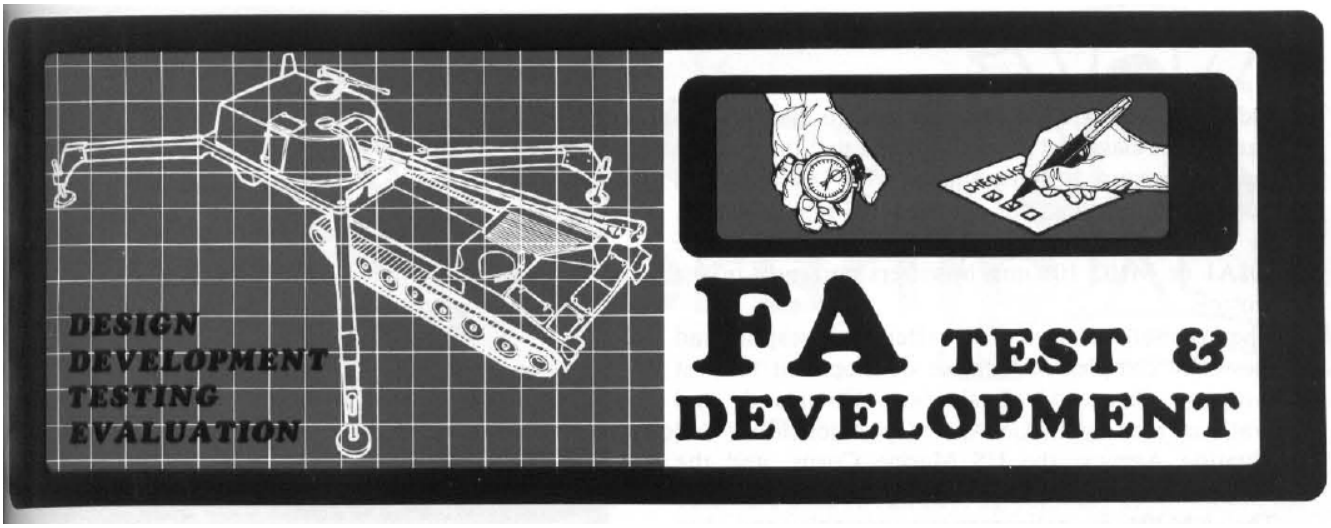
The game makes knowledge of the characteristics and limitations of modern weapons, friend and foe, mandatory. It is essentially a game where a reinforced US battalion is opposed by major elements of a "Threat" motorized rifle division. Participants in the game play both sides.

Players set their pieces on the terrain model, physically locating each item on the ground according to their tactical plans. Ammunition loads of each vehicle by type, and numbers of rounds per type, is determined and fed to the computer. This selection often becomes critical during game play.

One CGSC director said that, among valuable lessons learned in the course, "we have re-learned the value of smoke." He added that tests have shown the 4.2-inch mortar, a weapon the Army was planning to phase out, has proved to be the most effective delivery tool in the current inventory for the smoke screen purpose. He also noted that players running the "Threat" forces, quickly perceived the value of smoke screens by their forces as a way of off-setting longer range capabilities of US weapons and have used it often. These players have also learned the effectiveness of rocket artillery systems.

The terrain board on which the battles are waged measures 18 by 32 feet and represents an actual area of southern Germany that is about 7½ by 18 miles in size. The board was constructed by the Training Aids Services Office (TASO) at Fort Leavenworth.

According to a TASO official, the locale of the terrain board was instantly recognized by a senior officer who recently returned from a NATO assignment.



105-mm HEAT round test favorable

Operational testing of the XM622 105-mm direct fire high explosive antitank (HEAT) round was recently conducted at Yuma Proving Ground, AZ, with generally favorable results. The XM622 is designed to replace the obsolete M67 HEAT round and the M327 HEP round which is no longer in production.

The XM622 is a fixed round with a single propelling charge providing a muzzle velocity greater than zone 7 of the HE projectile. It contains a fin-stabilized, shaped charge, designed to defeat conventional armor targets. The basic design philosophy for the XM622 has been to maintain maximum common use of production parts from the M456A1 HEAT round for the 105-mm tank gun.

Testing was conducted by the US Army Field Artillery Board, and an in-process review will determine suitability of the XM622 for type classification.

Red Team formed at Fort Sill

At the direction of the Commanding General a Red Team has been established at the Field Artillery Board. The mission of this team is to function in an adversary or "Devil's Advocate" role in analyzing issues designated by the CG.

This type of analysis will insure that conclusions regarding doctrine, training, force development, and materiel acquisition are best for the Field Artillery and can stand the scrutiny of agencies outside the Fort Sill community. The conclusions of the Red Team will be provided to all interested agencies at Fort Sill for comment.

M198 production started

Integration and assembly of the M198 155-mm howitzer begins in May at the Army's Rock Island Arsenal, IL, under a $40 million five-year contract that calls for production of 19 howitzers, 635 recoil mechanisms, and integration and assembly of 635 howitzers.

The integration and assembly consists of assembling the M45 recoil mechanism produced by Rock Island Arsenal, the M39 carriage produced by Consolidated Diesel Electric Company, the M199 cannon produced by Watervliet Arsenal, and fire control equipment made by NUMAX corporation.

M198 155-mm towed howitzer

FA Test & Development

XM204 type classification recommended

An Army materiel development panel has recommended that the XM204 howitzer and its XM760 cartridge be type classified as standard and that the weapon system be procured in accordance with DA approved validated requirements for a towed 105-mm howitzer. This does not mean that it will replace either the M101A1 or M102 105-mm howtizers currently in the inventory.

The recommendation came after the weapon had successfully completed extensive development tests at the Army Test and Evaluation Command and operational tests by the US Army Operational Test and Evaluation Agency, the US Marine Corps, and the Canadian and Australian military departments.

The XM204 is helicopter-transportable and has greater range capability than comparable weapons in the field. The XM204 is the first artillery weapon to employ the soft (fire out of battery) recoil cycle. This weapon differs significantly from conventional recoil artillery weapons in that it has a single trail extending forward under the tube and no trails to the rear.

Ammunition for the XM204 is of the semifixed type. The XM204's maximum range of 14.7 kilometers is achieved by using the XM760 cartridge with a single increment XM200 propelling charge.

XM204 howitzer

HEL office established

The US Army Human Engineering Laboratory (HEL) in collaboration with the Field Artillery Board has established an HEL Liaison Office at Fort Sill. The increasing demands for the rapid development of complex and sophisticated systems for the Field Artillery has created the need for a more timely exchange of research information. This liaison office will provide a direct communications link between the Field Artillery Board and HEL, a DARCOM laboratory.

The mission of HEL is to conduct human factor engineering and research, thus providing an accurate insight into the capabilities and limitations of the modern soldier consistent with tactical and environmental conditions.

Practical Partnership

72d Field Artillery Group crest

by MAJ Landon P. Willman

The 72d Field Artillery Group (US) of VII Corps Artillery and Artillerie Regiment 12 of the German Army became Partnership units in 1972. Since that time, personnel of the two units have been bound together not only as partners within NATO, but as true friends. As strong as the partnership bonds were, the current commanders realized that interoperability involved more than social engagements and sporting events. If there was to be "true" interoperability, there had to be mutual professional respect and dedication to arms. It was time to do something in this regard.

Map exercise

The two units erected a 50- by 150-foot beer tent at Peden Barracks, Wertheim, Germany, but the purpose was not to have a beer *fest*. Rather, the commanders assembled elements of subordinate units of their commands, bringing German and American artillerymen together, to demonstrate their professional expertise side-by-side. There would be no punches pulled because differences had to be identified and solutions adopted if the two national forces were to work together.

The purpose of the exercise was to establish and practice artillery procedures and techniques through a German-American map exercise. A schedule of events significant to fire support planning and execution was developed and integrated into a demanding tactical scenario. It was decided to push the limits of operational capabilities — to the point of learning by failure what we were not capable of doing well. The proximity of group and regimental units in the tent provided an excellent environment for participants to recreate particular situations for correction or resolution.

The tent was arranged in cubicles with 12th Regiment units along one side and 72d Group units along the other. A system of remote speakers and field telephone sets were used to simulate actual radio communications over which units could pass operational and intelligence information, using standard radio communications procedures. American and German forward observers (FOs) conducted bilingual fire missions, with artillery batteries of both nations testing the impact of language and procedural differences. German and American units coordinated counterbattery fires, massed fires, and time-on-target missions against a simulated enemy attack.

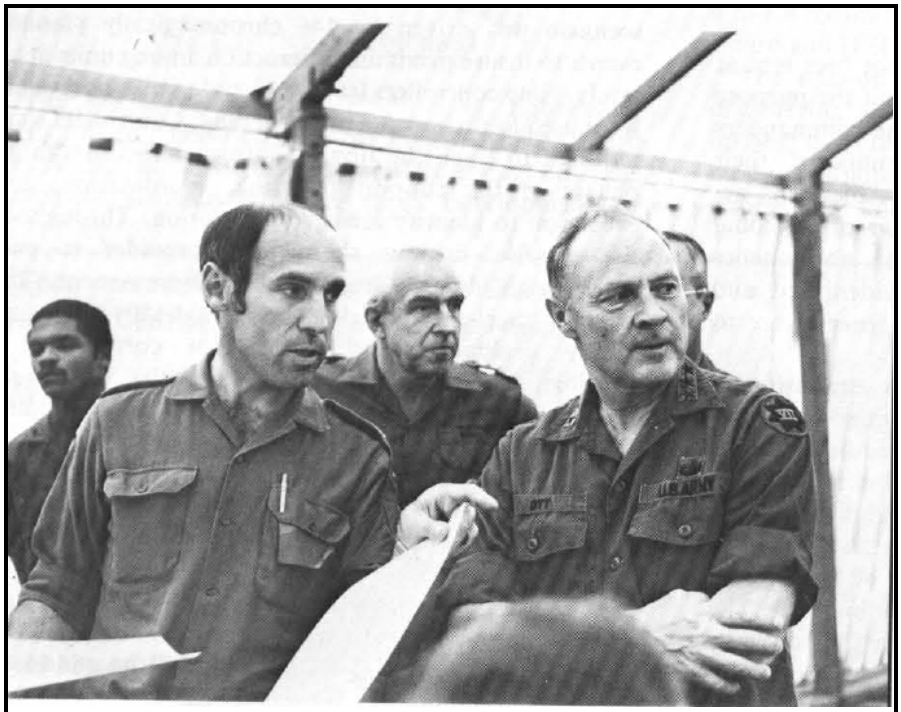
Control

To facilitate problem play and exercise objectives, the scenario was driven by 146 chronologically planned events to insure maximum interaction among units at all levels. Nine controllers (seven US and two Bundeswehr) were used to orchestrate problem play. Controllers were required to track the flow of information through all phases of fire support planning, coordination, and execution to identify areas for resolution. Throughout the exercise, critique sheets were provided to participants to identify areas needing improvement. The critique sheets were picked up periodically to insure timely evaluation and on-the-spot correction, if possible. At the end of each day's activities, a bilingual critique was presented identifying those areas needing further discussion.

Exchange of information and critique sheets provided an excellent source of information to identify areas for improvement at all levels. The following significant facts emerged from the exercise:

- Use of Bundeswehr operations overlays and graphics presented difficulty for US liaison and operations personnel. This problem will be addressed through training and during future interoperability exercises.
- It was determined that stabilization of liaison personnel is essential to establish continuity between supporting/supported units. Liaison sections with prior

An American liaison officer passes enemy targets from a German direct support battalion to his own reinforcing battalion. The mission is tracked by exercise controllers until the mission is executed.



Lieutenant General Ott, VII Corps Comander, discusses Artillerie Regiment 12 intelligence and target acquisition procedures with the Regimental S2.

experience were visibly more responsive during the exercise.

• Registrations and observer calls-for-fire revealed the necessity to establish specific interoperability procedures for fire direction centers and FOs.

• Counterbattery fire was well executed and responsive.

• Significant differences existed between group and regimental meteorological (met) support capabilities. The German met section required temperature, density, and humidity input from the 72d Group. Procedures need to be established to optimize met support.

• All participants used National Security Agency Communications-Electronics Operations Instructions (CEOI) procedures. Fire missions conducted directly between 72d Group batteries and 12th Regiment FOs were authenticated and processed expeditiously. Bundeswehr personnel at all levels proved proficient in all aspects of US CEOI procedures. It was determined, however, that there were problems associated with CEOI commonality. We must be able to talk to each other.

• There was no commonality between intelligence information available in group and regimental tactical operations centers. This was partly a communications problem and partly a collation and procedural problem. Intelligence information generated from lower levels did not reach the 72d Group consistently and timely enough to provide the most current enemy situation. The 12th Regiment operated an intelligence net which rapidly passed comprehensive intelligence information. The 72d Group liaison section, which would normally pass this data, was too overloaded with operational information

to devote the time necessary to pass intelligence information.

• The 72d Group and 12th Regiment tactical operation centers should be organized to provide comparable command and control capabilities to include operational procedures, forms, and formats.

Working together

The map exercise was an important demonstration of professional soldiers working together to develop a mutual understanding of procedural similarities and differences. It demonstratively showed the necessity for continued and expanded joint operational and logistical exercises. The soldiers' understanding of, and confidence in, our mutual capabilities, as demonstrated in the exercise, was especially gratifying.

Commanders, staffs, and subordinate units should take every opportunity to work with their NATO partners. Training programs must be formulated with interoperability objectives in mind, and training schedules should be exchanged to integrate on-the-ground training at all levels. The combined presence of German-American artillery fire support on the battlefield must reflect the effectiveness of *real* interoperability.

Working together, the VII Corps motto — "They Shall Not Pass" — will be a reality.

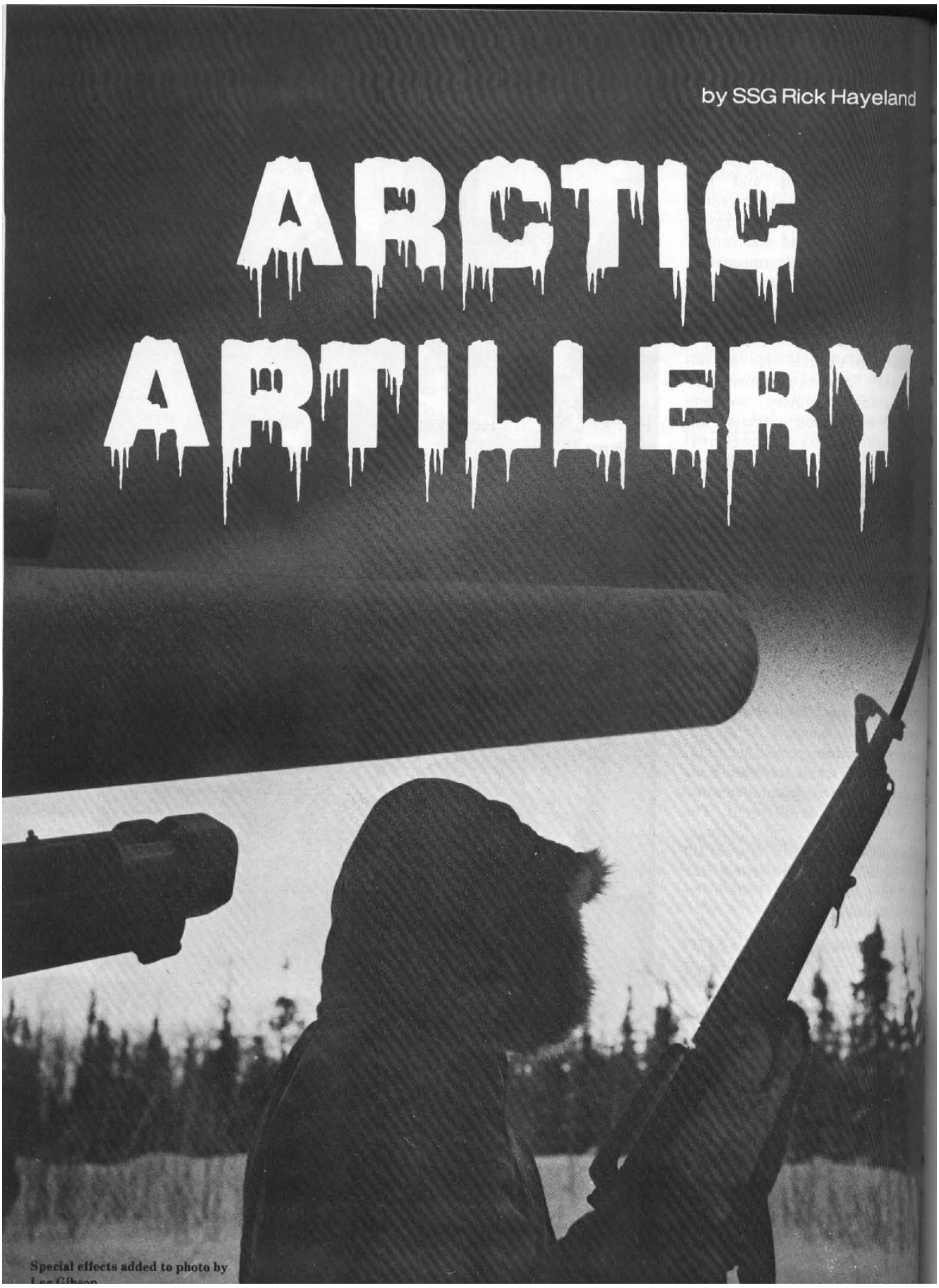
MAJ Landon P. Willman is currently Assistant S3 (Plans and Operations) of 72d Field Artillery Group. Previous to that he was Executive Officer, 1st Battalion, 75th Field Artillery, Bamberg, Germany.

German and American observers conduct bilingual fire missions. German observers fire for US units and American observers fire for German units.

Battalion and battery operations are separated by partitions. The units plan, coordinate, and fire artillery missions.

by SSG Rick Hayeland

ARCTIC ARTILLERY



Special effects added to photo by
Lee Gibson

When artillerymen gather and begin talking about the weather, each will probably be able to contribute his favorite story about the time "It was so cold that . . . ."

But, for the men of Charlie Battery, 1st Battalion, 37th Field Artillery, at Fort Wainwright, Alaska, "cold" is a way of life. Temperatures range from minus 40 to minus 50 degrees Fahrenheit for weeks at a time from November through February.

Charlie Battery at Wainwright claims the distinction of being the northernmost field artillery unit in the United States Army. It is 350 miles north of the rest of its battalion at Fort Richardson. The battalion's mission is to support the 172d Brigade with its 105-mm M101A1 howitzers.

Special problems are unique to training in the cold weather of the Alaskan interior. The big difference is in the time it takes to do things. Things that take only a little effort and time in a moderate climate become major efforts in the extreme cold.

Charlie Battery Commander, CPT Brian L. Davie, says that many of the time standards used in evaluating ARTEPs cannot be met when it is 40 below. When you are wearing heavy gloves, a job takes more time. Also, your glasses fog up and you must be careful not to breathe on the sighting equipment.

How cold does it get in the Wainwright area? It is so cold that—

- A man's unprotected hand will freeze to any cold metal he touches.
- A careless wisp of breath will coat any optical with a thin coat of ice.
- More than an hour's hard work is required to loosen the frozen trails of the 105s after a day's firing.

Self-propelled artillery was tried at Fort Wainwright several years ago but could not be fully adapted to the weather. Hydraulics froze up in the severe cold; and, when the heating was off, the metal-enclosed crew compartment was like a refrigerator, radiating cold in all directions.

The M102 towed howitzer was also given a try at Wainwright, but it also was not satisfactory in the arctic climate. The firing platform must be staked in the ground, and it is difficult to get the stakes into the frozen ground. Many stakes were broken. Steel stakes were substituted, but some of them broke when an attempt was made to take them out of the ground, which proved to be almost an impossible task.

Towed howitzers, however, are the only ones that work effectively in the arctic climate, perhaps because they are so simple.

For the battery commander in the arctic, special considerations, unheard of in training elsewhere, must be taken into account before any move is made. Any type of hasty displacement becomes a Herculean effort at 40 to 50 below zero.

Do you take your Yukon tents and stoves with you? Can you get all the vehicles started? How long will it take to get the howitzers dug out of the ground?

"Just keeping the trucks running is a big problem," says Captain Davie. "We normally cycle start our vehicles (run them periodically around the clock), but in November, during a training exercise at Fort Greely, we weren't geared up to cycle start. When we arrived at Greely, the temperature was 10 degrees above zero. Later it started dropping and was down to 37 below the day we were to leave. That morning we had only a few trucks that started, so we used them to start the rest."

Distances between elements are vast in Alaska. In one 17-day winter period last year, Charlie Battery logged more than 1,000 miles for every vehicle in the Battery during training exercises.

Even though the vehicles used in training averaged 15 years in age, all of them covered the distance under their own power.

"Maintenance plays an important part in the whole operations picture," said Davie. "For these particular exercises, our mechanics had to perform much of their maintenance under arctic field conditions."

By its very nature, artillery is spread out over considerable distances. With the forward observer (FO) in one location, the unit being supported in another, and the battery itself in a third, heavy emphasis is placed on maintaining communications among the three.

Under arctic conditions, even rudimentary procedures such as emplacing the howitzer and composition of the basic load are very different from the SOPs of FA units in more hospitable climates. (All photos except head photo by SSG Rick Hayeland)

The cold that produces such natural beauty also causes unusual communication problems and can freeze skin to metal on contact.

Under arctic conditions, however, certain tricks of the trade must be employed to keep those lines of communication open.

The AN/PRC-77 radio battery, which lasts two or three days in summer, must be replaced once or twice a day in arctic winters. If radios are not used (whether mounted in vehicles or on a back pack), cold seeps into them — cold which could result in damage to the radio if it is not warmed before operation. When radio equipment gets "cold soaked" it has to be brought into a heated area to warm up slowly to prevent damage to the radio.

Land-line communication presents less of a problem, but the telephones and batteries must also be kept warm.

Charlie Battery radiotelephone operators (RTOs) stay inside the section's Yukon tent with the tent flap opening facing the gun. Inside the tent, the RTO records his data and relays the necessary data to the gun crew by voice. In 40-below temperatures, it is virtually impossible for the RTO to record necessary data outside in the cold.

Cold weather also plays havoc with the first mission of the day when the tubes are cold. Under winter conditions, Charlie Battery takes along extra rounds of ammunition because the first few rounds from a cold tube normally fall short. The FOs know this and they will always call for a "repeat" on the first one or two rounds.

The errors in range are always increased on the first mission of

the day or the first mission after a two-hour or longer break; so one or two rounds are fired to heat the tubes up before beginning an adjust mission or a registration.

The season of the year has a bearing on type and quantity of ammunition brought to the training area. For example, in the winter, the artillery battery can expect no more than four hours of day-light from mid-November through January. The result is more night training, calling for more illumination rounds. In summer, the situation reverses, since the night is only four hours long.

Airmobile operations in winter present problems along the same lines as those already discussed, but they are particularly valuable when the snow and terrain make vehicle traffic impossible. First, the Battery carries everything that it can — fuel for the Yukon stoves, tents, rations, and extras of everything in case it gets weathered in. When the choppers bring the howitzers in, the howitzers must be emplaced in the proper location and pointed in the right direction. This calls for close coordination between the people on the ground and the pilot, who sometimes must hover his aircraft for a long period of time. It's particularly difficult for the men on the ground in winter because they are operating in the "rotor wash" of the chopper and in almost white-out conditions because of the blowing snow. Personnel must dress appropriately because exposed skin will freeze rapidly in the combined rotor wash and the 40-below temperature.

Sometimes the howitzer does not land where it should. One time it took the Battery two hours to manhandle a howitzer once it had been set down incorrectly.

But winter in Alaska is not the bad guy that most people think it is. It's something you learn to live with.

The men in Charlie Battery enjoy the uniqueness of their situation and are proud to be the northernmost field artillery unit in the US Army.

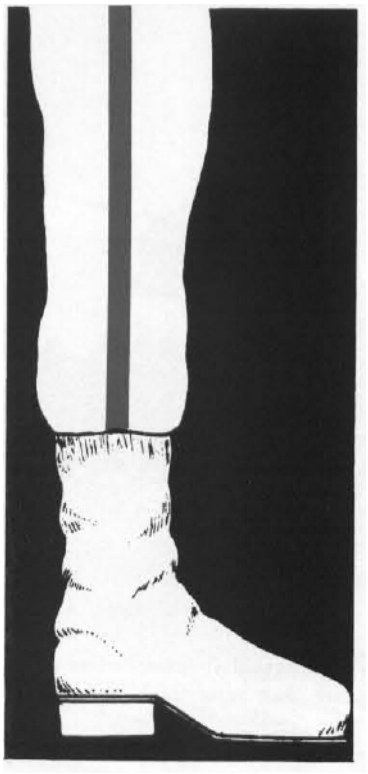
The winter is harsh and demanding, but it's livable. Winter training calls for more attention to the welfare of the soldiers. In that respect, more emphasis is placed on the NCOs and section chiefs. The veteran soldiers know what it is like to be cold, so they give the new arrivals the benefit of their experiences.

The men in Charlie Battery take care of each other!

SSG Rick Hayeland is assigned to the Public Affairs Office, Fort Wainwright, AK.

Chinooks, so essential to arctic mobility, cause "white outs" and near zero visibility under their rotor wash. Note disappearing treeline at left.

Personnel must be careful not to breathe on the optics of the aiming circle. At these temperatures, the moisture from a person's breath immediately forms a coat of ice on a lens.



Redleg Review

WARSHIPS OF THE WORLD: MAJOR CLASSES, by Bernard Ireland, Charles Scribner's Sons, New York, 1976, 192 pages, $7.95.

At least since the dreadnoughts of World War I, large warships have made the world's navies the most capital intensive of the armed forces. Although the missions of those large ships (and consequently their designs) have changed, the major navies of the world believe that the need for these enormous floating cities remains.

Bernard Ireland's book gives a very readable insight into these large warships of the world. The author limits this book to ships over 5,000 standard tons, and because of the cost of new development and operation of such large ships they are found primarily in the navies of the Soviet Union and the United States. Therefore much of this book deals with the navies of those two nations. Ireland plans two subsequent books — one about escort ships and one dealing with submarines and smaller warships.

The convenient, compact format includes photos of the ships, statistical data, and several information-packed narrative paragraphs on the histories and capabilities of the different classes of warships. Although basically a statistical reference work — and a very useful and usable one — the narrative portions add to the value of the book.

The reader should be cautioned to double-check completion dates on more recent ships — especially those of the United States — since cost overruns and changing prriorities have caused failure to meet some of Ireland's projected dates on ships like *Eisenhower* (completed in the fall of 1977), *Texas* (September, 1977), *Mississippi* (scheduled for mid-summer, 1978), and several of the *Spruance* class destroyers.

This is a very readable and attractive reference book. Combined with the author's other two planned works, it should be very worthwhile for both those with a professional interest and those with an occasional interest in the warships of the world.

Cdr George Kolbenschlag, USN, is Chief of the Navy Office of Information, Atlanta, GA.

HISTORY OF THE ARTILLERY, CAVALRY AND INFANTRY BRANCH OF SERVICE INSIGNIA, by Leon W. Laframboise, Watson Publishing Co., Steelville, MO, 1976, 193 pages, 529 illustrations, $18.50.

The author, Master Sergeant Laframboise, is a career Air Defense Artilleryman who has a deep interest in the history of branch insignia. He has published several works on the subject, as well as designed some official unit insignia. His research in the history of combat arms insignia is a welcome addition to the subject of heraldry.

The author pored over archives of regulations, general orders, etc., to provide the most accurate data possible. He starts his report on the artillery with a design approved in 1808. He has determined that no other branch insignia has undergone so many changes as has the artillery, with its evolution from field artillery through coast artillery, air defense, the consolidation of field and air defense artilleries, and then their separation.

The numerous variations provide an interesting chronology of the Army's evolution in organization and uniforms. For instance, at one time artillery adjutants wore a small adjutant general's "shield" below their cross-cannons, and the chaplains serving with us wore a cross below the intersection of the cannons. The design of our insignia was also greatly influenced by advances in metallurgy and the overall development of the uniform as a whole as styles and colors changed.

His tracing of the other two branches mentioned in the title is equally thorough.

The 529 pictures in the book are of very good quality and are an excellent collection. The text is gratefully kept to a minimum, giving only the necessary facts.

The price of the book may preclude wide circulation, but it is a reference work that is mandatory for any serious student of military history and certainly for every library.—Ed.

GETTYSBURG: A JOURNEY IN TIME, by William A. Frassanito, Charles Scribner's Sons, New York, 1975, 248 pages, 200 photographs, $5.95 (Paperback Edition).

If you are one who has pored over wartime photographs of the Gettysburg battlefield in fascination, this book is definitely for you. Mr. Frassanito has written an exciting detective story in his study of after-the-battle photographs that proves most of the photo captions

for the scenes showing battlefield dead are incorrect. The photographs used as primary historical sources were those taken of the battlefield by Mathew Brady, Alexander Gardner, and the Tyson brothers.

In writing this book, Mr. Frassanito sought three necessary items of information on each photograph; namely, the name of the photographer, the date the photo was taken, and an identification of the scene portrayed. The identification caused the most frustration and challenge to correct "serious inconsistencies." By correctly identifying these photos, he has rewritten the history of the Battle of Gettysburg significantly.

Gettysburg: A Journey In Time is a time machine that affords the reader an intoxicating voyage into the past, in a "you-are-there" type of environment.

CW2 Bernard J. Lane is a radar technician with the 1st Battalion, 229th Field Artillery, Pennsylvania Army National Guard.

LUFTWAFFE: A HISTORY, edited by Harold Faber, The New York Times Book Company, 1977, 267 pages, 33 photos, $15.00.

This book is a condensation of the accounts of seven Luftwaffe generals and one historian who analyze and attempt to explain how initial Luftwaffe successes could culminate in such a dismal failure.

The book analyzes the Luftwaffe concept of using only tactical forces to quickly defeat small, neighboring, and relatively backward countries. It examines the blitzkrieg tactic in which enemy air forces are overwhelmed while still on the ground and then tactical airpower is almost entirely devoted to the support of ground forces.

The tactic was proven in the rapid defeat of Poland and France, and its success reinforced German thinking that long-range planning and a strategic air force were unnecessary. Further, those who recognized the need, could not or would not buck the dictatorial system to correct what proved to be a fatal error.

Thinking that existing air power was adequate for prosecution of the anticipated war, the Luftwaffe drastically reduced aircraft development and pilot training as early as 1941. In addition, a transport command was never developed, nor was a capability for strategic bombing realized.

Thus, the authors maintain that the ultimate failure of the Luftwaffe was preordained before the first shot was fired against England, Russia, and the United States.

A wealth of information about the German Air Force is contained in the book and while interesting, is repetitious in areas where different authors make the same point. Their comments on military organization and the desired relationship between military and political leaders are thought provoking and contribute to the value of the book.

COL Warren E. Norman is the Senior USAF representative at Fort Sill.

HELICOPTERS OF THE WORLD, by Michael J. H. Taylor and John W. R. Taylor, Charles Scribner's Sons, New York, 1976, 128 pages, $7.95.

This book is for chopper fans and rotor-rooters. It contains more than 125 photographs and accompanying data on helicopters large enough to lift a 40-ton load, and small enough to be built in garages at home and then flown safely by amateur pilots.

Data include the purpose for which each aircraft is built, engines and horsepower, rotor diameter, length, empty weight, gross weight, maximum speed, range, passenger and/or freight accommodation, and armament where applicable.

A foreword by the authors provides a brief history of helicopter development and the book itself reflects the strides taken to make it ". . . a life-saving and life-enriching aircraft."

Those with any connection at all to the helicopter scene and those who are simply interested in rotary-powered flight will find this volume a valuable reference.—Asst. Ed.

AFRICA: THE HERITAGE AND THE CHALLENGE, edited by Joan G. Roland, Fawcett Publications, Inc., Greenwich, CT, 1974, 544 pages.

This anthology of African history compiled by Professor Roland provides the reader with a timely look at that most active of Continents. As each day's newspaper headlines feature further developments on the "Dark Continent," the information contained in this book allows one to understand more clearly these headlines.

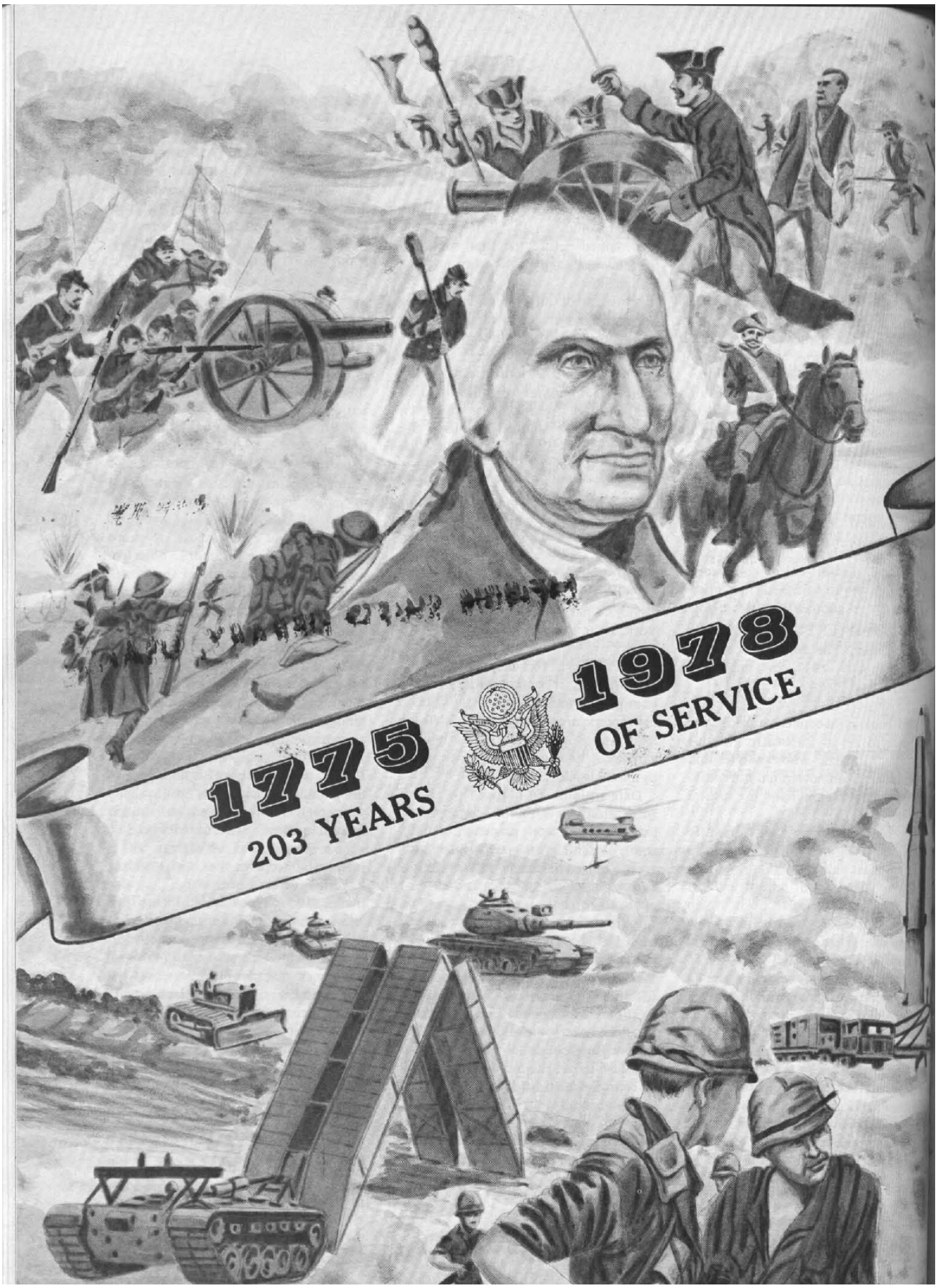
Combining the writings of talented historians, diplomats, scholars, politicians, and others to explain the many and varied problems confronting these so-called emerging or Third World nations, Ms. Roland has assembled some in-depth explanations of many of the dilemmas facing these new independencies. One of the salient features of this history is the inclusion of more than one side to each controversial presentation. Opposing, tangential, and even radical views are offered so that a more objective assessment may be made of the knotty problems confronting the leaders and the would-be leaders of the African nations. For example, on the subject of South Africa's reluctance to acquiesce on black majority rule, the editor offers no less than four differing viewpoints ranging from the liberal appeal for dialogue to the ultra-radical plea for open revolution.

Preceding each article Professor Roland gives us a short explanation of the author's background and current views on the subject. This is particularly helpful in allowing the reader to retain a proper amount of objectivity. It is interesting to note that many of the historians and others writing in this book although not black themselves, show great empathy for the black's plight.

Designed to be read in short sessions, this work is not only interesting but highly readable. It won't tell one how to pronounce those "impossible" African names that begin with "N" or "M" followed immediately by another consonant such as Nkrumah or Mboya, but it will supplement the daily offerings of the news media.

COL (Ret) Howard F. Brown resides in East Greenwich, RI.

☆ US GOVERNMENT PRINTING OFFICE: 1978 – 771 – 103/3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