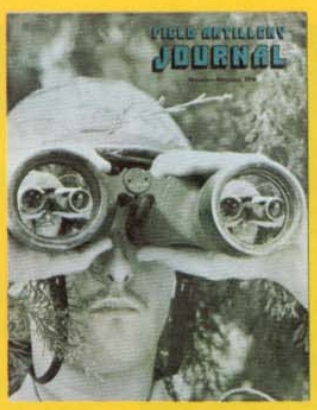
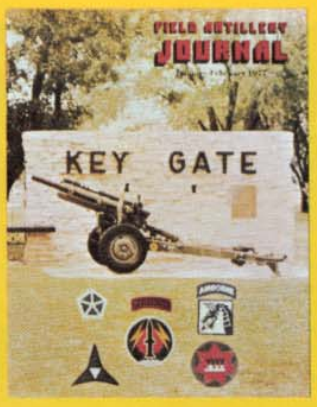
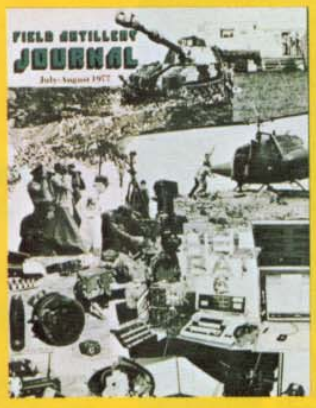
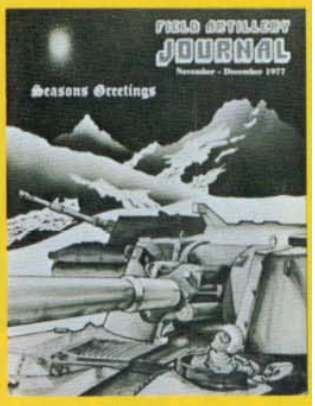
Field Artillery Journal

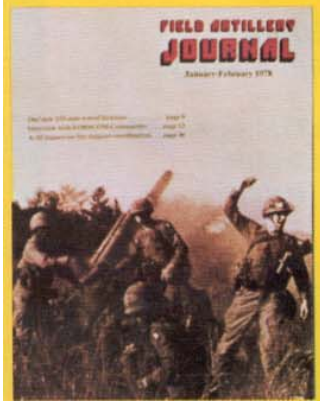
July-August 1978

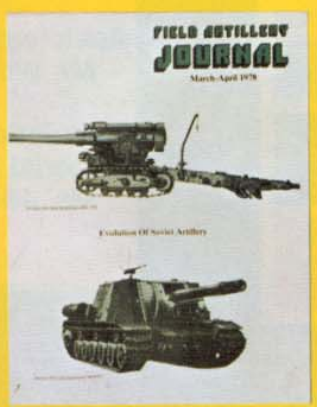


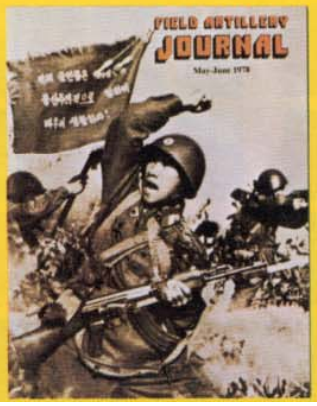












Fifth Anniversary Issue

Field Artillery Journal

the journal of fire support

Volume 46 **July-August 1978** **Number 4**

The *Field Artillery Journal* is published bimonthly at the US Army Field Artillery School for the same purpose stated in the first *First 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 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."

Unless otherwise stated, material does not represent official policy or endorsement by any agency of the US Army.

Funds for the printing of the publication were approved by the Department of the Army, 31 May 1978.

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.

All letters and articles should be addressed to Editor, *Field Artillery Journal*, PO Box 3131, Fort Sill OK 73503. AUTOVON 639-5121/6806 or Commercial (405) 351-5121/6806.

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Subscriptions to the *Journal* may be obtained through the Field Artillery Association, Fort Sill, OK 73503. The rate is $9 per year to US and APO addresses. Canadian and Mexican addresses should add $2 for postage, and all other foreign addresses should add $3 for postage. There is a reduced rate for multi-year subscriptions. For further information write to the Field Artillery Association or call AUTOVON 639-6356 or Commercial (405) 351-6356.

The front and back covers show the past 29 issues of the *Field Artillery Journal* since its rebirth in 1973. The *Journal* logo has been changed to emphasize our branch in the title.

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Articles

Features

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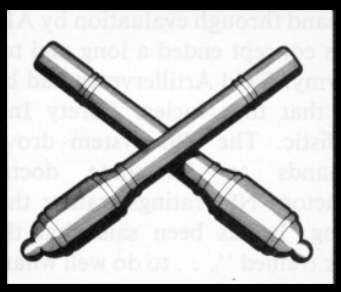

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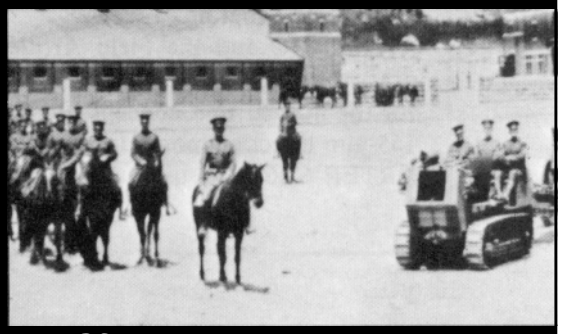

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On The Move. . .

by MG Jack N. Merritt

On 10 April 1978, the Army Chief of Staff signed a valuable new training concept into being. The concept, Army Training and Evaluation Program (ARTEP) for nuclear units, is designed to allow noncustodial, nuclear-capable units to be certified by the chain of command through evaluation by ARTEP. The approval of this concept ended a long and tortuous road for the US Army. Field Artillerymen had been aware for many years that the Nuclear Surety Inspection (NSI) was unrealistic. The NSI system drove units and major commands to formulate doctrine that insured satisfactory NSI ratings, rather than to provide good training. It has been said that the NSI produced a soldier trained ". . . to do well what need not be done at all."

The move to make nuclear training more realistic and take the burden of NSI off battalion level units has been underway for years. Two major attempts to change the system were the ORT/TPI and creation of division artillery warhead sections, but they failed because the former allowed the nuclear portion to overshadow the conventional, and the latter reduced the flexibility of the nuclear systems.

Three major events occurred which gave us the breakthrough we needed to make nuclear training realistic.

1) The ARTEP provided a list of critical tasks which units must train to do in order to be prepared for combat.

2) FM 100-50 is a significant change to Army nuclear doctrine. With approval of this document, Department of the Army recognized and addressed differences between peacetime and combat operations for the first time.

3) The Vice Chief of Staff, General Walter Kerwin, tasked TRADOC to examine the relationship between Nuclear Surety Inspections and the Army Training and Evaluation Program.

TRADOC and the Field Artillery School prepared draft training objectives and an outline of the ARTEP for the nuclear unit concept. Because of the density of 155-mm direct support cannon battalions in the Army, ARTEP 6-365 was used as the vehicle for introducing

the nuclear units concept. The concept provided the nuclear training objectives which, when added to conventional training objectives already in ARTEP 6-365, would allow the units to train for their total conventional and nuclear mission. This concept was submitted to DA in August 1976. General Kerwin approved the concept and directed TRADOC to field validate it with the major commands before implementation.

The Field Artillery School, which was responsible for validating the process, conducted the validation using seven nuclear-capable battalions worldwide. Training and evaluation of nuclear-capable units by the chain of command using the ARTEP nuclear training objectives and the doctrine in FM 100-50 received enthusiastic support from field commanders from captain to general. Commanders reported that the ARTEP was a realistic and valid program to train nuclear-capable units and to evaluate that training.

TRADOC submitted the concept for approval to DA in June 1977.

Staffing of the concept at DA level ironed out most of the basic questions regarding certification procedures, command responsibilities, and external Inspector General involvement. However, to insure the Army was on board, the final issues were resolved at a general officer's conference held on 15 February 1978. Attending the conference were General Blanchard (USAREUR), General Kroesen (FORSCOM), Lieutenant General Trefry (DAIG), and Lieutenant General Meyer (DCSOPS) who is responsible for management of the nuclear program in the Army. Because the Field Artillery has the majority of nuclear units in the Army, I was appointed as the TRADOC representative. During this meeting the cards were put on the table, and the consensus was that the Army needs to train realistically and that this was a new and better program.

The concept agreed on was as follows:

• Noncustodial nuclear-capable Field Artillery units will be trained and evaluated to ARTEP standards. A unit which does not achieve the standards will require additional training and evaluation. The frequency of the total evaluation will be determined by the major command (USAREUR, FORSCOM, EUSA) and will be at least once every 18 months. Division (or comparable) commanders will be responsible for the total evaluation, assisted by operators and trainers.

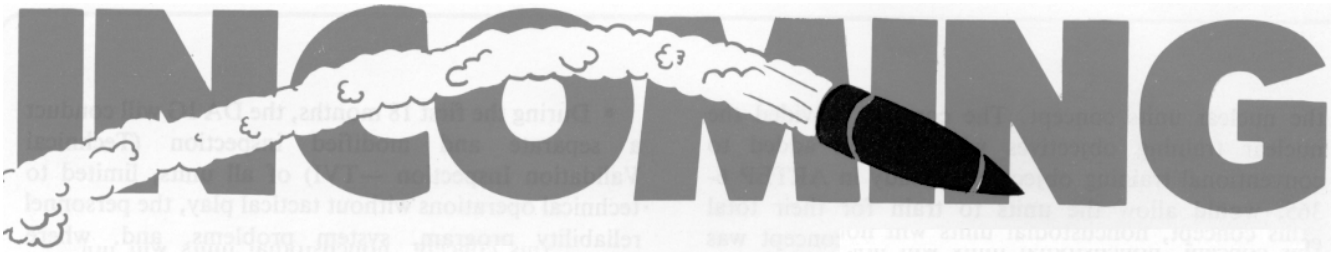
• During the first 18 months, the DAIG will conduct a separate and modified inspection (Technical Validation Inspection —TVI) of all units, limited to technical operations without tactical play, the personnel reliability program, system problems, and, where applicable, war reserve storage and accountability. This validation requirement will be evaluated for continuation after the first 18 months.

Under this concept, noncustodial units will not be subject to NSIs, whereas units who have custody of war reserve weapons will still be subject to present NSI requirements.

The target date for implementing this new concept is August 1978.

One word of caution to accompany this long awaited emphasis on realism in training: In many cases, the ARTEP is being improperly used in the field. Commanders are using it as a test — not as a training tool to enhance training. If units in the field apply the same logic to the nuclear concept, they will end up with the same untenable situation as the ORT/TPI. For the first time in our quarter century association with nuclear weapons, we have a realistic means to train and evaluate our nuclear units. The Field Artillery has fought long and hard to remove the nuclear albatross from the neck of the field commander. Anything we do in regard to nuclear weapons will continue to be politically and psychologically sensitive. The ball is in your court. Only by responsible application of ARTEP principles can we guarantee our new freedom to train to fight the next war.

I want to acknowledge the letters on pages 4 through 6 noting the fifth anniversary of the rebirth of our *Journal*. I'm sure all of you share with me an appreciation of the indispensable role our professional journal serves as an open forum for sharing views that will improve our branch as a member of the combined arms team.



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

The *Journal* received these letters of congratulation on the occasion of its fifth anniversary. Letters came from Redlegs around the world — airborne and "legs," cannon and missile units, schools and staffs — plus a non-Redleg reader, General Starry. We thank you for your support and will continue to publish a professional journal you can all be proud of.—Ed.

TO THE EDITOR:

Congratulations on this fifth anniversary of the rebirth of the Field Artillery Journal! All Redlegs take pride in and appreciate the indispensable role the Journal plays by providing a forum to share professional views that enhance our branch as a member of the combined arms team.

Keep up the good work, and best wishes for the coming year.

WALTER T. KERWIN, JR.
General, United States Army
Vice Chief of Staff

DEPARTMENT OF THE ARMY
HEADQUARTERS US ARMY MATERIEL DEVELOPMENT AND READINESS COMMAND
5001 EISENHOWER AVE., ALEXANDRIA, VA. 22333

DRCBSI 12 April 1978

Editor
Field Artillery Journal
Box 3131
Ft Sill, OK 73503

Congratulations and best wishes on the fifth anniversary of the "rebirth" of the Field Artillery Journal. The success of our Journal is a clear reflection of the professionalism of its editors, staff and contributors. The Journal has provided a forum through which Field Artillerymen everywhere have been able to exchange their ideas and concerns.
We must continue to take advantage of the best brains in our Branch, no matter where they are assigned or how far their views may depart from conventional wisdom.
Keep up the good work!

JOHN R. GUTHRIE
General, USA
Commanding

HEADQUARTERS
UNITED STATES ARMY TRAINING AND DOCTRINE COMMAND
OFFICE OF THE COMMANDING GENERAL
FORT MONROE, VIRGINIA 23651

ATCG 10 March 1978

Dear Major Cauthen:

Best wishes to the Field Artillery Journal on its fifth anniversary. In a few short years your journal has established itself as a truly professional publication that serves all branches of our Army and Redlegs worldwide.

I commend you and your editorial staff. Keep up the fire!

Sincerely,

DONN A. STARRY
General, United States Army
Commanding

DEPARTMENT OF THE ARMY
HEADQUARTERS
COMBINED ARMS CENTER AND FORT LEAVENWORTH
FORT LEAVENWORTH, KANSAS 66027

ATZLCG 9 March 1978

Editor, Field Artillery Journal
Box 3131
Fort Sill, Oklahoma 73503

The July-August 1978 issue marks the fifth anniversary of the rebirth of the Field Artillery Journal. The Combined Arms Center is glad that this important window on current artillery matters has been reinstituted and flourishes. We hope it will continue to be the impressive professional journal, part of the lexicon of the professional library of the Army.

J. R. THURMAN
Lieutenant General, USA
Commanding

DEPARTMENT OF THE ARMY
HEADQUARTERS, VII CORPS
APO NEW YORK 09107

AETSCG

3 April 1978

Dear Editor:

My warm congratulations to you and your staff on this the fifth anniversary of your splendid publication.

The standard of excellence set by the Field Artillery Journal since its rebirth has marked it throughout the entire Army. I receive constant compliments about our branch and its splendid magazine from officers of other branches as well as from fellow Redlegs.

In my present position I read many service journals in an effort to keep abreast of changes going on throughout the Army. No other publication can compare with the Field Artillery Journal for the interest level of its articles and its excellent format. You are truly the voice of the Field Artillery; you are listened to by professionals all over the world. Keep up the fine work.

Sincerely,

David E. Ott

DAVID E. OTT
Lieutenant General, USA
Commanding

ARMED FORCES STAFF COLLEGE
OFFICE OF THE COMMANDANT
NORFOLK, VIRGINIA 23511

13 April 1978

Major William A. Cauthen, Jr., USA
Editor
Field Artillery Journal
Box 3131
Fort Sill, Oklahoma 73503

Dear Major Cauthen:

Congratulations on the occasion of the fifth anniversary of resumption of publication of the Field Artillery Journal. As a former Chief of Public Affairs as well as a career "Redleg," I have a special appreciation for the excellence and professionalism of this magazine. Best wishes for continued success.

Sincerely,

Gordon Hill

L. GORDON HILL, JR.
Major General, USA
Commandant

DEPARTMENT OF THE ARMY
HEADQUARTERS, U.S. ARMY TEST AND EVALUATION COMMAND
ABERDEEN PROVING GROUND, MARYLAND 21005

24 APR 1978

DRSTE-PA

Major William A. Cauthen, Jr.
Editor
Field Artillery Journal
PO Box 3131
Ft. Sill, OK 73503

Congratulations on the Fifth Anniversary of the Field Artillery Journal.

It is a marvelous publication of exceeding value to field artillerymen everywhere. I particularly enjoy the Journal's candid approach to controversy. This leads to authentic credibility, a level of quality few other publications reach.

In fact, the volume of reader response in "Incoming" is the best testament to the magazine's success, for it shows the Journal is both widely read and taken seriously.

Best wishes.

Sincerely yours,

PATRICK W. POWERS
Major General, USA
Commanding

SUPREME HEADQUARTERS ALLIED POWERS EUROPE
GRAND QUARTIER GENERAL DES PUISSANCES ALLIEES EN EUROPE
BELGIUM

Editor, Field Artillery Journal
Box 3131
Fort Sill, Oklahoma 73503

22 March 1978

I join Field Artillerymen from around the globe in saying "Happy Birthday" to the Field Artillery Journal on the fifth anniversary of its rebirth. The term "rebirth" connotes a reawakening or renaissance, and indeed what we should celebrate today is not only the rebirth of the Field Artillery Journal, but the reawakening of the Field Artillery itself. By being the common medium of Field Artillerymen around the world, by its consistent highest standards of excellence and professionalism, the Journal has played an indispensable part in this renaissance of the Field Artillery. For that, we owe the Journal and its dedicated workers our praise and gratitude. To each of you associated with the Journal these past five years - a sincere thank you and well done for being our life line to "Buffalo Country"!

Though still young at "five", may you continue to prosper, and may you grow old gracefully in the service of our Field Artillery, and our nation.

NILES J. FULWYLER
Brigadier General, US Army
SHAPE, Belgium

DEPARTMENT OF THE ARMY
HEADQUARTERS, 56TH ARTILLERY BRIGADE
APO NEW YORK 09281

AEUAT-CG

Dear Editor:

On behalf of the Officers and men of the 56th Field Artillery Brigade, I congratulate the Field Artillery Journal on the occasion of the fifth anniversary of its rebirth. The unique contribution which this singularly well managed publication makes to the Field Artillery community in providing a vehicle for soldiers and officers young and old to get their ideas before the redleg community is of immense value.

Officers of the Pershing Brigade find the magazine of especial value as a means of keeping abreast of developments in the larger world of the cannon, from which we emerged, and to which most of us shall return.

Long life to the Field Artillery Journal.

Sincerely,

Robert B Hankins

ROBERT B. HANKINS
Brigadier General, USA
Commanding

DIVISION ARTILLERY
"Second To None"

Memo For The Editor, Field Artillery Journal

Congratulations on the 5th Anniversary of the resumption of publication. In this brief time, the Journal has quickly reestablished itself as the Field Artillery's premier medium for the exchange of professional thought and innovation. Your contribution stands unequalled among military publications.

Well Done!

James E Drummond

JAMES E. DRUMMOND
COL, FA
Commanding

"AND FIT TO FIGHT"

DEPARTMENT OF THE ARMY
HEADQUARTERS XVIII AIRBORNE CORPS ARTILLERY
FORT BRAGG, NORTH CAROLINA 28307

AFZA-AR-CO

23 March 1978

Editor, Field Artillery Journal
Box 3131
Fort Sill, Oklahoma 73503

"The officers and men of XVIII Airborne Corps Artillery extend congratulations to the Field Artillery Journal on the occasion of the Journal's fifth anniversary. The Field Artillery Journal has been on time and on target using the ambitious "forum" concept articulated in Volume 41, Number 1. From that rebirth we've seen the Journal rapidly mature into a first rate professional publication furnishing the Field Artillery community a wide variety of fact, opinion and controversy. You have challenged us; have made us think, evaluate, reexamine our procedures, and discard outmoded methods. You have encouraged us to innovate and hussle to keep up with the flow of productive change which is moving the Field Artillery into the future. You have spread the word quickly and efficiently, and the United States Army Field Artillery is better as the result.

The XVIII Airborne Corps Artillery has accepted the Journal as its own, and joins with Redlegs throughout the free world in sending its congratulations for five truly superb years. Innovation and improvement are the Field Artillery's future; your mission has just begun."

JERE L. HICKMAN
Colonel, FA
Commanding

DEPARTMENT OF THE ARMY
HEADQUARTERS, 2nd BATTALION (155) (SP)
20th FIELD ARTILLERY
APO NEW YORK 09358

AETHK-CDR

28 March 1978

Dear Major Cauthen:

"Congratulations from the "Bobcats" of the 2nd Battalion, 20th Field Artillery. In October, 1976, this battalion moved from Fort Carson to Wiesbaden, Germany. Since then, the Journal has provided a valuable link between this unit and the rest of the Field Artillery Community. We have learned from the Journal's contributors, and have adopted many suggestions".

Johnnie P Byrd

JOHNNIE P. BYRD
LTC, FA
Commanding

Fighting the artillery battle

The *Journal* presently suffers from a lack of critical discussion of organization and doctrine.

We are told repeatedly in explanations of the recent changes in Field Artillery organization and doctrine that "The battle will be fought at the division level." But will it? Can we be sure of that?

It certainly was true in Vietnam, where the size of opposing forces, their relatively limited equipment, and the character of the terrain combined to place the decisive action at division or lower levels. But will the same conditions exist as we face the armies of the Warsaw Pact? Even a cursory consideration makes one hesitate to answer "yes."

First, we will face a modern army which outnumbers us in every military category. It is heavily equipped because its emphasis is on *firepower*. It will have formidable airpower and adequate air defense systems.

Second, the varied terrain will offer open avenues of approach suitable for maneuver. We will be forced to deploy our smaller number of divisions on extended frontages.

Third, before the action even approaches the division areas, our artillery and air forces must undertake three vital missions:

- They must at least blunt the enemy's necessary logistical buildup.
- They must win the battle for air superiority, including air defense suppression.
- They must fight successfully the all-important counterbattery duel.

The success, even partial success, of this firepower foreplay would substantially reduce the fire support of the enemy's maneuver forces as they prepare to engage our divisions.

Now the question: Will the decisive action take place at the individual division front? Yes — IF one of our divisions happens to be astride a vital road junction. Then the enemy would make every effort to eliminate it. Otherwise, their more probable action would be to bypass — i.e., slip some of their plentiful divisions through the weakly held fronts and gaps dictated by our necessarily extended deployment. They would simply contain, by a holding action, our more heavily held division fronts. We may be sure their intelligence would be well aware of our deployment problems.

Our resistance at the division level, then, might well prove to be spotty, broken, uneven — inadequate.

The prospect for an increase in the number of our divisions is not good. Without more divisions we cannot hope to deploy a strong defensive line. We should therefore make every effort to improve our effectiveness in the fire fight that precedes the action of the maneuver forces. What steps should be taken to that end?

- We must pay more, whatever is needed, for target acquisition. Enough radar, sound and flash, and similar technological aids must be electronically sited across the entire corps front, without regard to division boundaries, to provide viewing sectors deep into the enemy's territory. For this operation we must have a reinforced corps artillery target acquisition *battalion*.
- The range needed for destruction of the enemy's logistics will probably require the programing of several missile battalions by the corps artillery staff.
- The critical battle for air superiority will call for the closest coordination between the corps artillery commander and the air commander. For the artillery, this can be achieved only at corps level, because in many cases the air defense suppression fires must be delivered to extreme ranges.
- Because we will face a huge quantity of enemy artillery, our counterbattery program must be given much more attention and effort than it has ever received. We should provide enough corps artillery battalions to handle the task. The corps artillery commander will find it necessary to allocate portions of this job to division artillery. When breakthroughs occur on the division front, the corps artillery commander must be able to provide ample flanking fires to contain the bulge. Divisional artillery units plus rear corps artillery units covered by reserve brigades should execute these emergency fires under the direction of corps artillery.
- It is not inconceivable that the personnel of an entire division command area might become casualties in a chemical cloud laid down by the enemy. In such an event, the corps artillery commander and staff would necessarily direct the fire defense.

The magnitude and importance of all these artillery tasks demand more artillery commanders and staffs than we have ever possessed. The possibility that one or more such units could be wiped out in a nuclear or chemical attack must be taken into serious account.

Equally important in the discharge of these heavy responsibilities is the power of appropriate rank for artillery officers. Without it they cannot (given all the fiercely competing claims at staff conferences) win approval for the ammunition stocks, position areas, road priorities, etc., that are essential to a satisfactory performance of their tasks. An artillery major general, commanding sufficient staff and battalion and group strength, is an absolute necessity in each corps. To expect a div arty commander (presently a colonel) aided by a brigade headquarters to do the job is impractical and wholly unsound.

The present plan for one brigadier general at corps level, with a miniscule staff, *recommending* not *commanding*, will be about as effective as a damp round of saluting ammunition.

R. P. Shugg
BG (Ret), USA
San Francisco, CA

Time and FADAC

I have just finished reading the article on "Calculators and the Field Artillery Mission" in the *Journal* (March-April 1978). Having had experience working with the FADAC system I found the article very interesting. Under current battle concepts, firing batteries and their headquarters elements will be required to move constantly. Artillery units that use the FADAC system are faced with the problem of preparing the FADAC in less time than ever before.

Because of the size and weight of the FADAC, including its power source, it usually takes two to four men to set it up for operation. Unless it is mounted in the vehicle, precious time is lost.

I am glad to hear that our systems are always improving and calculators may be part of the answer. In closing, I would also like to point out that on page 24, figure 1 (same issue), the observation post is plotted 1,000 meters off.

SSG John S. Perea
9th Div Arty
Fort Lewis, WA

Incoming

High burst computation by calculator

I co-authored an article with LTC Ruel L. Wilson Jr. which describes a high burst registration program for the programable pocket calculator. In addition to providing the convenience and easy operation of a hand-held calculator, the programable pocket calculator has a programing capability which makes it versatile enough for use in solving a variety of field artillery problems, including survey and fire direction.

The opportunity for artillery precision registration is often limited because of either poor observation of ground targets or the absence of a clearly defined, accurately located registration point in the target area. To overcome these limitations, either the high burst (HB) or mean-point-of-impact (MPI) registration procedure may be used as an alternate procedure. In conducting an HB or MPI registration, all rounds are fired with the same data and the mean chart location is determined after firing is completed. Manual calculation of the HB or center of impact location requires knowledge and adeptness in the use of logarithms, antilogarithms, and trigonometric functions. Besides being time consuming, manual computation increases the chance for error. Through use of a hand-held programable calculator, this lengthy calculation can be reduced to a few keystrokes and a solution can be obtained in seconds. Other advantages are that computational error is practically eliminated and the problem can be solved without consideration as to whether observer 01 is to the left or right of observer 02 or into which quadrant the bearing from 01 to the HB falls. Our paper introduces artillerymen to the value of a programable pocket calculator in computing an HB registration. Although our program is suitable only for the HP-65 calculator, a similar program can be written for use with other hand-held programable calculators.

The HP-65 is designed to function in either a manual or programable mode. With this calculator one can carry out complex, sophisticated computations with only minimal effort and knowledge of the calculator itself. Programs having as many as 100 steps can be run. A tiny magnetic card reader and recorder enable the user to run prerecorded programs or to create, record, and execute his own program. Knowledge of computer language is not required to use the HP-65. Also, prior programing experience is not necessary. The user simply outlines the problem in terms of the keystrokes needed for calculation and the additional keystrokes needed to control the program. The keystroke sequence is keyed into memory. The program is recorded for future re-entry on the magnetic card by merely passing it through a slot in the calculator. When you wish to solve a problem, the program is stored in the calculator, input data is keyed-in, and the stored program is executed by simply pushing a key. The program stops when additional input data is needed or when a result is displayed.

"Input" and "output" data may be recorded in the appropriate spaces on DA Form 4201; however, for our program, we devised an abbreviated form which shows only that data pertinent to the computer solution.

Donald Burdick
LTC, FA
1st Bn, 214th FA (GAARNG)
Elberton, GA

Thank you for the additional information on exploiting the seemingly unlimited potential of small calculators. A copy of your system has been forwarded to the School's Combat Developments Directorate and Gunnery Department for possible inclusion in the FA System-wide program being produced for field use.—Ed.

Cannoneers/Missilemen

Regarding the "Incoming" from MAJ Douglas J. Middleton and your reply in the *Journal* (March-April 1978), kudos to both of you. During the last 27 years I have spent as a Redleg, a difference has existed between the "tube artillerymen" and these "missile cats who should really be ADA."

Coming from Camp Chaffee as a Field Artilleryman in 1951, I graduated from OCS in November 1952. I had taught surface gunnery (or FA) with 90-mm, 120-mm, twin 40s, and quad .50s. When I went to Korea, I reverted to FA and served as FO, AO, RSO, XO, and assistant S3 of the 10th FA Battalion and 49th FA Battalion. From there I was assigned as a gunnery instructor, 1955-57, at Fort Sill. Probably because of that, I became the first S3 of the first Honest John rocket battalion and, later, the first S3 of the first Pershing battalion (2-44) in 1962. Later, I commanded the 3d Battalion, 84th Artillery (Pershing), was commander of a 105 battalion in Korea, and div arty XO of the 4th and 23d Division in Vietnam.

"Tube Artillerymen" have been very kind to me because of my background. But many officers who have worked for me in missile outfits, including my present job as Deputy Commander, 59th Ordnance Brigade, have been blasted by "tube artillerymen" and told "all missilemen are really ADA officers wearing FA insignia!"

I have had to tell my young cannoneer officers manning the missiles that such is not true and that the "tube artillerymen" lack the total experience my young charges are getting.

The change of attitude at Fort Sill that you, as editor, expressed, became predominant under LTG Don Keith's assignment as "Mr. Field Artillery" and I hope it will continue for many years to come.

C. F. Hastings Jr.
COL, FA
59th Ordnance Brigade
APO New York

Your letter was mailed before MG Merritt's column in the May-June 1978 issue was printed. I'm sure you enjoyed reading his feelings on this subject.—Ed.

Reunion

The 7th Field Artillery Association will hold its 11th annual reunion September 15-16 at the New Hampshire Highway Hotel, Box 855, Concord, NH 03301. For information write Warren N. Caldwell, President, 51 South Street, Milford, NH 03055.

Statue for medics

Over the years in battles fought by Americans around the world, the cry for help has been answered by a dedicated selfless soldier — the combat medic.

A group of Active and retired Army officer and enlisted personnel have organized an effort to construct a memorial to those medical soldiers who went into combat to serve — and save — their fellow soldiers, frequently at the price of their own lives. The proposed memorial is a statue depicting a medical soldier tending a fallen comrade. An artist's conception of the statue to be located at Fort Sam Houston, TX, is shown below.

Preliminary cost estimates indicate a need to raise in excess of $100,000 for the memorial. The fund has been authorized by IRS to function as a nonprofit, tax deductible, charitable organization.

Anyone who would like to remember and honor those medics should send their tax deductible check or money order to:

Combat Medic Memorial Fund
P.O. Box 34, Academy of Health Sciences
Fort Sam Houston, TX 78234

If additional information is required, call Richard J. Berchin at (512) 221-2454/5706 or write to the above address.

Richard J. Berchin
Chairman
Combat Medic Memorial Fund

Put the "Scan Shell" in a rocket

Colonel Hercz's article in March-April 1978 *FA Journal*, concerning a conceptual artillery projectile which could perform reconnaissance missions was exceedingly interesting and thought-provoking. I think we all appreciate the crying need for an accurate, real-time intelligence gathering and target acquisition means quickly responsive to the division or subordinate units. The "Scan Shell" sounds like it could go a long way toward meeting that need.

I might, however, suggest a modification to the concept. Why not put the scanning warhead on a rocket such as the US Navy's five-inch ZUNI which I mentioned in my article, "We need an MRL" (*FA Journal* Nov-Dec 76 and Jan-Feb 77)? The Scan Shell would fit beautifully with the MRL concepts suggested in the article.

Because of the extremely low launch stresses imposed by rocket launching as compared to cannon launching, it should be possible to develop a "Scan Rocket" much more quickly and cheaply than would be the case with a "Scan Shell." Further, the "Scan Rocket" could be fired from compact and inexpensive (even expendable) launchers which could be organic to target acquisition organizations. The possibilities are fascinating.

Let's face it — tactical air support and reconnaissance are great, but they can't handle all the needed jobs all the time.

William H. Rees
Lt Col, USAF
Duluth, MN

Reunions

The 6th Field Artillery Veterans Association will hold a reunion July 14-16 at the Sheraton Inn, Gettysburg, PA. Write Joe Gobrick, Rt. 2, Box 94-C, Weatherly, PA 18225.

The 911th Field Artillery Battalion will hold a reunion 29-31 July at Pittsburgh, PA. Contact Mr. Fred J. Gero, 653 West County Line Road, Hatboro, PA 19040.

The 2d Battalion, 77th Field Artillery and 631st Field Artillery Reunion Group will hold a reunion 28-30 July at Holiday Inn, Corsicana, TX. Contact Mr. Jim Collins, 915 N. 21½ Street, Corsicana, TX 75110.

The 419th Armored Field Artillery Battalion will hold a reunion 29-30 July at Hotel Onslow, Reno, NV. Contact Mr. Vern Floerke, 209 Calistoga Road, Santa Rosa, CA 95405.

The 62d Armored Field Artillery Battalion Association will hold a reunion 13-15 July at Ramada Inn, Fort Smith, AR. Contact Mr. John R. Howerton, 9988 Live Oak, Fontana, CA 92335.

The 73d Field Artillery Battalion (WW II - ETO) will hold a reunion 11-13 July at Ramada Inn, Nashville, TN. Contact Mr. Edward M. Brook, RD 1, Canisteo, NY 14823.

Battery Antitank Defense

by MAJ C. T. Catchings

Is there a need for an antitank capability in artillery batteries? You* bet *there is!

— 6 December 1942, near Tebourda, Tunisia, Battery C, 27th Field Artillery, overrun by armored forces.

— 15/16 February 1943, 68th Armored Field Artillery Battalion encounters armored forces at Kasserine Pass, Tunisia.

— 16 December 1944, 591st Field Artillery Battalion, cut off by armor in Winterspelt, Germany.

Where else were artillery units facing armored forces during World War II whose stories are not recorded in the annals of history? Where will the next encounters occur?

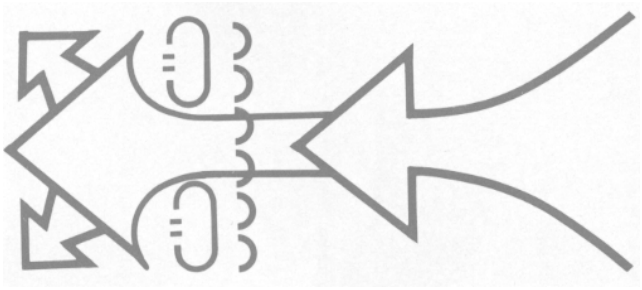
It is ludicrous to think that artillery batteries on the modern European battlefield will not have to contend with armored forces. Nor can we assume that we will be able to displace before engagement occurs. These unexpected engagements will continue in the future for several reasons.

From the Warsaw Pact perspective, there is the sheer density of their forces on the battlefield. In the past, enemy tanks were our primary concern, but in the future, not only will tanks be encountered, but the Soviets' new BMP also presents a howitzer-killing capability. This armored infantry combat vehicle mounts a 73-mm smoothbore gun (with an effective range of 900 meters) and four or more SAGGER antitank guided missiles (with an effective range of 500 to 3,000 meters).

Warsaw Pact divisions and regiments have reconnaissance battalions and companies respectively. These units, equipped with PT-76 tanks, operate well forward. Those artillery units supporting covering force operations are particularly vulnerable to the threat posed by these units.


KAREN
RANDALL

Decisive lateral repositioning was once considered a survivability measure since batteries were not in the direct line of the penetration but, rather, on the shoulders of the penetration. However, this presents problems for artillery batteries also. As depicted below, once the penetration has occurred, Warsaw Pact forces then expand the penetration. This can cause units to be cut off or engaged.



Another Warsaw Pact consideration is the high priority they place on identifying and destroying our artillery units. Reconnaissance units make every effort to obtain the locations of all nuclear weapon delivery systems and gun positions.

Additionally, our methods of employing field artillery in the future enhance the likelihood of encounter on the battlefield. During artillery raids, batteries may be positioned much closer to the forward edge of the battle area (FEBA) in order to optimize range capabilities. Frequent displacement by batteries, while reducing their vulnerability to counterfire, increases their chances of encountering enemy armored reconnaissance patrols. Perhaps the most salient aspect of friendly employment to be considered, however, is terrain gun positioning. Particularly as we move towards eight-gun-batteries, units are spread over a much wider area with little or no defensive perimeter possible.

Traditionally, artillery doctrine has been that batteries would not withdraw from a position or fail to render fire support solely because of the threat of attack by hostile forces. On the modern battlefield, maneuver unit dependence on field artillery fire support is greater than ever. This increased responsibility diminishes the ease with which one might expect a unit to displace.

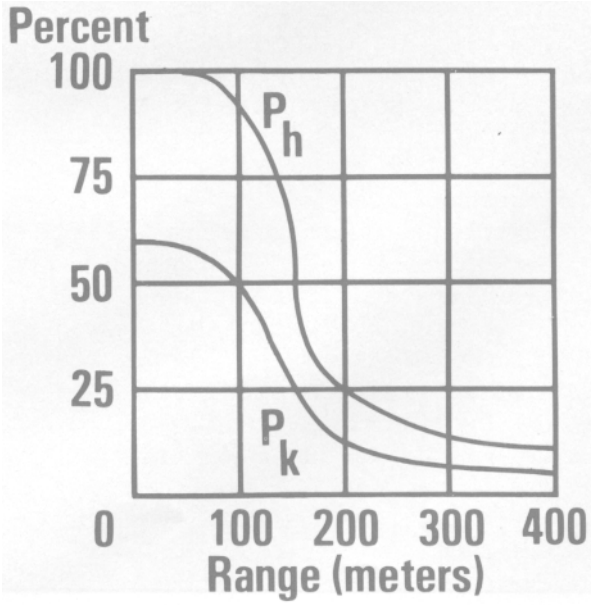
To continue to provide the required fire support and avoid defeat by enemy armor, the artillery battery must have an organic antitank capability NOW. There is currently no effective antitank capability within the battery. The essential antitank capability is strictly for self defense and does not imply an aggressive tank killing mission.

During World War II, it was fairly common knowledge that self-propelled howitzers, while less maneuverable than tanks, were superior to them in firepower; armored confrontations were not always disastrous for the artillery units. Today, the tank's increased maneuverability, devastating firepower, and increased armor protection has reduced its vulnerability to artillery fire.

The role of providing fire support to maneuver forces is of paramount importance, and artillery munition developments have focused in this direction — as they should have. With the exception of 105-mm howitzers, there are no antitank rounds available to the Field Artillery. Furthermore, the research, development, and production costs for such a round for 155-mm and 8-inch howitzers would be prohibitive. Of course there are instances when high explosive rounds will kill a tank by achieving a firepower, or "catastrophic kill." But, by and large, given a hit on a tank, the best one can hope for is a "mobility kill." Additionally, the problem of achieving a hit is compounded due to poor direct fire sighting systems. This problem has consistently contributed to a low single shot kill probability (SSKP) against moving targets with field artillery direct fire.

The only other antiarmor capability besides the howitzer available to the battery in the direct fire mode is the light antitank weapon (LAW). The LAW was designed as one of a family of three infantry antitank weapons and, as such, was intended for the infantryman to have a close-in tank-killing capability. With a 250-meter maximum engagement range for the LAW against stationary armor and 200 meters against moving arms, the LAW is indeed a "last resort" weapon for the artillery battery.

As depicted in the graph below, the probability of a first round hit (Ph) and kill (Pk) with the LAW are well below 200 meters in all cases. These are probabilities expected from a well-trained gunner.



It can be seen then that an artillery battery has a very limited antitank capability. This in turn reduces the survivability of a battery. In order to enhance its survivability, the battery needs an antitank weapon system that delivers a lethal blow to enemy armor in an effective manner at ranges beyond 200 meters. There are currently two options available, the TOW and the Dragon.

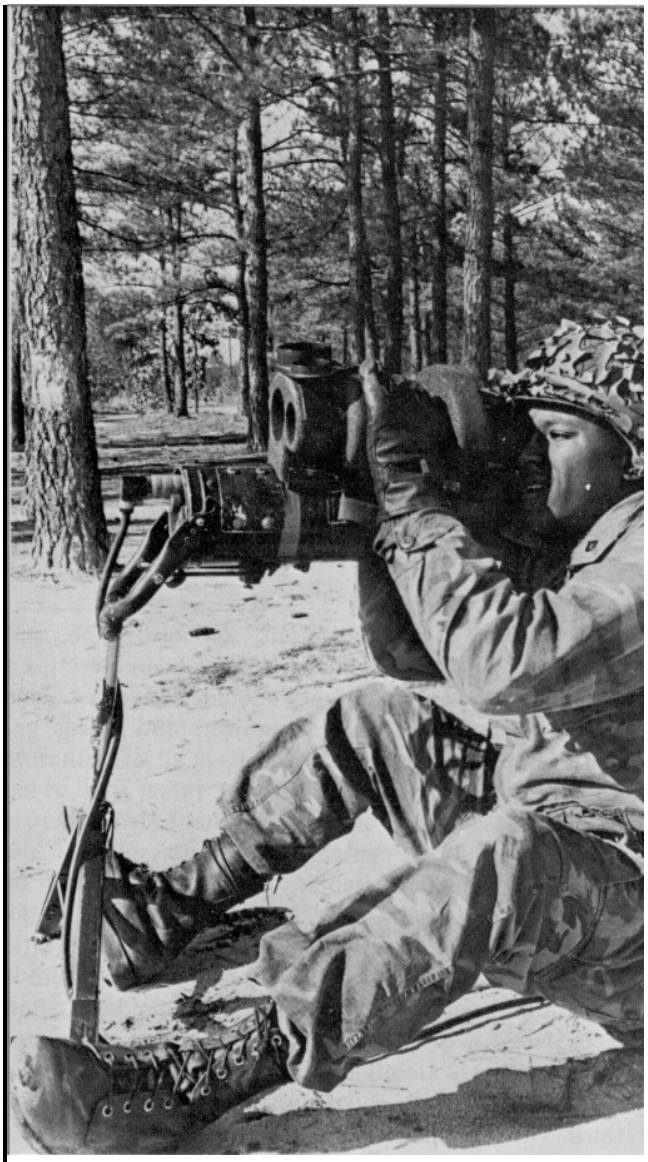
The tube launched, optically-tracked, wire guided missile (TOW) is an effective tank killer out to a range beyond 3,000 meters. The system offers ease in acquiring and tracking targets which contributes significantly to the consistently high probability of hit values obtained. Yet, the TOW is a rather expensive proposition for the Field Artillery. With current manpower constraints it seems unlikely that a dedicated crew of four men with carrier- or jeep-mounted TOWs can be afforded for battery antitank defense. Further, considering the range of the TOW and the fact that artillery batteries are normally located behind FEBA forces, efforts must be made to minimize the danger to friendly forces by erratic or uncontrolled rounds. Also, since an artillery battery will employ its antitank weapon only in a self-defense role, the full range capabilities of the weapon system would be wasted.

This leaves the Dragon for consideration. The Dragon is an effective, man-portable, medium antitank weapon system. It has a maximum effective range of 1,000 meters and offers a high probability of hit and a respectable SSKP. With the consolidation of many battery functions at battalion level, units will be hard pressed to provide personnel to man observation posts (OPs). However, it is a "must" for survival that batteries have OPs, and this is where the antitank weapons will go. Depending on the OP locations (300 to 500 meters from the gun-line seems reasonable), antitank protection can be gained up to 1,500 meters from the main battery position. It is probably within this range that an armored force will be considered a "threat" to a battery.

An additional plus for the Dragon is that it does not require additional personnel, a major disadvantage of the TOW. The Dragon is employed using the "designated gunner" concept whereby an individual is selected from within the TOE unit to employ the weapon as an additional duty, as opposed to a "dedicated gunner" whereby the individual is assigned the primary duty of gunner by TOE.

Now is the time for the Field Artillery Community to seriously consider providing artillery batteries with a better antitank capability. The days are gone when a relatively safe haven could be had six kilometers behind the FEBA. Gun-and-run tactics, across the FEBA operations, and support of the covering force all expose the firing battery to a greater opportunity of encountering armored forces than ever before. The battery may not have needed an antitank capability other than the main gun in the past, but, in the future, if they need it and do not have it, they will not need it again.

MAJ C. T. Catchings is a member of the Doctrine Team, Directorate of Combat Developments, USAFAS.



Ready . . . Aim . . . Fire . . . This trooper from the 82d Airborne Division tracks his target down range and gets ready to fire his Dragon. (US Army photo by SP4 Thomas Casarez)

The *Journal* interviews . . .

GEN John R. Guthrie

Journal: Sir, many of our artillery developments are created to counter a Warsaw Pact capability or to take advantage of a Pact vulnerability. Is the US Field Artillery advantage in quality adequate to overcome the Pact advantages in quantity?

Guthrie: Probably not without a lot of detailed and devoted effort on the part of those responsible for developing the doctrine, tactics, and techniques of employing the improved systems that are becoming available now and in the next few years. But there is no doubt in my mind that we must overcome that Soviet capability by a combination of our field artillery employment and the way we counter Soviet reliance on field artillery as their arm of decision. We will have to gain and retain fire superiority if we are to contain the threat posed by the Warsaw Pact.

Journal: Are NATO standardization and interoperability going to have an increased impact on the large number of field artillery components in various stages of research and development?

Guthrie: NATO rationalization, standardization, and interoperability (RSI) will have a considerable impact on everything we do, and they should. I have just come from a symposium on this subject, and I was encouraged by the increased awareness at all levels that we must "eat the elephant bite by bite" rather than trying to encompass it all in one gulp. By that I mean, there is pretty generally a consensus on both sides of the Atlantic that interoperability is what we should be striving for, especially in the area of consumables, in the immediate future, and standardization will take a little bit longer — quite a bit longer in many cases. There is also an understanding that 100 percent standardization is probably a utopian dream. To us, that means interoperability in ammunition more than any other single thing, fuel second, and subsistence probably a poor third. The other major area for interoperability effort is in "C3" (command, control, communication). People who question our efforts in this area tend to forget that even within our own forces our doctrine calls for liaison officers who always carry their own communications.

The Commander of US Army Materiel Development and Readiness Command (DARCOM), GEN John R. Guthrie, returned to Fort Sill recently for a series of discussions on Field Artillery tactics, techniques, and doctrine. General Guthrie began his career as an artilleryman, commanding at battery, battalion, and div arty levels before commanding a corps in the Far East. His current command is responsible for the large number of essential materiel developments on which the future of the Field Artillery depends.

Even when entire units cannot communicate because of different radios, frequencies, etc., they can, and do, communicate face-to-face through their liaison officers who "interoperate," so to speak.

Journal: Will RSI requirements slow down our R and D process?

Guthrie: In the near term, yes. When we get psychologically and procedurally attuned and adapted to the new methods, the impact will be less noticeable. I think we need to contract the "RSI virus" the way we've been contracting Russian flu. We must get the virus and start running a high RSI fever: that's the only way it will work. If we try to erect an elaborate scaffold of teams, staffs, and agencies on our normal organizational structure, we'll just create adversary relationships and cause people to work against RSI, rather than for it.

Journal: One final question on this subject: Was the selection of the smoothbore 120-mm German gun for our XM-1 tank a concession to NATO standardization?

Guthrie: I can say categorically that this is not the case although in the long term it will contribute to it. I don't think that anyone who is informed can question the decision that was made; it was predicated on the Chief of Staff's desire to assure that the American soldier was afforded the best possible equipment. It is just not possible to say what the Soviet threat will be in 1985. The 105-mm gun is adequate today, but the 120-mm gun offers more options for adjusting to the future threat beyond 1985. We are setting up, at the direction of the Army Secretary and Chief of Staff, an adequate testing and evaluation program; we plan to develop a less complicated breech, look at a few other areas, and make a decision on production in 1981. There has been pressure to bring the 120-mm gun on line sooner, but I feel we need to take the time to test the *system* fully.

Journal: In our own national acquisition process, what can be done to keep politicians from forcing procurement contract awards for political and economic reasons rather than accepting the thoroughly tested military recommendation?

Guthrie: I can't really comment on this because it hasn't happened in my tenure at DARCOM. I think it is quite understandable for members of Congress to bring the capabilities of the industry in their state or district to the attention of the proper decision-making authority.

Journal: GSRS and "automation at the breech" are two developmental actions that will allow us to fire enough ammo fast enough to attack all the significant targets our advanced target acquisition systems will supply. Would you comment on these two areas?

Guthrie: I have, and guess I always have had, a problem with eliminating the "man" element in our firing. There is a certain amount of time required to make the right decisions in the precise delivery of fire. I don't have a clear understanding in my own mind what we are really trying to achieve in "automation at the breech." If it is to get more precision in laying, or if it is to save personnel without loss of round-the-clock operation or decreased maintainability, then that's one thing. If it's to save time, when the time-limiting factor is our built-in low sustained rates of fire, then it's not necessary. As I said, "automatic artillery" — taking the human element *totally* out of the loop — doesn't appeal to me. Like all other automatic systems, "garbage in, equals garbage out."

Journal: It appears that surviving Warsaw Pact counterfire will be a major factor in any European War. What can we do that we are not already doing to enhance survivability?

Guthrie: I was quite impressed with the emphasis placed on survivability measures in the briefings I got here at the School — the necessity for frequent displacements, offset registrations, blackout night convoys, radio silence, maximum use of faster, secure digital traffic, etc. But these must be constantly practiced or attempts to use these methods become "Chinese fire drills."

The Soviets will use any and all means to locate and destroy our artillery. The Soviet counterbattery priority has been the destruction of nuclear capable units. Now, with the M198 going to our light divisions, only the airborne and air assault units will be solely nonnuclear. We've got to do everything possible to counter his ability to locate us.

Journal: Do you think that the officer, NCO, and enlisted personnel in the Field Artillery are adequately prepared to take maximum advantage of the current technology that science has provided us in modern weapons systems?

Guthrie: I don't think I can answer that question from my personal knowledge since I've been away from direct observation of the branch for so long. I have no reason

to doubt their ability, and certainly what I have seen during this visit was very encouraging. I will say I am concerned about reports of company/battery officers Army-wide who cannot pass their troops' Skill Qualification Tests. Knowing your soldier's duties has been a part of "being an officer" for as long as I can remember. Maintaining high levels of individual training is as much the responsibility of the unit commander as maintaining high levels of unit proficiency. In each case, he must know what he must teach. To make matters worse, we are shortening our institutional training time for officers when the demands for this knowledge are greater than ever.

I'm also concerned about the lack of time devoted to the study of previous wars. The number of officers and NCOs with experience in the type of combat we can expect if a war were to occur in Central Europe are fewer everyday. This means that, to an ever increasing extent, our young leaders can only learn the lessons of the past through the study of military history.

Journal: After your discussions here on recent doctrinal changes in the branch, do you have any reservations about the Field Artillery Section, FA Brigade, or fire support team (FIST)?

Guthrie: With respect to the Field Artillery Brigade, I do not have any reservations. It seems to me that, with a few exceptions, it's largely a cosmetic change. I still have a personal reservation about the elimination of the corps artillery headquarters and headquarters battery. With the expanding of Soviet artillery in quantity and sophistication, it seems to me we should be adding to our ability to command and control our field artillery assets, rather than decreasing them. As a former battalion S3 and division artillery S3, I have distinct reservations about adding the counterfire mission to those already assigned to the division artillery. I believe our experience in two world wars and Korea clearly demonstrated the validity and effectiveness of the corps artillery and division artillery organization for combat. I can't understand how we would further add to the already great burden of the div arty commander by giving him the missions of corps artillery and still expect it to be done by a colonel. As I see it, when we went to the ROAD division in the 1960s we gave the div arty commander more of a mission, more battalions, more troops, more tubes, and more vehicles and reduced him from a brigadier general to a colonel. Now we're giving him a new and vastly increased mission. I have a "philosophical disconnect" on that.

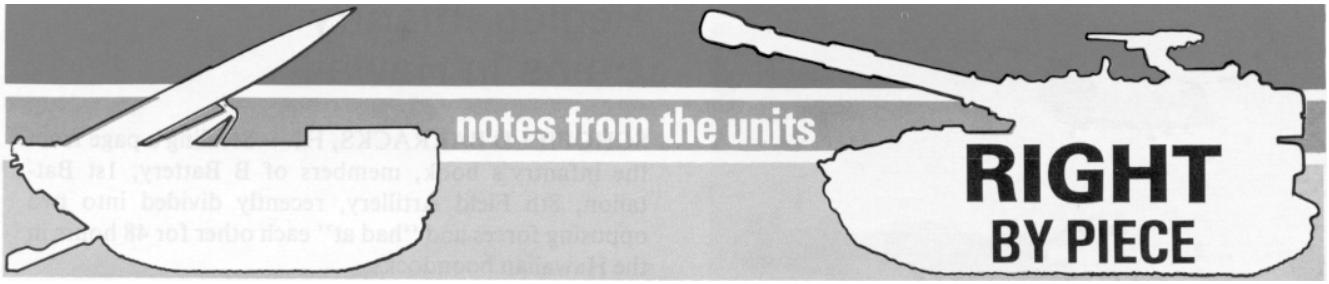
With respect to the FIST, yes, I still think we must consider whether we are properly structured in regard to experience in the FIST. I guess I'm convinced we need to give serious thought to moving toward the British system because quite frankly it appears to me that, with the additional responsibilities of the FIST chief, we really are putting more weight on the relatively inexperienced officer than is desirable. At the same time, we are not demanding much from our most experienced officer, the battery commander. Over the time that I was in direct support of a British brigade in Korea, we talked this over with them at great length. Since then, and particularly recently, I've gone from not believing it was in our best interest to believing that we should take a hard look at it one more time. The job of the FO in Korea was simple compared to what it is today.

Journal: Thank you.

Guthrie: I'd like to add that this return to Sill has been wonderful. I have fond memories of my tours here — I had two sons born here. Sill is a beautiful post.

The performance of the members of the staff and faculty and the 1st Battalion, 17th Field Artillery, was simply superb, and it's encouraging to see the quality of people leading the School and Center. As long as Sill keeps that caliber of people, there is no doubt we'll achieve that essential fire superiority we will require if we ever have to confront the Warsaw Pact.

I was particularly gratified to observe the 1-17th using TACFIRE in its designed role — not to speed up the delivery of fires — but to assist in communications, fire planning; it offers orders of magnitude improvement over what we've been able to do in the past. Regarding TACFIRE, we must be very careful what we evaluate it against. If someone wants to see what TACFIRE can do, they need to go back and try to do manually what TACFIRE produces now. There isn't any question that without TACFIRE, the rest of our modern Field Artillery System, as the School is now teaching it, won't work.

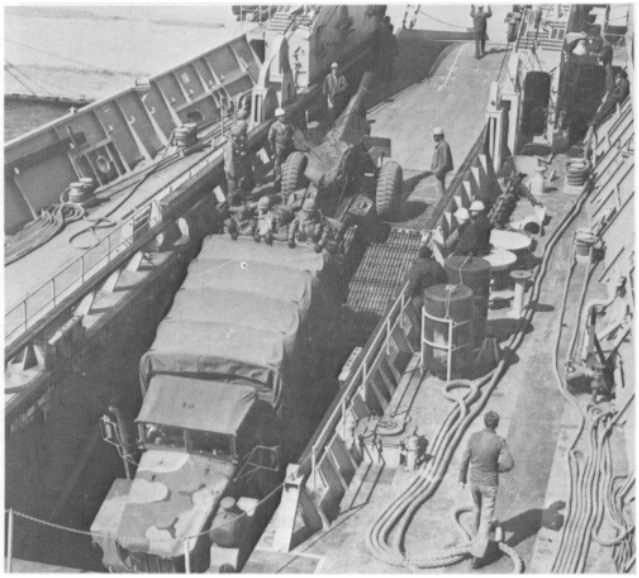


Seaborne training for 1-6th FA

FORT BRAGG, NC — Two training missions were recently combined into one when Fort Bragg's 1st Battalion, 6th Field Artillery, conducted an amphibious operation en route to its Army Training and Evaluation Program (ARTEP).

The battalion deployed to Morehead City, NC, where it boarded three ships from the Naval Amphibious Squadron 6. From there, the battalion traveled by sea to the ARTEP site at Fort Pickett, VA, for a simulated wartime mission.

Two of the ships had well decks, filled with water, enabling smaller craft to float into the large ship and off-load equipment. The third ship was equipped with a special ramp for on- and off-loading purposes.



A howitzer and its prime mover roll aboard a Navy landing craft during a recent seaborne move by the 1st Battalion, 6th Field Artillery.

Everything from ¼-ton jeeps to 5-ton trucks plus 18 howitzers and the battalion's 500 soldiers was loaded onto the ships. During the 16 hours at sea, the soldiers and sailors got along well together. Shipboard accommodations were very popular among the Redlegs who were accustomed to Army sleeping bags and C-rations.

The battalion Executive Officer, Major Robert Morig, said "It was a unique experience. The troops enjoyed themselves and received valuable training at the same time."

Artillery live fire exercise combines 101st and Guard

FORT CAMPBELL, KY — A ficticious enemy which invaded Fort Campbell's north and south ranges recently was pulverized by artillery fire. Starfire 78, an exercise hosted by the 101st Airborne (Air Assault) Division Artillery provided mutual-support training for Active Army and National Guard artillery units.

Four Div Arty battalions were moved into field positions by Chinook helicopters in response to the invasion. Fanned out to cover the impact range from every angle, Div Arty called all participating Active and Guard units into support positions. One 155-mm howitzer battalion flew in from Fort Bragg, NC, and was attached to Div Arty's 155-mm battalion, while Kentucky and Indiana National Guard units were mobilized. A headquarters element, the 138th Artillery Group from Lexington, KY, moved in and set up its own tactical operations center to support Div Arty by organizing counterfire missions against enemy artillery.

The only battalion-sized National Guard unit to participate in the exercise, the 1st Battalion, 163d FA, convoyed its M101 105-mm howitzers from its base at Evansville, IN.

An additional benefit was derived by having a group of ROTC cadets from nearby Murray State observe portions of the exercise.

C Battery, 2-33d FA Commander, CPT C. R. Dickenson lays his battery as the tubes prepare to fire. In the background a CH-47 resupplys live ammunition to the unit during a recent FTX. (Photo by SP5 Kinoshita)

Aerial resupply works for FA battalion

GRAFENWOEHR, GERMANY — "Big Windy Lead this is PZ control, I have you in sight . . . on course . . . call short final on approach, over." Typical radio traffic for an artillery unit in the 1st Infantry Division Forward, right? Wrong, but it was recently quite common for the 2d Battalion, 33d Field Artillery at Grafenwoehr.

The battalion conducted continuous aerial resupply missions to its three firing batteries while maintaining its fire support capability during the battalion FTX. Officials here believe this was the first aerial resupply of 155-mm howitzers at this training center since records have been kept.

The entire resupply lasted five hours with nine separate flights of cargo lifts by Chinook helicopters. The operation began when the battalion ammunition officer established the field ammunition supply point. The 155-mm ammunition was then off-loaded into cargo nets. After a brief instruction period, the artillerymen rigged their own nets under Pathfinder supervision.

Valuable experience in air traffic control procedures was gained by the unit, and the operation worked so well that the artillerymen plan to try aerial resupply again when they go to Munsingen for live fire exercises.

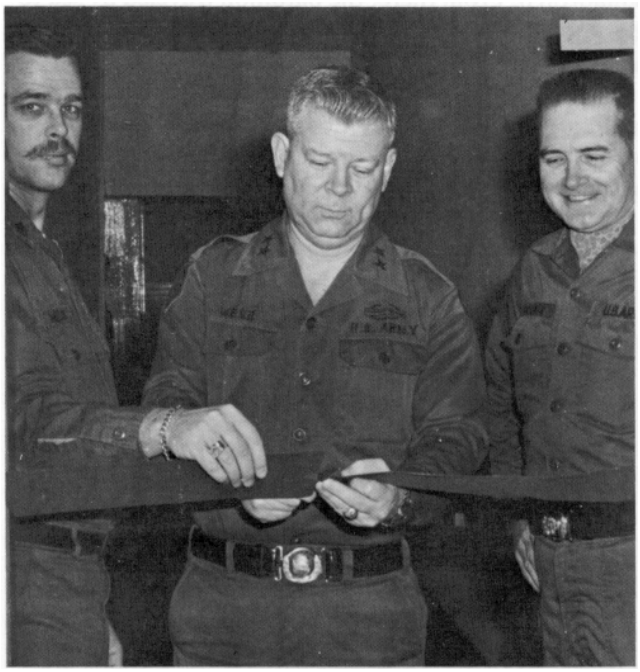
Redleg infantry trains in Hawaii

SCHOFIELD BARRACKS, HI — Stealing a page from the infantry's book, members of B Battery, 1st Battalion, 8th Field Artillery, recently divided into two opposing forces and "had at" each other for 48 hours in the Hawaiian boondocks.

Using infantry tactics, the Redlegs went into action patrolling, raiding, ambushing, and preparing forward defensive positions. While these tactics are not emphasized on a cannon crewman's SQT, they could come in handy someday.

The final challenge in the battery's two-day taste of the infantry came when the weary artillerymen assaulted an almost vertical, easily defended position.

After the assault, a debriefing was held. B Battery Commander, CPT Robert Young, summed up the grueling two days saying: "The exercise gave the men of B Battery a better appreciation of their own role as artillerymen and a new respect for the Division's infantrymen."



FRANKFURT – Ribbon cutting honors, opening offices for V Corps' new Field Artillery Section (FAS), are performed by MG William L. Webb Jr., Deputy Commander, V Corps, with the help of BG John A. Maurer (right), V Corps Artillery Officer, and MSG Robert D. Wallis, Operations Sergeant, Field Artillery Section. The FAS was activated by redesignating the Fire Support Element and will be expanding to reach full strength by this summer. (Photo by SP4 Brewster)

A soldier from the sponsoring unit, 1st Battalion, 6th Field Artillery, keeps an eye on one of the contestants entered in the shot put competition during the 1978 North Carolina Regional Special Olympics held recently at Fort Bragg. (Photo by Bobby Moody)

FA unit aids special olympics

FORT BRAGG, NC — For the fourth successive year, the 1st Battalion, 6th Field Artillery, sponsored the North Carolina Regional Special Olympics. About 900 mentally and physically handicapped children from four nearby counties competed in various track and field events in the largest gathering to date for the annual olympics. The competition is designed for children who are not capable of playing on school teams.

"Everyone is a winner" was the theme for the games and every child was awarded a ribbon for his or her placement in an event. The sponsoring 1-6th FA soldiers provided medical care, prepared the field for competition, and served as escorts. Events included the softball throw, frisbee throw, wheelchair races, shot put, high jump, long jump, 50- and 220-yard dash, and 440-yard relay.

SP4 Terry Kelley, volunteering to help with the special olympics for the third straight year, said "This is the best thing Fort Bragg does all year to help the civilian communities."

The area coordinator of the olympics for the past four years, Ms Frances Brisson, said, "I've seen children who could do practically nothing physically who've participated in Special Olympics and wound up competing on school teams."

Opening ceremonies included a Golden Knights parachute demonstration and a presentation by the 82d Airborne Division chorus.

Change in scene hones training

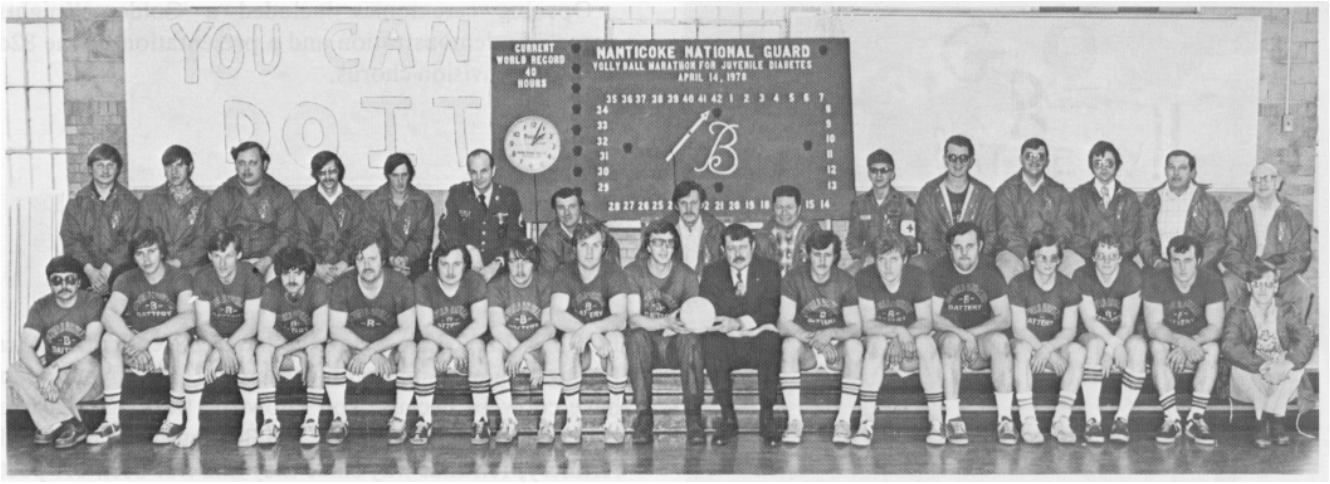
FORT RILEY, KS — Have you ever gotten that *deja vu* feeling while on a training exercise? Does your map have cobwebs because you know the training area like "the back of your hand"? The 3d Battalion, 6th Field Artillery, felt that way since they had not been off post for an exercise since REFORGER 75. So they did something about it. They investigated various off-post locations for training and settled on Camp Shelby, MS. Approximately 420 troops of the 3-6th were airlifted to Mississippi for a three-week training exercise at the almost unoccupied post.

Camp Shelby is operated by the Mississippi National Guard, which provided the 8-inch howitzers and heavy equipment. The necessary light equipment was transported from Fort Riley by military vehicle. The change in scene — from the prairies of Fort Riley to terrain closely resembling Germany — made otherwise repetitious training stimulating and challenging.

FA fires Redeye for a Benning first

FORT BENNING, GA — The 2d Battalion, 10th Field Artillery, already a unique unit, has again done something out of the ordinary. The Air Defense Artillery Battery (Provisional) of that unit launched the first Redeye guided missile to be fired at the Infantry Center. The firing was the result of four months of planning and coordination by battery members to solve the problems of range and airspace requirements. The effort proved successful when the first Redeye scored a tactical kill of a ballistic aerial target.

The ADA Battery was organized as the first Redeye battery in a separate brigade on 12 August 1977 by consolidating Redeye assets of the 197th Infantry Brigade (Sep) under the control of 2d Battalion, 10th Field Artillery. The unit was organized to facilitate training and prepare for conversion to the Stinger missile system.



Players and supporting members of Battery B, 1st Battalion, 109th Field Artillery, Pennsylvania Army National Guard, raised $840 for charity while breaking the world record for marathon volleyball. (Photo by Bill Gross)

Guard team takes volleyball record

NANTICOKE, PA — The *Guinness Book of Records'* entry for marathon volleyball fell recently to Battery B, 1st Battalion, 109th Field Artillery, of the Pennsylvania Army National Guard. In a 42-hour game, beginning at 7 p.m. on a Friday, Battery B played steadily until 1 p.m. Sunday to topple the old 40-hour record set by a high school team.

In the process of becoming world record breakers, the Guard Redlegs collected $840 for the fight against juvenile diabetes. Two six-man teams, with no substitutes, played steadily with only a five-minute break each hour.

LTC Robert Carroll, commander of the 1-109th FA watched the game and said that "Everybody finished in good shape." He noted that the men did not slow the pace but played as though they were vying for a championship title.

1-84th FA fires new 8-inch howitzer

FORT LEWIS, WA — The 1st Battalion, 84th Field Artillery, the composite 155-mm/8-inch general support battalion of the 9th Division, has completed its conversion from the M110 8-inch howitzer to the improved M110A1 version.

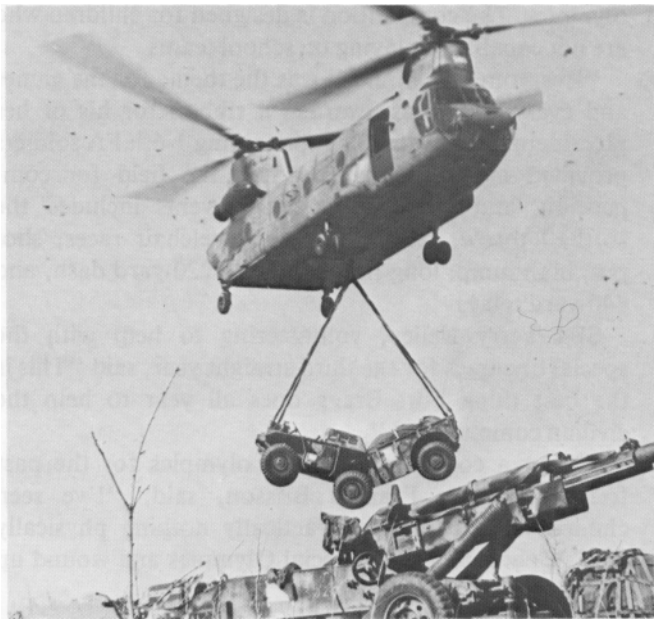
The M110A1 has many improvements, not the least of which is a longer tube which offers an increase in range from 16.8 kilometers to 20.6 kilometers. The conversion process costs about $80,000 per weapon.

As soon as the modifications were completed, Delta Battery took the weapons down range for test firing. The modified weapon will provide more effective fire support to the 9th Division.

3-34th FA writing unit history

FORT LEWIS, WA — Wives of personnel in A Battery, 3d Battalion, 34th Field Artillery, are compiling a battalion history. Anyone with pictures, stories, historical facts, names, and dates is requested to write to CPT D. N. Fetter, A Battery, 3-34th FA, Fort Lewis, WA 98433.

FORT BRAGG, NC — The sling-loaded gama goat and the howitzer belonging to Battery C, 2d Battalion (Airborne), 321st Field Artillery, are being airlifted by a Chinook helicopter as part of recent 82d Airborne Division combined arms exercises. (Photo by SP4 Marty Baker)



Men of the 1st Battalion, 6th Field Artillery, spread decontamination solution on one of the unit's vehicles during a simulated chemical attack. (Photo by Killeen Daily Herald)

Artillery battalion practices antichemical action

FORT HOOD, TX — A field artillery unit moving through a wooded area is suddenly enveloped by "enemy" chemicals. The call of "gas" is taken up in chorus by the men. Protective masks are whipped out of their carriers, fastened to the men's heads, and then cleared. Gloves and hoods are hastily put over exposed areas of the body and a decontamination area is set up.

This was the start of a chemical decontamination exercise held recently by the 1st Battalion, 16th Field Artillery, 2d Armored Division.

After personnel have donned their protective gear, the unit's vehicles are driven through an area where a neutral liquid simulating Super Tropical Bleach has been placed on the road to decontaminate the wheels and treads of each vehicle.

The vehicles are then moved to an area where masked soldiers are waiting to spread simulated decontamination solution on the vehicles. The unit tried to use the "Goldstein Apparatus" (March-April 78 *FA Journal*) but reported a lack of adequate air pressure from 2½-ton truck air tanks. Then, the howitzers and support vehicles are driven to a holding area where they will sit to allow the decontaminants to neutralize the chemical agents. Finally, a light coat of oil was applied to vehicles to combat the corrosive properties of the decontaminants. The men leave their vehicles and go through a station where clothing is taken off and scrubbed with decontamination solution. The masks stay on.

A shower and a dressing area have been set up. The men remove protective masks just before showering and do not breathe until "deadly" chemicals are washed from bodies. They then remask.

The exercise was held to test decontamination procedures in a chemical attack and to determine whether the hazards of a chemical attack could be reduced with available equipment.

*Pending further field reports, the **Journal** stands by the reported use of the "Goldstein Apparatus." Photos accompanying the article (pg 59, March-April **Journal**) portray a liquid spray strong enough to produce a deflected mist.—Ed.*

2-76th FA inactivated

FORT RILEY, KS — A ceremony 19 May marked the inactivation of the 2d Battalion, 76th Field Artillery. The 2-76th FA was activated at Fort Riley 15 November 1976. From an aggregate total of nearly 500 members, the battalion has been reduced in strength to augment units in Germany.

Remaining personnel will become part of a provisional battalion until being assigned to the 2d Battalion, 51st Air Defense Artillery, to be activated at Fort Riley in September.

FORT STEWART, GA – SGT Adner Batts inspects an 8-inch howitzer in the performance of his duties as chief of section in D Battery, the 8-inch battery of the 1st Battalion, 13th Field Artillery. Sergeant Batts' performance recently won him the NCO of the Quarter award for the 24th Infantry Division and Fort Stewart.

North Korean Artillery

Part Two: Tactics

by CPT J. D. Schnabel

Part One was published in the May-June 1978 issue.— Ed.

North Korean artillery units have the mission of neutralizing the enemy during offensive operations or denying the enemy a breakthrough during defensive operations. In order to achieve these aims, emphasis is placed on cooperation, concentration of fire, mobility, and surprise attack.

• *Cooperation* between an artillery unit and the supported maneuver unit is promoted by centralized control of maneuver plans and fire support plans. To insure cooperation, the deputy commander of artillery at all levels establishes his command post in the vicinity of the maneuver command post.

• *Concentration of fire* is achieved by organizing artillery units into artillery groups.

• *Mobility of firepower* is the ability to move fires swiftly from one target area to another or neutralize a number of targets at the same time.

• *Surprise attack* is carried out at night or during periods of restricted visibility. To conceal the advance of maneuver forces, the artillery preparation is sometimes *not* fired prior to a surprise attack.

Organization for combat

Maneuver units conducting the main attack will have additional artillery support provided by higher headquarters. The organization for combat begins at the Minister of the People's Armed Forces level where the minister assesses the importance of each army's mission and determines the quantity of artillery he will allocate to each. To provide the required artillery to support the operation, the Artillery Command's assets are allocated to armies and, subsequently, to divisions. These artillery allocations are combined with organic assets to form artillery groups at each echelon. Groupings establish command and organizational structure which insures flexibility in concentrating artillery fire for the main attack. The formation of artillery into army, divisional, and regimental artillery groups permits maximum exploitation of artillery support and retains the maximum degree of centralized control. Artillery groups usually consist of at least two battalions and may be composed of similar or mixed units to include mortars, field guns, howitzers, and multiple rocket launchers.

The army artillery group (AAG) is formed by combining attached assets of the Artillery Command with organic artillery minus those assets given to first echelon divisions. The AAG will assume the primary counterfire mission and contain longer range artillery weapons.

The division artillery group (DAG) is formed using a similar process and will probably consist of two to four battalions, employed in general support of the division. The DAG also assists the Army with its counterfire mission.

Each regimental artillery group (RAG) is normally comprised of two to four artillery battalions. The RAG destroys targets which hinder the advance of the attacking forces.

The maneuver battalion may be supported not only by the organic 82-mm mortar battery but additionally by an attached artillery battalion, used in a direct fire role against armor and strongpoints. Artillery batteries may also be assigned to infantry companies to provide direct fire support.

The North Koreans may also form army, divisional, or regimental antitank reserve units depending on the tank threat. These units are formed with antitank artillery, assault guns, artillery, infantry elements, and engineer support, deployed on high speed avenues of approach.

Artillery support to offensive operations

During offensive operations, the density of the supporting artillery fire for main attacks is expected to be 80 to 100 artillery pieces per one kilometer wide front and 40 to 60 pieces for a supporting attack or during defensive operations. Antitank artillery is not included in these densities.

During the attack, artillery units leapfrog close behind the assaulting forces and provide both direct and

indirect fires. Priority of fire is given to the main attack force. Artillery units make maximum use of range and are deployed as close to the front as possible to facilitate liaison and communications.

Escorting artillery, which comes from regimental artillery assets and supports the attacking force, is normally positioned during the hours of darkness in well-camouflaged positions approximately 800 to 1,500 meters from the enemy's frontlines. This area is called the assault staging position and is occupied by the escorting artillery and their supported maneuver unit two to five hours in advance.

The North Koreans also employ a roving gun concept in which one or two guns from the RAG move forward (500 to 1,000 meters) and conduct independent direct fire missions at enemy defensive positions. When firing is complete, these guns return to their unit.

Artillery registration is conducted using one gun per battalion. Strict control over registrations by army and division artillery is exercised to conserve ammunition and prevent detection. Mortar and tube artillery weapons usually expend no more than 8 to 10 rounds, and registration is conducted on a daily basis.

Artillery support of a unit in an offensive operation normally consists of three stages:

• *Preparation fires*. These fires usually last 10 to 30 minutes but, on special occasion, can last as long as two hours. Known or suspect targets throughout the enemy's defensive area are engaged. Priority targets include the enemy's command posts; observation facilities; defense positions; and, in order, tank, artillery, engineer, and infantry units. Commanders at all levels observe and confirm the results of fire from the COPs and report the results to their superior commanders. If the preparation fires are not as effective as desired, the division commander may postpone the time of attack and continue the preparation fires. Preparation fires may not always preempt an attack since this pattern of operation enables the enemy to predict the time of attack. All artillery, from battalion to army groups, participate in preparation fires.

• *Fire in support of attack*. Planned targets along the enemy route of withdrawal will be engaged on an on-call basis or on a prearranged time schedule. These fires are designed to harass, confuse, and neutralize the retreating enemy, prevent an enemy counterattack, and cover the spaces between units and exposed flanks.

The artillery groups generally attack the enemy's frontline units to a depth of 2,500 meters. The larger caliber weapons in the group primarily engage enemy artillery targets, command posts, and reserve units.

Escorting artillery destroys planned targets and targets of opportunity by direct fire. When the order is delivered to commence the attack, the DAG and RAGs shift fires to deep and flank targets. The space created by the shifting fires is filled with mortar fire.

• *Fire in support of pursuit operations*. Following the breakthrough, fire support is given to attacking units operating in the enemy's rear area to neutralize enemy resistance and prevent counterattack. Fire support is also given to protect the flanks of the attacking unit. Artillery units in support of such an operation will be highly mobile. Artillery groups continue to fire at counterbattery targets and reserve unit positions. One-third of the artillery units are allowed to move at one time; therefore, two-thirds will always continue to perform fire missions. Escorting artillery engages direct fire targets along the enemy's counterattack and retreat routes. This artillery stays within 1,000 meters of the leading units.

During the march, the artillery is well forward to provide the front units with fire support. The RAG may be included in the infantry regiment's march formation, and the DAG may advance as an independent column. Radio silence is maintained during the march.

Artillery support to defensive operations

Defense is considered only a temporary measure, and the North Koreans will constantly seek the opportunity to seize the initiative through offensive action. The

North Korean artillery crew in action.

purpose of the defense, therefore, is to inflict heavy losses on the enemy and create favorable conditions for resuming the offensive. The type of defense stressed most often by the North Korean Army is the mobile defense, but the area-type defense may also be used depending on the situation.

Artillery support of defensive operations is designed to force the enemy to commit his force earlier than scheduled, cover obstacles, block the enemy's observation, smash assault formations, and extend support for counterattacks. Artillery also covers spaces between defensive units. The artillery is organized to support the covering force's swift retreat by establishing positions well into the forward area. Light guns are deployed on high terrain.

Some field artillery may be within 200 meters of the FEBA while the mortars are 200 to 400 meters from the FEBA. Generally, units of the RAG are within five kilometers of the FEBA, units of a DAG within seven kilometers, and units of an AAG seven to nine kilometers from the FEBA.

Antitank defense is provided by antitank artillery, tanks, assault guns, antitank obstacles, and aviation units. Regimental antitank reserve units are established on major enemy tank approaches four to six kilometers from the FEBA, and division antitank reserve units can be found seven to nine kilometers from the main defensive perimeter. Deception measures, such as false artillery positions and COPs, and roving guns may be widely used.

The North Korean artillery also maintains a massive final protection fire plan in which all firing units engage predetermined target areas in an all-out attempt to stop and destroy the attacking enemy.

The fire support plan for the defense is formulated by army and division artillery headquarters. The plan contains information such as mission assignments, zones of responsibility, ammunition to be used per mission, and locations of supply depots and COPs.

Fire support is divided into several firing zones in order to delay and crush the enemy advance:

• *Long-distance firing zones*. Fires are planned to harass the enemy before he can deploy into attack formation. The engaging artillery units are forward of the FEBA and fire on targets of opportunity. These units provide fire support to the withdrawing covering force to deplete enemy strength as he advances. Roving artillery (including mortars) is employed while artillery units withdraw through the FEBA.

• *Close defense firing zones*. Fires are planned in the area where the enemy will mass for an attack. Fires are designed to harass and crush assault preparations and formations and to destroy enemy artillery weapons and COPs.

• *Support to defense zones*. Fires are planned within the first echelon maneuver battalion's defensive area to cover the units' withdrawals from the FEBA or to support a counterattack.

Lower echelon tactics

The organizations of a typical artillery battalion and firing battery are shown in figures 6 and 7. It should be kept in mind that the number of tubes per battery is either four or six, depending on the caliber or readiness status of the unit.

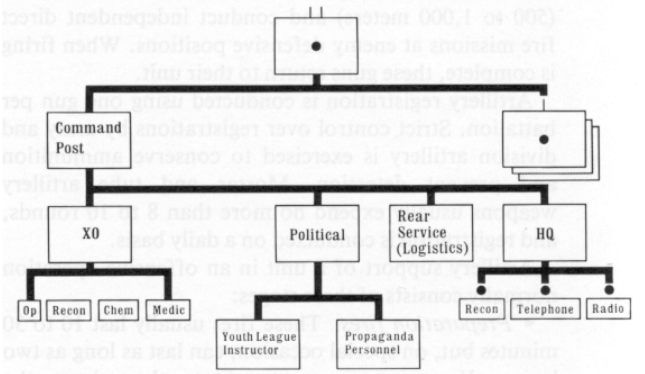


Figure 6. An artillery battalion.

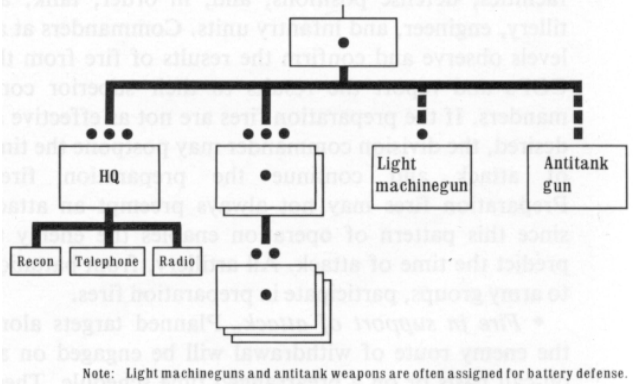


Figure 7. An artillery battery.

Battery positions, the battalion COP, and ammunition supply points are included in the organization of an artillery battalion position. All these are within an 8-kilometer area. Ammunition supply points are located 1.5 to 2 kilometers from the firing positions.

Types of North Korean artillery firing positions include primary, auxiliary, reserve, and dummy positions. The tubes are set up generally on line, either

in an open area to permit direct firing or in concealed positions for protection from aerial detection. Open artillery positions are vacated after one or two fire missions, whereas concealed positions are more permanent. Natural defensive terrain, ease of camouflage, ease of observation, and closeness to road nets are factors considered in selecting a position. Night firing positions are mainly selected in a forest, behind a hill, or in a town.

The reconnaissance squad of the battery, with the executive officer (XO), reconnoiters the firing positions and, with the battery commander, selects the various COPs. A typical battery position with the various observation posts is shown in figure 8.

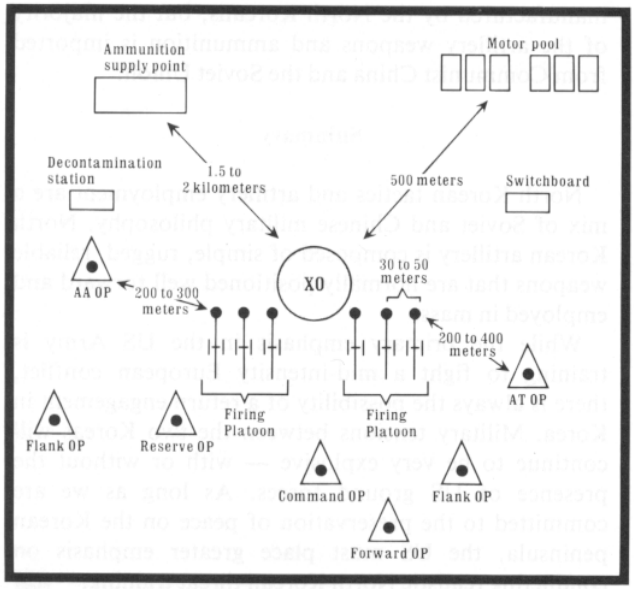


Figure 8. Artillery battery position with COPs.

Duties in establishing a battery position include:

- Establishing an aiming point.
- Locating the motor pool (500 meters from the guns), switchboard, and decontamination station.
- Initiating camouflage measures.
- Preparing for night occupation.
- Implementing security measures.
- Establishing antiaircraft OPs on high ground about 200 to 300 meters from the positions.
- Setting up antitank (40-mm grenade launcher) and light machinegun teams 200 to 400 meters from the guns.

The supported maneuver unit generally provides the battery with security guards, and all personnel continually dig trenches and foxholes.

The battery COP is manned by the battery commander, two reconnaissance men, and a radiotelephone operator. The reconnaissance men perform duties of observing the battlefield and calculating fire direction data to be sent to the guns. The distance between battery COPs is about 600 meters and between battalion COPs, two to three kilometers.

Dummy OPs are normally established on tops of hills. The forward OP reinforces the COP, is manned by three reconnaissance men, and can be attached to a maneuver unit. Flank OPs provide deep and flank observation and perform checks of the other OPs. The reserve OP is used when the COP has to be evacuated.

During movement, the battery travels in column formation. One battery will move while the others provide continuous fire support. The standard speed for daytime march on a good road is 20 to 30 kilometers per hour and at night 10 to 15 kilometers per hour. Vehicles maintain a 25- to 50-meter interval except in mountainous terrain where the interval is 100 meters. Usually an artillery battalion marches 120 to 150 kilometers per day; however, during a forced march, it may move as much as 300 kilometers per day provided adequate trucks are available.

Target acquisition

Besides aerial, radar, sound and flash ranging means, the North Koreans acquire enemy targets usually by direct visual observation through COPs and the reconnaissance effort. A popular technique is to fire on a suspect artillery location in order to cause the unit to fire back, thus giving the enemy position away through visual means or crater analysis.

Communications

All means of communications such as radio, telephone, visual, sound, and messenger are used by the artillery.

During movement, communication silence is maintained. Communication security at all levels is strictly enforced.

Communications between COPs and the firing battery is primarily by radio and telephone, but may include sound and visual methods. In emergencies, prearranged signals will be used to include bonfires, smoke of various colors, arm signals, flag signals, flashlights, and tracers. Sound communication is used for giving warnings of air raids and CBR attacks. Each battery has five radios, while the total for the battalion is 22.

Visual observation is the primary means of target acquisition.

Concerning wire communications, each battery has one switchboard and six to eight telephones. The battery COP is connected to the forward OPs, gun positions, and battalion COP by direct telephone lines. Trunk lines are established between the battery and supported units with branch lines connecting motor pools, antiaircraft OPs, and other units.

Artillery supply

At each maneuver unit, the deputy commander for artillery is responsible for handling supply and repair of weapons, ranging from small arms to guns. Artillery commanders are responsible for the artillery supplies (ammunition) from Artillery Command to regiment level. Artillery supply distribution is based on the principle of forward deployment. Higher headquarters are responsible for the allocation and transportation of supplies to their subordinate units. Some small arms are manufactured by the North Koreans, but the majority of the artillery weapons and ammunition is imported from Communist China and the Soviet Union.

Summary

North Korean tactics and artillery employment are a mix of Soviet and Chinese military philosophy. North Korean artillery is composed of simple, rugged, reliable weapons that are normally positioned well forward and employed in mass.

While the primary emphasis in the US Army is training to fight a mid-intensity European conflict, there is always the possibility of a return engagement in Korea. Military tensions between the two Koreas will continue to be very explosive — with or without the presence of US ground forces. As long as we are committed to the preservation of peace on the Korean peninsula, the US must place greater emphasis on conducting realistic North Korean threat training.

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.

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Soviet 152-mm SP weapon (M1973).

Soviet SP Artillery Doctrine

by CPT George R. Patrick

There has been much discussion of the awesome Soviet conventional military capability arrayed against NATO forces in Europe. The methods of offensive maneuver for employing these forces are no less impressive — an overwhelming surge, calculated to crack the defensive crust, paving the way for a series of giant turning movements or deeper envelopments.[1] An integral ingredient of this offense is the massive amount of fire support that the Soviets intend to bring to bear in all offensive situations. The greatest part of this fire support is the artillery fire that is planned to seal and protect the flanks of a penetration, crush enemy counterattacks, limit the mobility of an enemy force until it can be fixed and annihilated with ground units, and erode the ability of enemy units to conduct organized defense. The concept of "fire combat" is set forth as the main ingredient of the recipe for success, paving the way for the attackers.[2]

A new method of furnishing a portion of that fire support has recently appeared in the form of the 122-mm and 152-mm Soviet self-propelled howitzers. This article will discuss Soviet thought on two "new" characteristics of the mid-intensity war, show how these led in part to the creation of the modern SP artillery piece, and explain how these battlefield characteristics affect the employment of these new weapons.

Experiences from World War II provide the basis for most of current Soviet offensive doctrine. That war saw an increasing reliance on the use of massed artillery to facilitate offensive operations. For example, artillery weapon concentrations in the offense increased from an average of no more than 100 guns per kilometer of attack frontage at the gates of Moscow in 1941, to almost 320 per kilometer of front during the last phases of the war in 1945. Massed fires and extensive artillery fire support became firmly entrenched in doctrine.

Although the requirement for fire support persists, the Soviets believe that several aspects of future conflicts will differ widely from those of World War II.

One of the most evident is the relative mobility of the combatants. Whereas the offense in World War II was initially limited to chewing the front away at a relatively slow pace, future conflict will be violent and swift, with large distances covered rapidly by maneuver units. Indeed, the speed of the assault is considered a main prerequisite for success.[3] Soviet artillery will no longer be afforded the luxury of being able to group behind the frontlines of a solid front and conduct organized displacements, arriving at the objectives as much as two weeks behind the maneuver forces in some cases. During much of the course of that conflict, friend and foe will be intermixed across the battlefield in meeting engagements, encirclements, and the like.

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[1]Savelyev, V., COL. "Manoeuver In an Offensive Battle." *Soviet Military Review*, February 1976, pp. 16-17.
[2]Vorobyov, I., COL. "Fire, Attack, Manoeuver." *Soviet Military Review*, June 1975, pp. 12-15.
[3]Nikolayev, I., COL. "Breakthrough of Enemy Defenses." *Soviet Military Review*, July 1974, pp. 10-13.

Another great difference will be the increased lethality of the next conflict. The nuclear, biological and chemical environment, the use of antitank guided missiles, improved conventional munitions, and more capable ground attack aircraft, to mention a few, significantly decrease the chances of survival. The fact that friend and foe will be intermixed across the battlefield as the Soviets attempt to pursue their breakthrough operations will also tend to enhance the vulnerability of the soldier and his unit — particularly if he and his unit are exposed in an unarmored configuration.

The Soviets are faced with the need to furnish the kind of fire support they call essential under the new stresses of the "modern battlefield."

It is not surprising that SP artillery began to appear in the early 1970s in the Soviet Army.

There are two major types of artillery support in the Soviet scheme of maneuver.

• The first is indirect fire by division artillery from behind terrain mask, usually positioned from one-quarter to one-third of its range behind the frontlines.

• The second type is direct fire furnished predominantly by accompanying artillery (normally organic to the motorized rifle regiment), which actually accompanies tank and infantry units in the same attack formations. According to current literature, all of the Soviet 122-mm SP artillery is used in this role; 152-mm SP artillery is also used as accompanying artillery in some situations.

The origins of SP artillery accompaniment go back to the battle of Kursk, July through August 1943. Self-propelled guns were formed into regiments and attached to infantry and armor units in the proportion of a battalion of SP guns to an infantry division. Their mission was to destroy enemy antitank guns and tanks with direct fire during the assault. Although the characteristics of SP artillery weapons have changed since the time of World War II, the employment of accompanying artillery has changed little. Artillery weapons, primarily the 122-mm howitzers, are expected to follow from 500 to 1,000 meters behind the first wave of attackers, firing through gaps in the attacking units, with the purpose of destroying enemy direct fire weapons that hinder the advance. The accompanying artillery will be positioned within direct fire range (one to two kilometers) of the enemy, *before* an assault, to conduct direct fire on enemy positions during the preparation that precedes the assault.[4] In special situations, artillery weapons will direct fire against

Soviet 122-mm SP weapon (M1974).

minefields that hinder maneuver. The preferred caliber for this type of fire is 152-mm, but the 122-mm howitzers can also be used.[5]

Under the battlefield conditions that the modern Soviet accompanying artillery is likely to encounter, the SP howitzer is the natural choice.

The first dominating condition — mobility — is well served by the SP howitzer. It must be remembered that the Soviets place tremendous emphasis on moving in the assault as fast as possible, even to the extent of allocating artillery to the mission of direct fire neutralization of mines, antitank guns, and other items that will impede rapid movement in any manner.

The older, towed howitzers cannot keep up with the fast moving front waves. The M1974 122-mm SP howitzer has an estimated top speed of 50 to 65 kilometers per hour. In BMP-equipped units, towed howitzers reverted to the indirect role as SP weapons became more available.

It is interesting to note that the 122-mm SP howitzer reportedly has an amphibious capability, a very important consideration in closely supporting maneuver across the many rivers of Central Europe. Another advantage is that ammunition can be transported within the SP howitzer's cab, further enhancing mobility.

The increased lethality of the battle area is the other main reason for adoption of the SP howitzer. Even lightly armored protection against fragmentation and

[4]Selyavin, V., COL. "Direct Fire." *Soviet Military Review*, November 1975, pp. 18-19.
[5]Selyavin, V., COL. "Artillery Breaches Obstacles." *Soviet Military Review*, August 1975, pp. 28-29.

small arms fire in the frontlines is important. The ability to maneuver, load, aim, and fire while protected is a bonus. Soviet essays on the value of SP artillery make clear that this point has not been lost on them.

The armored protection of the SP howitzer protects more than just the crew. The ammunition and communications equipment carried within the SP howitzer are less vulnerable to fires and fragmentation. Communications between the commander of an accompanying artillery unit and his individual weapons is of paramount importance. Soviet doctrine calls for massed direct fire on defensive targets, an impossibility without radio communications in each weapon.[6]

An added benefit of SP weapons is the 50 percent reduction in crew size needed to employ the weapon. A crew of four is required for the 122-mm and five for the 152-mm.

Characteristics of the M1973 and M1974 SP weapons

	M1973	M1974
Caliber	152-mm	122-mm
Range (kilometers)	18.5	21.9
Muzzle velocity (meters per second)	665	807
Rate of fire (rounds per minute)	4	7 or 8
Ammunition	48 kg, HE, AP chemical	39 kg, HE, smoke, illuminating, AP
Crew size	5	4
Miscellaneous	Reported to have a 0.2-KT nuclear round	Amphibious, reported to have an automatic or semiautomatic loader
Cruising range (kilometers)	500	500

With the SP howitzer, the Soviets have managed to at least partially accommodate their particular tactics of accompanying artillery to the battlefield conditions imposed by modern warfare. The result of this accommodation will be the increasing appearance of the SP howitzer in the initial assault waves of the future, contributing its part to the immense outpouring of offensive fires characteristic of the Soviet breakthrough attack.

CPT George R. Patrick is assigned to the Directorate of Course Development and Training, USAFAS.

Soviet artillery modernization progressing

A number of new weapons and improvements in Soviet artillery have been recently confirmed by Western intelligence according to *Defense and Foreign Affairs Daily.*

A multi-barreled rocket launcher is deployed in East Germany and has been seen in Czechoslovakia. The new weapon has a caliber of 240-mm and is truck-mounted with a similar vehicle carrying spare ammunition. It appears that the launchers are not destroyed during firing, but that the second vehicle latches onto the first for rapid reloading. It is not known whether a tracked version of the launcher exists.

The weapon will probably go first to motorized rifle divisions, the intelligence sources report. This is part of the general overall improvements in quality now being made by the USSR to motorized rifle divisions in the central sector.

Deployment of the new weapons coincides with a major study into the use of artillery by Soviet forces. The study is being made at the general staff level and follows in the wake of a general debate among senior Soviet military commanders as to how a stabilized NATO defense, including large numbers of highly effective antitank guided weapons, can be overcome in offensive operations.

In recent months it appears that the argument has fallen on the side of the elitist artillerymen. Two new self-propelled guns have been introduced as well as this latest rocket launcher. One-sixth of the Soviet land forces stationed in East Germany have been equipped with self-propelled artillery, according to a close observer of Soviet military affairs.

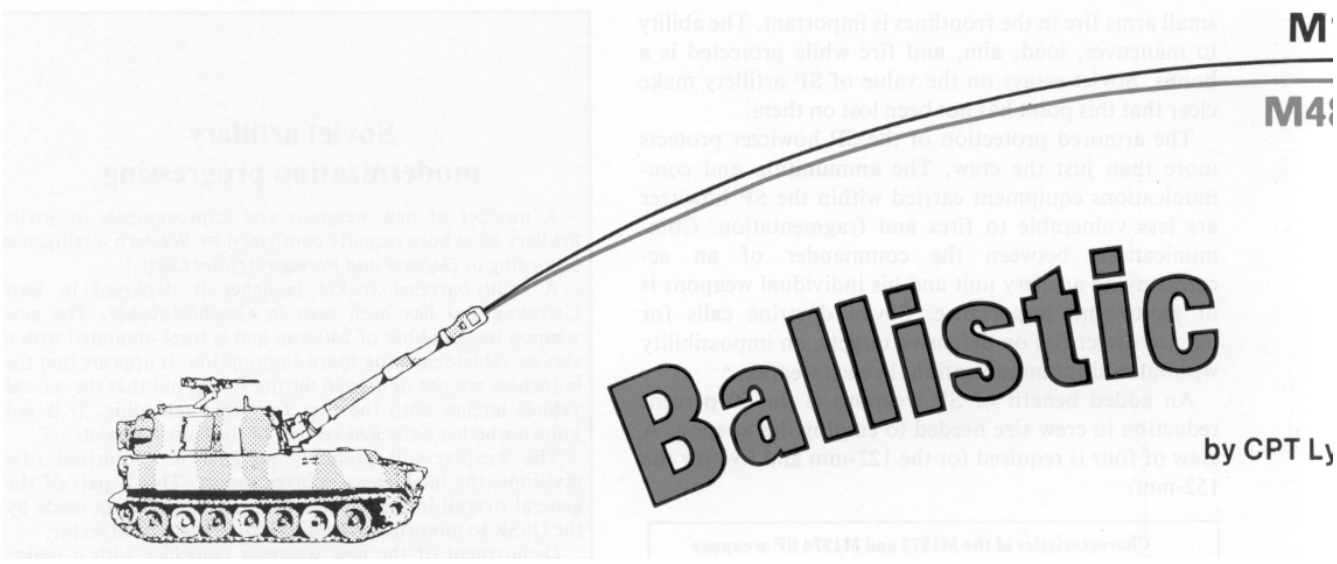
Serious reequipment of improved artillery began last year with the aim of replacing the six towed guns in each regiment with 18 self-propelled weapons. Initially, one regiment in each division will receive the 18 SP guns with plans for two regiments to be equipped later. It is possible that the SP guns will fire rocket-aided projectiles as do the towed 180-mm field guns.

The reequipment project results from an assessment of the time and distance involved in possible Soviet land operations. Towed artillery had neither the protection nor the pace to provide the necessary "suppression fire" for tanks and mechanized infantry during the offensive phases of the war.

The Soviet Union bases its battlefield philosophy very largely on the experiences on the eastern front during World War II. However, the lack of experience in modern conventional war — particularly war involving heavy barrages of artillery fire — must be one factor behind the new appraisal of the problems of suppressive fire.

Also, anticipated is a Soviet look at the logistics setup for maintaining so many new artillery systems during offensive operations. Traditionally, the Soviets have had enough guns to keep a considerable number in reserve. Intelligence reports also say that nuclear ammunition has been developed for the 152-mm, 180-mm, and 240-mm weapons.

[6]Frenkin, V., LTC. "Artillery Control in Battle." *Soviet Military Review*, October 1975, pp. 18-19.



Ballistic similitude testing of the standard M107 155-mm high explosive (HE) projectile and the new M483A1 dual-purpose improved conventional munition (DP ICM) projectile was recently completed at Fort Sill. The purpose of the test was to determine whether M107 registration corrections could be transferred to the M483A1 DP ICM projectile to provide accurate first round fire for effect with the DP ICM at considerably less cost. The test plan was written by the Army Materiel Systems Analysis Activity (AMSAA) at Aberdeen Proving Ground, MD, in conjunction with the Gunnery Department, US Army Field Artillery School, and the test was conducted by the US Army Field Artillery Board.

Background

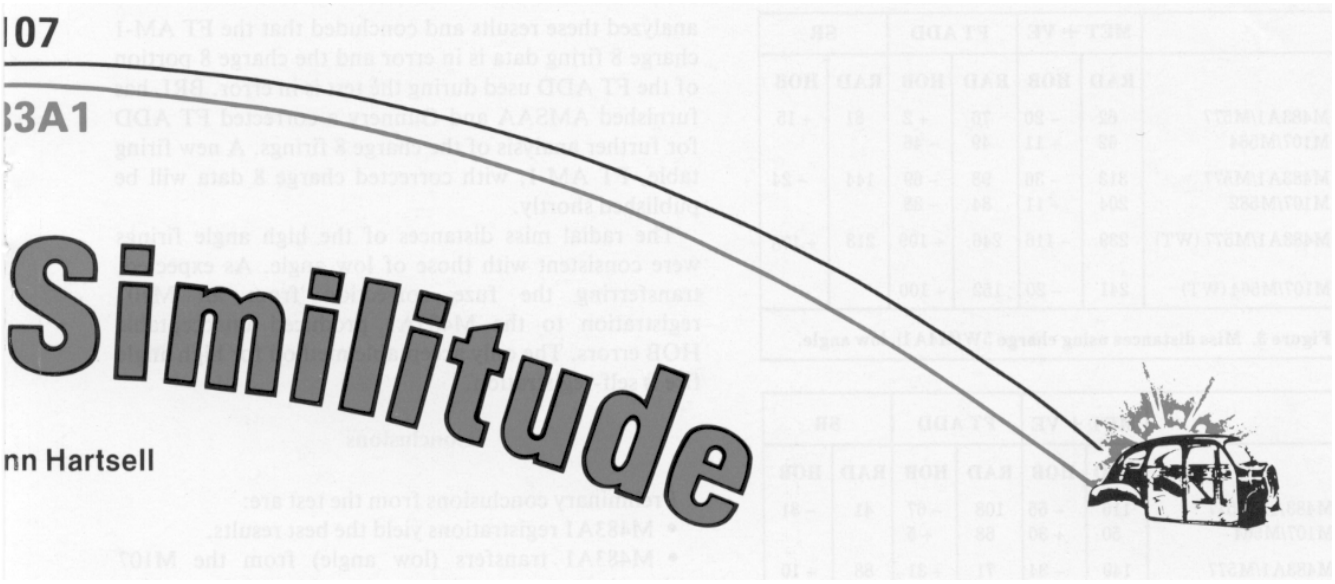
Firing data computations for the M483A1 DP ICM projectiles required that firing data first be determined for the DP ICM projectile in the self-registration mode and that corrections be applied to fire the projectile in the ICM mode; i.e., the same procedure as that used with the standard HE projectile and the old M449 family of antipersonnel ICM projectiles. A high order detonation is achieved in the DP ICM self-registration mode by removing the expulsion charge and installing a spotting or self-registration charge onto the base of the M577 fuze. This procedure dictated that two registrations — one for M107 HE and the other for M483A1 DP ICM — be conducted. Registration with the M483A1 is very costly, not only in terms of money (the cost of a DP ICM projectile is approximately eight times that of an HE projectile), but also in terms of time and survivability (how many registrations can we afford, based on the enemy's target acquisition capability?). Because of these problems a delivery procedure for the M483A1 based on M107 HE registration corrections was needed.

Test Concept

The test was conducted with the M109A1 howitzer, using both new and worn tubes. The charges fired were 3G and 5G(M3A1), 5W and 7W(M4A2), and 8(M119) for low angle, and 3G, 5G, and 8 for high angle. Three different registration and transfer techniques were evaluated during the test. All three techniques were fired each day of the test. The test consisted of 30 days of firing under varied weather conditions.

The first technique (hereafter referred to as the MET + VE technique) involved an MPI registration using the M107 with the M557 fuze. A concurrent met was solved using the 155-AM-1 tabular firing table (TFT) to isolate the HE met and position corrections. The HE position corrections were then transferred to the DP ICM, and total registration corrections for the DP ICM projectile were determined by the subsequent met technique using the 155-AN-1 TFT. All fuze settings fired in the transfer missions using this technique were determined corresponding to the elevation or elevation plus comp site if applicable, since no fuze correction was available from the MPI registration. Again both HE and DP ICM four-round transfers were fired at the same target.

The second technique (hereafter referred to as the firing table addendum (FT ADD) technique), involved a high burst registration using the M107 HE projectile



with either the M564 or M582 mechanical time fuze. GFT registration corrections were determined and applied in the normal manner. Using the M483A1 with the M577 mechanical time fuze, transfer missions were fired by applying deflection, time, and quadrant correction factors extracted from a trial firing table addendum, prepared by Ballistic Research Laboratories (BRL). Both HE and DP ICM rounds were fired at the same transfer target based on the same registration corrections for comparative analysis. A mean point of impact (MPI) was determined for each four-round transfer mission.

The third technique (hereafter referred to as the self-registration (SR) technique), involved a high burst registration using the M483A1 DP ICM projectile with the M577 fuze. Registration corrections were determined and applied in the normal manner, and DP ICM transfers were fired.

The transfer targets were both over and short of the registration point ranging from a 430-meter transfer with charge 3 to a 1,430-meter transfer with charge 8. There were three repetitions of all missions fired with the new tube, two using the M107 with the M564 fuze and related M483A1 transfers, and one using the M107 with the M582 fuze and related M483A1 transfers. One repetition of all missions was fired with the worn tube. During the entire test, 985 M107 projectiles and 923 M483A1 projectiles were fired.

Results

Figures 1 through 5 show the results of the test (by charge) in the low angle firings. All three methods of registration and transfer are depicted, and the radial (RAD) and height of burst (HOB) "miss distances" of the transfers are shown. The first two lines of each chart depict the average miss distances of all M107/M564 and related M483A1 transfers. The next two lines depict the average miss distances of all M107/M582 and related M483A1 transfers. The last two lines of each chart depict the average miss distances of all transfers fired with the worn tube (WT).

	MET + VE		FT ADD		SR	
	RAD	**HOB**	**RAD**	**HOB**	**RAD**	**HOB**
M483A1/M577	54	– 15	73	– 22	62	– 12
M107/M564	61	+ 17	56	+ 35		
M483A1/M577	24	– 30	55	+ 36	48	+ 53
M107/M582	76	– 6	68	+ 68		
M483A1/M577 (WT)	272	– 142	145	– 54	44	– 19
M107/M564 (WT)	279	– 88	115	– 42		

Figure 1. Miss distances using charge 3G(M3A1), low angle.

	MET + VE		FT ADD		SR	
	RAD	**HOB**	**RAD**	**HOB**	**RAD**	**HOB**
M483A1/M577	115	– 78	84	+ 35	22	+ 20
M107/M564	39	+ 2	78	+ 14		
M483A1/M577	216	– 78	27	+ 7	37	+ 26
M107/M582	177	– 60	36	+ 36		
M483A1/M577 (WT)	90	– 62	124	– 78	61	+ 105
M107/M564 (WT)	69	+ 24	54	– 57		

Figure 2. Miss distances using charge 5G(M3A1), low angle.

	MET + VE		FT ADD		SR	
	RAD	**HOB**	**RAD**	**HOB**	**RAD**	**HOB**
M483A1/M577	62	– 20	76	+ 2	81	+ 15
M107/M564	62	+ 11	49	– 46		
M483A1/M577	313	– 36	98	– 69	144	– 24
M107/M582	204	+ 11	84	– 38		
M483A1/M577 (WT)	239	– 116	246	+ 109	213	+ 173
M107/M564 (WT)	241	– 20	152	+ 100		

Figure 3. Miss distances using charge 5W(M4A1), low angle.

	MET + VE		FT ADD		SR	
	RAD	**HOB**	**RAD**	**HOB**	**RAD**	**HOB**
M483A1/M577	116	– 55	108	– 67	41	– 31
M107/M564	50	+ 30	68	+ 5		
M483A1/M577	149	– 34	71	+ 31	88	+ 10
M107/M582	107	+ 6	80	– 23		
M483A1/M577 (WT)	90	– 57	31	– 16	71	+ 22
M107/M564 (WT)	9	– 28	39	+ 12		

Figure 4. Miss distances using charge 7(M4A2), low angle.

	MET + VE		FT ADD		SR	
	RAD	**HOB**	**RAD**	**HOB**	**RAD**	**HOB**
M483A1/M577	375	– 37	384	+ 20	180	– 25
M107/M564	268	– 34	132	+ 6		
M483A1/M577	397	– 99	204	+ 102	82	– 49
M107/M582	130	– 155	90	+ 16		
M483A1/M577 (WT)	475	+ 68	251	+ 223	30	+ 60
M107/M564 (WT)	83	– 2	68	+ 74		

Figure 5. Miss distances using charge 8(M119), low angle.

With the exception of charge 8, all three registration and transfer methods produced the same comparative results. The M483A1 self-registration technique held a slight edge over the HE registrations/ICM transfers. This was most prominent in charge 5G. The FT ADD method produced slightly better results than the MET + VE method and of course was much easier and faster for FDC computations. It was especially noteworthy that the M483A1 transferred as well from the M107 registrations as did the M107.

During the test a discrepancy was found in the M107 charge 8 muzzle velocity (MV). The charge 8 firing table for the M107 (FT 155-AM-1) is based on theoretical data with a standard MV of 684.3 meters per second. The velocimeter used during the test produced a consistent MV for the new tube of 673 meters per second or 11 meters per second slower than the standard. BRL has analyzed these results and concluded that the FT AM-1 charge 8 firing data is in error and the charge 8 portion of the FT ADD used during the test is in error. BRL has furnished AMSAA and Gunnery a corrected FT ADD for further analysis of the charge 8 firings. A new firing table, FT AM-1, with corrected charge 8 data will be published shortly.

The radial miss distances of the high angle firings were consistent with those of low angle. As expected, transferring the fuze correction from an M107 registration to the M483A1 produced unacceptable HOB errors. The only acceptable method for high angle fire is self-registration.

Conclusions

Preliminary conclusions from the test are:

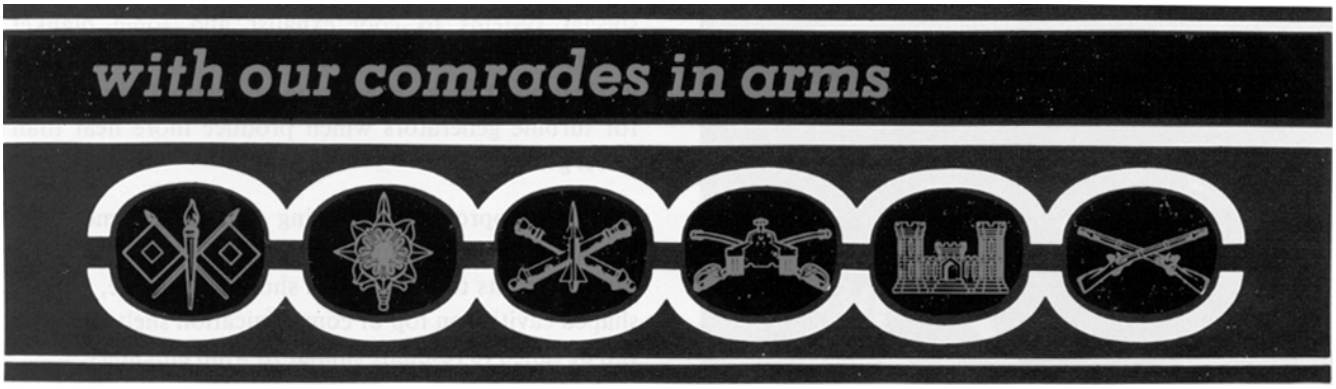
- M483A1 registrations yield the best results.
- M483A1 transfers (low angle) from the M107 registration are satisfactory with only minor degradation from M483A1 self-registration transfers.
- The M483A1 transfers from the M107 registration are as accurate as M107 transfers.
- Further analysis (and possible test firings) must be made on charge 8 M119 based on firing table corrections.

What does this mean to the Field Artillery?

If the procedures tested are accepted by the Field Artillery, then a unit would have two options for achieving effective first round fire with DP ICM. If the situation allows two registrations (ammunition availability, survivability), then the obvious technique to use is the M483A1 self-registration. If it does not, then acceptable DP ICM transfers can be achieved with HE registration corrections. The FT ADD is the preferred method for transferring HE corrections to the DP ICM because of the speed and ease of computation. The MET + VE technique would be viable for targets outside transfer limits. If the procedure is accepted, firing table addendums would be published for the field, and appropriate field manuals would be updated to include the new procedures.

A detailed round-by-round analysis of the test results will be conducted by AMSAA. The final test report should be completed in late summer. Preliminary analysis indicate that the M107/M483A1 procedures will be accepted as an alternate method.

CPT Lynn Hartsell is assigned to the Gunnery Department, USAFAS.



Marine Corps artillery improvements

The following remarks have been excerpted from the third annual State of the Corps message to the Congress by GEN Louis H. Wilson, Commandant of the Marine Corps.

"As part of the artillery modernization program, our aging 155-mm towed howitzers are scheduled for replacement by the new and greatly improved M198s. We look forward to the additional range the M198 provides over the current 105s and 155s. Further, 155-mm ammunition developments are exciting. The improved conventional munition round, the area denial antipersonnel mines round, the antiarmor mine system round, and the Copperhead laser guided projectile all represent a vast increase in modern firepower.

"During 1977 we completed modification to the M109A1 155-mm self-propelled howitzers. By the end of fiscal year 1978, we will have also completed a program to improve our 8-inch howitzers. Those howitzer and ammunition improvements will substantially increase our ability to deliver firepower.

"We are requesting authority to begin buying the AN/TPQ-36 Firefinder radar during fiscal year 1979. The AN/TPQ-36, a joint program with the Army, will provide a substantial improvement in response time and accuracy to our counterfire capability. In addition, we are requesting authority in fiscal year 1979 to begin buying the Battery Computer System, which is another joint program with the Army that will add speed and accuracy to the computations necessary to put rounds on the target. By the early 1980s, we will be utilizing digital communication terminals to implement rapid communications by burst transmission from fire control observers to the battery computer system. For the delivery of air and ground laser guided munitions and to designate targets, we expect to field in the early 1980s, the Module Universal Laser Equipment (MULE). The MULE will enhance our ability to deliver conventional ammunition accurately and allow for target identification and single-pass delivery of both conventional and laser guided munitions for laser spot tracker-equipped aircraft.

"In addition to improving our tank, antitank, and artillery capabilities, we will improve the firepower of the infantry company by replacing the present company mortar system. Further, we will improve command control by acquiring satellite communication terminals, and we will enhance close air support coordination by acquiring the AN/MRC-138 HF/UHF radio vehicle."

Contract awarded for Laser Target Designator

A contract for $17.2 million has been awarded to Hughes Aircraft Company by the Army Missile Research and Development Command (MIRADCOM), for production and engineering services of the Laser Target Designator (LTD), the shoulder-held "flashlight" that illuminates targets for laser guided missiles and projectiles.

Resembling a stocky, short-barreled rifle, the LTD projects an invisible laser beam that can guide any weapon equipped with a laser seeker — weapons such as Copperhead (for the 155-mm howitzer), Hellfire, Maverick, naval gunfire, and laser guided bombs. The LTD can also identify friendly forces, hand off targets to aircraft for attack with conventional weapons, and pinpoint drop zones and helicopter landing zones for rescue, resupply, and reinforcement operations.

Prototype laser target designator.

The 16-pound LTD, one of two laser designators under development for the Army, is the first selected for production.

Briefing bares camouflage activity

Fort Sill personnel heard the latest word on camouflage recently from Mr. Alan Sylvester of the Army Mobility Equipment Research and Development Command's Camouflage and Topographic Laboratory, the Army's center for camouflage technology.

The briefing covered research and development on camouflage and current camouflage techniques.

Current camouflage programs include thermal sensor covers, pattern painting, nets (with radar screening capability), smoke, and uniforms. Various forms of instant smoke, decoys, and shape disruptors are being studied.

New camouflage net achievements include near infrared protection, radar protection, a better adaptability to the seasons, and limited water absorption. Nets in woodland coloration have been issued to all overseas units and most active Army units in the US. Desert and snow nets have been type classified. A special net support system for the M109 SP howitzer has been developed (January-February 1978 *Journal*).

Thermal infrared camouflage for generators provides special systems to cool exhaust and some blanket material to give heat more surface area for faster dissipation. The lab is working on thermal camouflage for turbine generators which produce more heat than diesel generators.

Several approaches are being studied to camouflage communications antennae. These include more flexible tuning circuits to allow much shorter antennae, and U-shaped cavities on top of communication shelters which can be tuned to resonate similar to whip antennas.

Decoys are being made to resemble a number of vehicles and weapon systems. For example, the molded plastic jeep closely resembles the real item. The full-size M60 tank decoy, made of an aluminum pipe framework and nylon covering, can be erected in 20 minutes by a trained four-man team.

A spinoff from the decoy program, called the blend-disguise-decoy concept, consists of disguise drapes being placed over actual vehicles and over light frameworks of the same size. This makes identical blobs of the real vehicle and the framework.

Instant smoke research is being conducted under an Army project manager. The camouflage laboratory has designed prototype canisters which launch from a projector and others which will be used like grenades. The instant smoke objective is 120,000 cubic feet of smoke in two seconds.

Another instant smoke development in the prototype stage is called foam smoke. Foam smoke is made by an explosion of dry material which hangs in the air as if it were smoke. Foam smoke is considered superior to pyrophoric smoke because it is nontoxic and does not rise. It stays on the ground to conceal the target for a longer period of time.

Camouflage uniforms similar to those now worn by US Marines, as well as a desert version, are under development by the Army. The Army hopes to type classify these about 1981.

For camouflage users anywhere in the defense community, the laboratory maintains a camouflage action line. Questions concerning camouflage will be answered either on-the-spot or within 72 hours if research is necessary. This service is available 24 hours a day by calling AUTOVON 354-2654.

Recommended reading

The advantages of the containerized shipment and storage of ammunition as well as the problems encountered with containers are discussed in an article called "Containerization Comes to Ammunition," in the May-June 1978 *Army Logistician* magazine. The article contends that maximum use of containerization can result in increased efficiency in the transport of ammunition but where port facilities are not available, most containerships cannot be offloaded.

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A case is made for production of the neutron warhead by retired Army BG Edwin F. Black in the May 1978 *Military Review*. His article, "The Neutron Bomb and the Defense of NATO," states that a lack of determination in NATO and domestic political expediencies in the US, create a slow reaction capability to meet what will be a short warning situation in any Soviet assault on Western Europe. He argues that enhanced radiation weapons would add an option to NATO's capability to defend Western Europe in a short war scenario.

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Also in the same issue of *Military Review*, the situations facing commanders of TOE units due to the sudden influx of women are analyzed and discussed by LTC Joel Roberts, a Corps Support Command Commander, in "Women in the Army: A Commander's Perspective." The author believes that the female soldier can be a definite asset if given a chance and understanding.

With more FA unit MOSs open to women, the lessons learned by LTC Roberts may make the transition easier.

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For a straightforward look at the pure politics involved in making military procurement and basing decisions, "Defense Dollars and the Frostbelt Coalition" in the May issue of *ARMY* magazine lays the issues on the line.

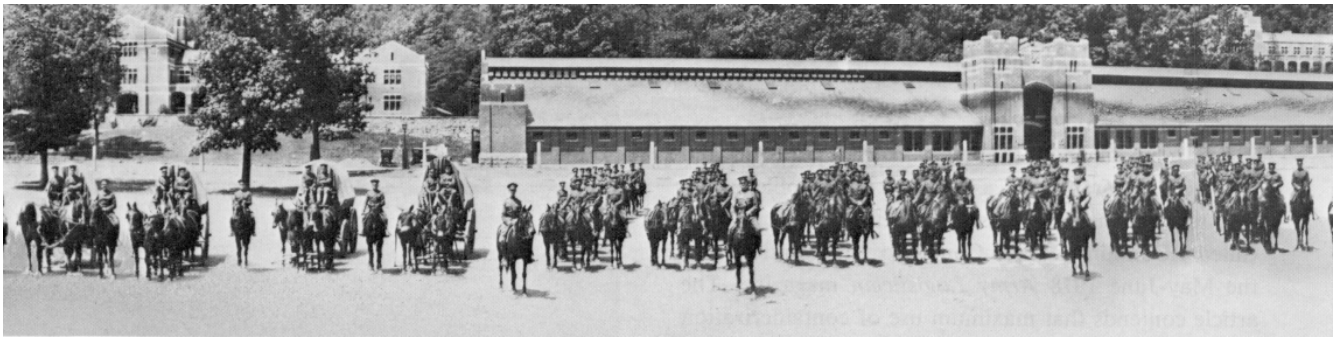
A soldier fires a Stinger missile. Visible between the missile and the launcher is the small ejector motor which propels the missile far enough to prevent blast burns to the gunner when the missile ignites. (Army photo by Frank Ontiveros)

Stinger enters production

Stinger, the Army's new man-portable, shoulder-fired air defense missile, has been ordered into production with the award of a $24.4 million contract to General Dynamics Corporation. Stinger, the successor to the Redeye missile, can destroy enemy planes ranging in sophistication from helicopters to low level, high speed jets.

Stinger will be an all arms weapon and provide immediate air defense for combat forces against aircraft attacking from any direction. The infrared, heat seeking missile has improved range and maneuverability, significant countermeasures resistance, and a device to identify friendly aircraft.

No test equipment is required in the field for Stinger because it is delivered as a certified round. The missile is packaged in a disposable launch tube which is discarded after firing. A separable, reusable gripstock, containing launch electronics and an identification, friend or foe antenna, is removed after firing and used with subsequent rounds.



USMA Detachment of Field Artillery, 1921 (photo retouched by Lee Gibson).

USMA DETACHMENT

by COL (Ret) Numa P. Avendano

It was my good fortune and privilege to have begun my military career in 1920 in the United States Military Academy Detachment of Field Artillery under a commander who molded my character and has been my mentor and dearest friend to this day, MAJ Jacob L. Devers who is now a retired four-star general.

The Detachment, according to information obtained from the West Point Library, was in continuous service at West Point from 1900 to the 1950s. It drew its tradition from "Griffin's Battery," the famous West Point Battery of the Civil War, which was organized at West Point on 7 January 1861 under command of LT Charles Griffin, USMA Class of 1847, by adding more men to the Detachment of Dragoons. Griffin's Battery was redesignated Battery D, 5th US Artillery. It participated with distinction in every major Civil War engagement from Bull Run to Cold Harbor. The Battery did not return to West Point after the Civil War, but it was reactivated at West Point in 1900 as the United States Military Academy Detachment of Field Artillery with men recruited at West Point or transferred from other units on the Post.

Quarters for the Detachment was a red brick structure built in 1852 as an Artillery barracks. In 1908, modern barracks, stables, and a gun shed were built on the south end of the Post and were used by the Detachment for more than 50 years.

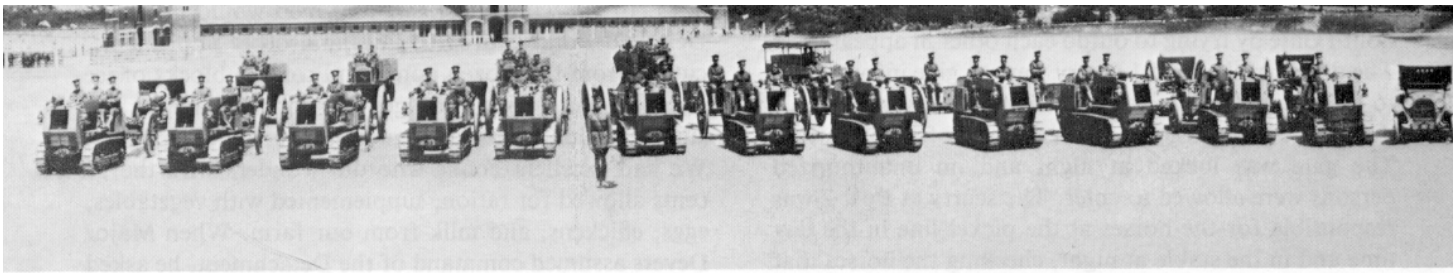
Several Detachment commanders became famous in later years. LT Charles P. Summerall, USMA Class of 1892, was well-known as the officer who blasted the great door of the wall surrounding the city of Peking, China, in the Boxer Rebellion in 1900. It is said that he drew a circle on the door and directed a gunner in his battery to aim his artillery piece there. In World War I he commanded the 1st Infantry Division, then commanded I Corps, and later became Chief of Staff of the Army. Another former commander, BG William "Bull" P. Ennis, USMA Class of 1901, commanded the 13th Field Artillery Brigade during World War I and later became Assistant Commandant of the Field Artillery School.

In World War I, the strength of the Detachment was increased to 215 men and motor trucks and tractors were supplied. It became a combination horse-drawn and motorized outfit with two batteries each of French, American, and British 75-mm guns and two 4.7-inch guns and two 155-mm howitzers.

After World War I, when Major Devers was in command, the Inspector General of the Army cited the Detachment as follows:

"I have recommended to the Superintendent [of the Academy] that every cadet of the first class [seniors] be given an opportunity to visit the barracks, stables, gun shed, storeroom, and mess of the USMA Detachment of Field Artillery. Such a visit will give them a very good idea of what to expect of an efficient Army organization. The organization is as near a model as any I have inspected in the Army, and it represents a very high soldierly standard."

When I first entered the Army, organizations trained their own troops, so I received my basic training in the Detachment along with three other recruits under SGT John Franklin who had about 15 years of service. The first thing he told us was: "I am going to make soldiers out of you, and I am going to start by teaching you to stand like a soldier, your general orders, and that Saint Barbara is our Patron Saint." He was quite a soldier! He and some of the other sergeants who had more than 15 years' service had known all our officers when those officers were cadets. The officers were: MAJ Jacob L. Devers, Class of 1909, commanding; MAJ Robert S. Donaldson, Class of 1909; CPT Stanley E. Reinhart,



OF FIELD ARTILLERY

Class of 1916; 1LT Lawrence M. Jones, Class of 1917; and 1LT Clarence P. Townsley Jr., Class of 1918.

What a group of officers and NCOs these were! The very best! The sergeants I remember, in addition to Sergeant Franklin, were 1SG Harry P. Tracy, MSG August P. "Smoky Pete" Lawrence, Sergeant Ducro, Sergeant Coppersmith (stable sergeant), Sergeant Gamble, Sergeant McCue, and SGT Joseph Stocks (mess sergeant). Another sergeant who had left West Point before I arrived became famous as the Field Artillery School Librarian — MSG Morris "Mike" Swett. It has been said that he knew by name every Field Artillery officer who attended the Field Artillery School. After he retired from the Army, he remained as the School Librarian until he retired from Civil Service in 1954. The School Library now bears his name.

Most of the sergeants in the Detachment had more than 15 years' service. Some had been commissioned during World War I. They set a good example and made other soldiers follow their teachings, or else.

The recruits were put through six weeks of intensive training including school of the soldier (mounted and dismounted), equitation (horsemanship), care of horses, harnessing and unharnessing, driving and draft, care of equipment, qualification with the .45 caliber pistol, guard duty, service of the piece, drill and ceremony, and everything else that an Artillery soldier should know.

After six weeks of training, we had one week of stable police and kitchen police and then we were assigned to sections in the horse-drawn battery or the motorized section. In addition to our regular duties, we learned "methods of instruction" because our primary mission was to instruct cadets and demonstrate the duties of Field Artillery soldiers, and we had better do it correctly!

A normal day in the Detachment began with reveille at 0545, drill call at 0600, recall at 0630, mess call (breakfast) at 0700, and "boots and saddles" (for mounted drill) at 0800. For mounted drill, the drivers were marched to the stable and the cannoneers to the gun shed. The drivers harnessed their horses, and the cannoneers rolled the carriages (limber and piece or caisson) to the apron.

Harnessing took 10 minutes; then the first sergeant would command: "Stand to horse. First section lead out. Second section lead out. . . ." The teams, consisting of three pairs (lead, swing, and wheel), would go to their carriages to be hitched. The drivers then "stood to horse" and the cannoneers took their positions at the carriages.

Usually Major Donaldson directed mounted drill on his horse — a beautiful mare named *Mabel*. Major Donaldson would mount, receive the report of the first sergeant, and then give the command "Prepare to mount . . . . Mount" which was supplemented by the appropriate bugle call. Then the drill — maneuvers limbered — would begin. There was nothing more exciting to a field artilleryman than maneuvers limbered — the sound of hoof beats, the clanking of trace chains, the snorting of horses, and the bugle calls giving commands for the various maneuvers such as countermarch, left or right about, double section column, flank column, etc. The guidon bearer would gallop to the head of the column in the new direction, then the command "Action front" could be heard, and the horses would stop. Cannoneers would dismount, uncouple the pieces and caissons, and prepare for action. When the command "March order, limber front and rear" was given, the limbers drawn by the horses were returned, the pieces and caissons were coupled, and maneuvers limbered would resume. After two hours of mounted drill, the materiel was uncoupled and returned to the gun shed. The drivers dismounted and led their pairs to the stable and unharnessed, groomed, watered, and fed them. The bugle would sound for mess call (noon meal) and again for guard mount and fatigue.

The Detachment had responsibility for the night mounted patrol and guarding the South Gate and the stables. We would "buck" for sentry duty at Post 1 at South Gate by trying to outdo each other in appearance. The duties of the Post 1 sentry were to give information to visitors and deny entry to persons who were slovenly dressed, boisterous, or showed signs of intoxication. The gate was locked at night and no unauthorized persons were allowed to enter. The sentry at Post 2 was responsible for the horses at the picket line in the day time and in the stable at night, checking the horses that might become untied, tangled, etc. The mounted patrol would ride around the Post during the hours of darkness.

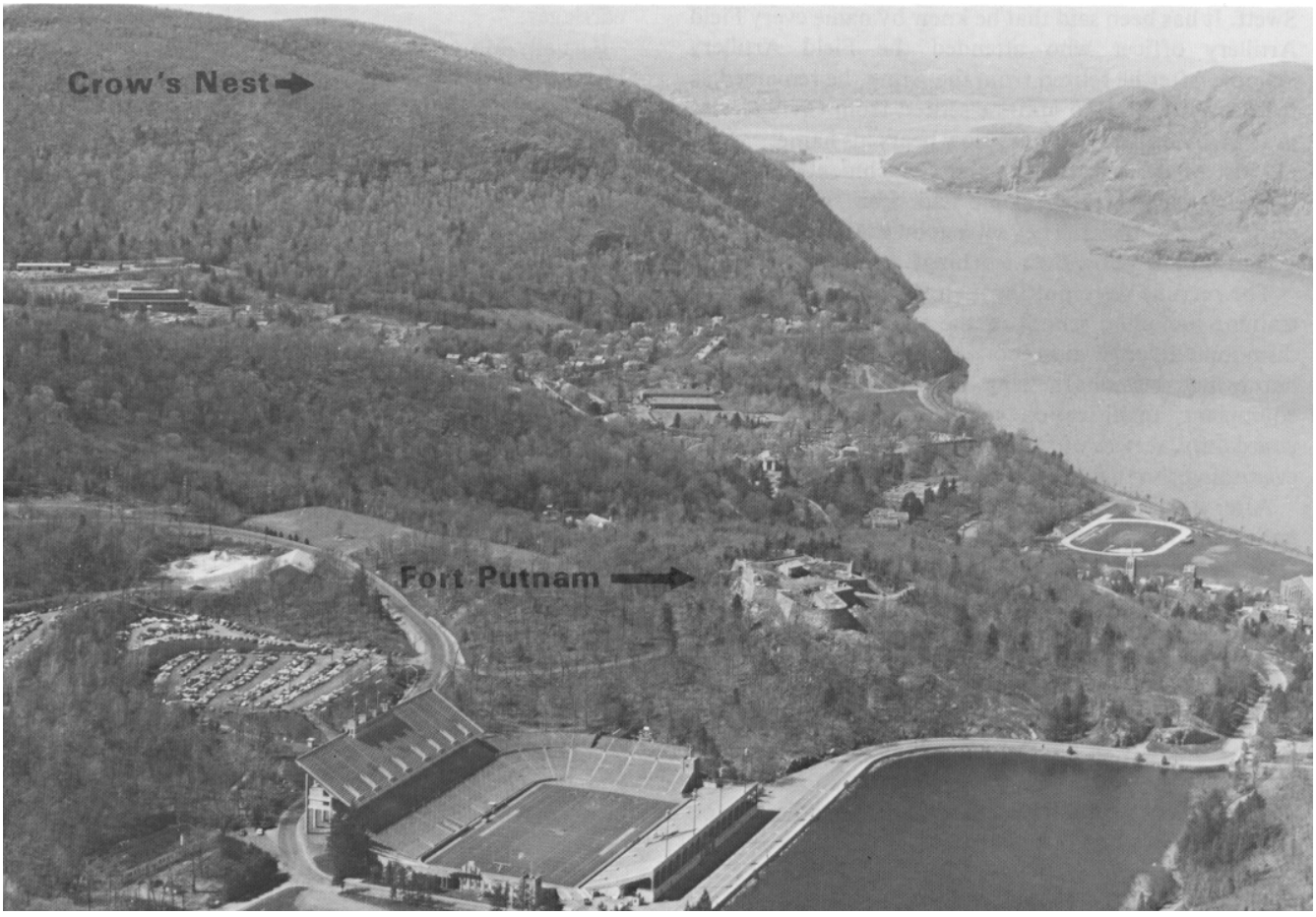
There was a cadet drill twice a week. In the spring, we would fire service ammunition with the French 75-mm guns. The gun position was just west of Lusk Reservoir, with observation from Fort Putnam and targets on Crow's Nest Mountain.

In addition to mounted and dismounted drills, ceremonies, inspections, firing salutes, demonstrations, etc., we were responsible for unloading and storing hay, straw, and grain for the horses; unloading coal for our furnaces and kitchen; and, deserving special mention, the famous "ice fatigues." Refrigeration, air conditioning, and electric heat were nonexistent in those days. In the winter, officers and men would march to Delafield Pond and, with saws and other implements, cut ice from the frozen pond, and roll the blocks of ice to an underground storage site for use during the summer. This fatigue duty gave us a very good appetite. We had excellent cooks who did wonders with the 50 cents allowed for ration, supplemented with vegetables, eggs, chickens, and milk from our farm. When Major Devers assumed command of the Detachment, he asked the Superintendent, BG Douglas MacArthur, for a plot of ground where we could plant vegetables and keep chickens and a cow. Our mess was substantial and palatable but, of course, could not compare with messes today.

For recreation, we had a football team, coached by LT "Biff" Jones who later became famous for coaching victorious teams at West Point, Louisiana State University, and Oklahoma University; a basketball team, coached by Major Devers; and a baseball team, coached by Lieutenant Townsley.

On Saturday afternoons and Sundays we could go on mounted pass to Bear Mountain or in the hills behind

"Down range" for the USMA Field Artillery Detachment circa 1920.



the barracks, but the best recreation was the Saturday night dances. The girls, chaperoned by their mothers, would come from Highland Falls, the town just south of West Point. When off duty, we could go to Highland Falls, but we had to wear uniforms. In those days, military personnel were not allowed to wear civilian clothing.

All scheduled activities, including sick call, were by bugle. But sick call was almost unheard of, because if we had two men per week, we had too many. The sergeants impressed upon us that it was a disgrace to be sick, so one had to be really sick before he would go on sick report. Of course, now and then we had injuries.

In June 1920 and 1921, General MacArthur ordered the Corps of Cadets and the Detachment of Field Artillery (horse-drawn) from West Point to Camp Dix (now Fort Dix), NJ, for two months summer training which included artillery and small arms firing and maneuvers. It took seven days to go and seven days to return, averaging 25 miles per day. Horses and men were in excellent condition so the journey was most enjoyable. During these "hikes" we became close friends with the cadets who, in later years, especially in World War II, went on to high rank and fame.

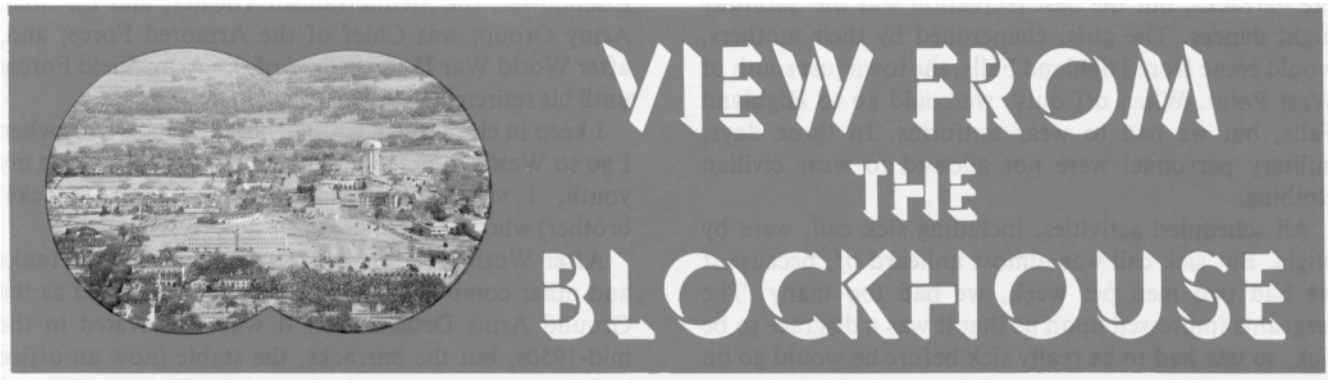
Major Devers, the Detachment commander, later commanded the 9th Infantry Division, Fort Bragg, the European Theater of Operations before General Eisenhower, the Mediterranean Theater, and the Sixth Army Group; was Chief of the Armored Force; and, after World War II, was Chief of the Army Field Forces until his retirement.

I keep in close touch with General Devers, and, when I go to West Point every three to five years to relive my youth, I visit SGT Frank Stocks (Joseph Stocks' brother) who lives nearby.

After World War II, the Detachment received tanks and other combat vehicles and was redesignated as the Ground Arms Detachment. It was deactivated in the mid-1950s, but the barracks, the stable (now an office building), and the gun shed (now the Visitor's Bureau) are still there. The mounted drill field is mostly a parking area for automobiles.

To the best of my knowledge, there are only four surviving members of the USMA Detachment of Field Artillery, all retired: GEN Jacob L. Devers, COL Lawrence M. Jones, MSG Frank Stocks, and myself. But, after 58 years, I can see Major Devers on *Pennington*, Major Donaldson on *Mabel*, Captain Reinhart on *Ramsey*, and Private Avendano on *Kingsbury* with bugler Green and guidon bearer Erb riding at a full gallop at the head of the column!

COL Numa P. Avendano retired from the Army in 1962 and is now living in Lawton, OK.



First women join Pershing training

"You've got to realize you're a novelty. They just don't know how to treat you." MAJ D. J. Middleton, Chief of Pershing Division, Weapons Department, was talking to the first four women to train in the Pershing Missile Crewman course, MOS 15E.

"They" are the men the women deal with every day — instructors, drill sergeants, and male classmates.

"Everytime you take a step here it's new terrain because people are always resistant to change. And there's a lot of old prejudice about women in combat arms," said Middleton.

Because the Pershing crewman is traditionally a male job, the girls expected more resistance from the men at the beginning. But the competition came later in the course.

"At first there was no jealousy problem," said PV1 Lynn Murray. The guys all thought it was "cute" to have women in the missile course. But then the resentment began to grow.

One reason for the feeling is the men think "We get more attention. They think we get away with more because of our sex," said PV2 Marla Cleator.

The women all shine in classroom work. Murray tied for honor graduate of class 7-78. They have more education. All the women have high school diplomas and three of them have some college.

"The men think we're all doing so well because the drill sergeants look out for us," said Cleator.

"Having us here has brought out the fatherly instinct in our drill sergeants and they treat us like daughters — sometimes like 12-year-old daughters," said PV1 Deborah McCarthy.

The men seem to change their behavior trying to be protective when the women are around. "The men don't like watching their swearing but always say, 'Shut up. She's around'," said Murray.

Much of the work on the Pershing system is physical, hard and heavy. Cables may weigh 60 pounds each. "Sometimes it takes me longer because the stuff is heavy, but I can do it. I get mad when the guys come up and try to grab the tools out of my hands because I'm slow. Some of them are slow too," said McCarthy.

The women said they don't like this feeling of competition and resentment. They want to feel more like a member of the team.

"I don't feel like I'm competing against the guys but against my own weakness," said McCarthy.

"I think you have a responsibility more to prove to yourself than to the Army that you can do it," Cleator added.

"We're going to see more women in the Army and what we're seeing right now is just a little over-reaction to the big change of having women in combat arms," Middleton feels. (SP4 Charlane Busse)

Watch that pocket calculator!

Pocket calculators can explode with sufficient force to knock a person down according to a recent warning in the *Journal of Environmental Health*. Research has shown that any metal object that comes in contact with the unprotected battery charge contact points will cause a thermal runaway. This, in turn, shorts out the nickel-cadmium batteries causing an explosion.

To prevent such an accident, pocket calculators should be carried in their cases.

BOC TOE changes

Consolidated Change Table 300-64 dated 20 April 1978 contains equipment changes in the Tables of Organization and Equipment for both the self-propelled and towed howitzer battery operations centers (BOC). Firing battery headquarters is now authorized one radio set AN/VRC-46 and two AN/VRC-47s, with towed units authorized an additional 1¼-ton truck. Equipment can be obtained by submitting appropriate requisitions.

FM 6-20 is here!

FM 6-20, Fire Support in Combined Arms Operations, is now being distributed to field units and service schools Army-wide. This comprehensive manual explains the relationship between the maneuver commander and the fire support coordinator (FSCOORD) and the integration of all fire support into combined arms operations. It was written by maneuver and fire support personnel and is designed for all members of the combined arms team.

The doctrine contained in FM 6-20 is the basis for instruction at TRADOC installations and for unit training. FM 6-20 is not a tactics manual; rather, it is the total fire support manual for the maneuver commander and the FSCOORD. It will be followed by two other how-to-fight productions: FM 6-21, Field Artillery Cannon Battalion; and FM 6-22, Division Artillery, Field Artillery Brigade, and Field Artillery Section (Corps). When these manuals are published, they will form the link between FM 6-20 and FM 6-50, Field Artillery Cannon Battery, to cover field artillery/fire support units and operations at all levels.

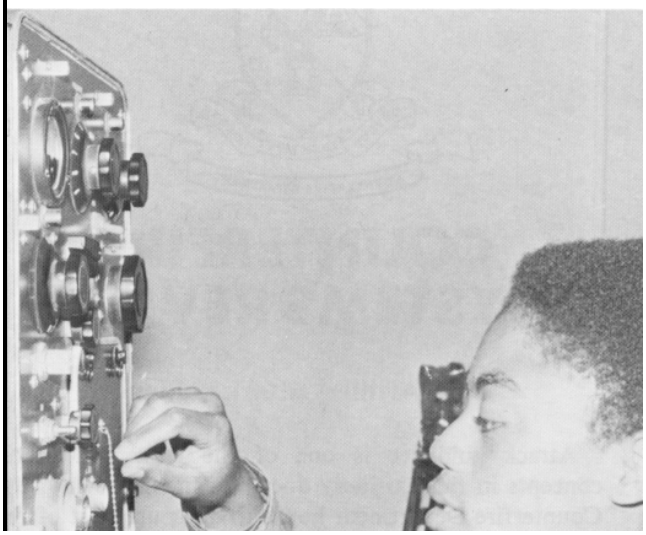
Units that have not yet received FM 6-20 through pinpoint distribution should check pinpoint accounts for currency and accuracy. To do this, write to Commander, USA AG Publications Center, 2800 Eastern Boulevard, Baltimore, MD 21220, or call AUTOVON 584-2562. If additional copies are required, they may be ordered on DA Form 17, addressed through publications channels and sent to the above address.

First women commissioned in Field Artillery

For the first time in the history of the Field Artillery, women are wearing officer's crossed cannons. 1LT Elizabeth Tourville and 2LT LaFrancais Hayes have been commissioned in the Field Artillery and will attend the Field Artillery Officers Basic Course (FAOBC) beginning in July. Following FAOBC they will both attend the Pershing Officer Course and be assigned to Germany.

Three additional women are scheduled to receive Field Artillery commissions this summer and attend the FAOBC and Lance Officers course. Four of the five new lieutenants are receiving their commissions through ROTC. The fifth, 1LT Tourville was transferred from Ordnance Branch on 6 April, making her the first woman officer in the Field Artillery Branch. A recent DA decision permits women to be assigned to all Field Artillery units except cannon.

An electronic distance measuring device is studied by PFC Maryann Johnson during one phase in the 21 areas of study required to complete the Field Artillery Surveyor course. PFC Johnson completed the self-paced course in just over four weeks to become the Army's first woman FA surveyor. She earned her Bachelor of Arts degree and taught in an elementary school before joining the Army. She is slated to go to Germany from Fort Sill. (Photo by SP5 Dave Knapp)



Maintenance evaluation packet ready

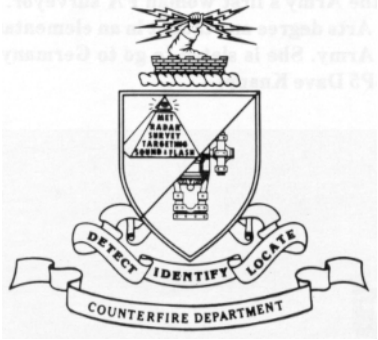
The November-December 1977 *FA Journal* (page 35), announced that a logistics management diagnostic evaluation package was being developed for unit commanders' use. The evaluation packet will be available 1 August 1978. This management tool was developed as a result of tests administered to FAOAC students and comments received from commanders. It was field tested and validated by units at Forts Sill and Riley.

The evaluation package has two sections. Section I contains the Administration Instructions and the Diagnostic Practical Exercise. Section II contains the Solutions and Remedial Guidance. Copies may be ordered by requesting the "Logistics Management Diagnostic Evaluation" from: Commandant, US Army Field Artillery School, ATTN: ATSF-CR-TS, Fort Sill, OK 73503.

This package is not a panacea for solving maintenance problems with a unit. It is, as the name implies,

"A tool to measure the degree of expertise or level of knowledge of personnel engaged in those critical areas that support a viable maintenance program."

When the package is used in this context, commanders can determine the maintenance management proficiency of their officer and NCO personnel. By analysis of the results, the commander and the individual are able to identify weak areas, and appropriate training can be developed to alleviate the deficiencies.



COUNTERFIRE SYSTEMS REVIEW

Field Artillery attack guidance

Attack guidance is one of the least understood concepts in field artillery doctrine. In this review, the Counterfire Department hopes to clear up most of the misunderstanding and provide a preview of what FM 6-22, Division Artillery, FA Brigade and FAS (Corps), will have to say about attack guidance when it is published.

The division artillery commander is responsible for counterfires, interdicting fires, air defense suppression, and the traditional mission of close support. To keep the proper balance of fires to each of those areas is not an easily defined task. It is usually done through FA organization for combat and attack guidance.

But what is attack guidance and how can it help?

Attack guidance is simply those instructions given by the division artillery commander with guidance from the division commander for the attack of targets. This guidance will be used by the div arty tactical operations center (TOC) to direct the engagement of targets by those units over which div arty exercises control.

In the formulation of attack guidance, the div arty commander's first consideration is the guidance from the division commander combined with recommendations from the div arty S3 and other staff members, based on these factors:

- Mission of the supported force.
- Time available to deliver fires.
- The air situation (friendly and enemy).
- The value of planned fires versus immediate attack of targets as they are located.
- Ammunition available.
- The enemy's artillery capabilities, to include number and type weapons, state of training, mobility, ability to reinforce, and vulnerability.
- The enemy's current tactics and techniques of artillery employment.
- Friendly versus enemy target acquisition capabilities.

Once the div arty commander has considered these factors he must include in his attack guidance, as a minimum, instructions for:

1) *How to attack:* Targets are attacked to achieve suppression, neutralization, or destruction effects (may also be expressed as a percent of damage or casualties desired). This does not mean that a blanket suppress, destroy, or neutralize statement will be issued in attack guidance. The guidance could, and very likely will, designate different categories of targets for different levels of attack, depending on the importance of each target category.

2) *When to attack:* Targets are to be attacked when acquired, or they are planned — on call or scheduled. Once again, this does not mean that a blanket "as acquired, on call, or scheduled," will be issued, but will indicate categories the div arty commander wants to attack at different times, depending on their ability to affect our operation.

3) *Restrictions:* This part of the attack guidance explains any restriction the div arty commander may want to place on the attack of targets such as:

a) Restricting the amount of ammunition expended.

b) Restricting certain units from firing.

c) Specifying other conditions which must be met before engaging a target (e.g., "Attack category 1 and 2 targets only when receiving casualties from those targets.").

An example of attack guidance is: "Attack 122-mm MRLs as acquired to a level of destruction. Suppress all other targets on call only when fires from those targets are inflicting casualties. Direct support and reinforcing units will not fire until the attack begins."

It is not implied that once attack guidance is issued that it cannot be changed. The div arty TOC will continually evaluate the original factors and recommend changes to attack guidance as necessary. In addition, the S3 may expand it to provide more detailed guidance to personnel in the TOC and under the control of div arty.

Attack guidance allows personnel in the div arty TOC to act on targets as soon as they are developed, in a manner that the commander desires. Once a target is passed to the fire control element, the decision has already been made as to the disposition of the target because we know how and when to attack the target and know the restrictions on the attack. Attack guidance expedites the disposition of targets by allowing immediate reaction at the lowest possible level.

Attack guidance is not the solution to all of the div arty commander's problems. It is, however, a tool that he can use to standardize procedures he might otherwise have to personally supervise.

Longer life power supply developed for calculators

A power supply adapter for the Texas Instruments SR-56 hand-held calculator organic to survey sections, has been developed by the Counterfire Department. The adapter fits into the battery compartment of the SR-56 and allows the theodolite night lighting power pack to be used as the calculator's power source instead of the commercial battery.

The theodolite power pack is powered by six discardable BA-30 batteries and has an operational life of about 36 hours compared with two hours for the rechargeable commercial battery. The new adapter is compatible with the SR-59 which is being considered as a replacement for the SR-56.

Production of the power supply adapter is underway at the Fort Sill Training and Audiovisual Support Center. The initial production run will be distributed by the Counterfire Department. Pending TRADOC approval, a graphical training aids number will be assigned to the adapter so that units may order them through their local TASC.

NCOs . . . Army still needs TARTs

TART . . . another acronym to add to your list. It stands for Target Acquisition Radar Technician, the title of warrant officers holding MOS 211A. The problem is that there are not enough people with that MOS. There has been an intensive effort to recruit eligible personnel but the field is still wide open and should remain that way through October.

Warrant officers in this specialty are involved in both operational employment and organizational maintenance of weapons support radars. This requires them to be thoroughly familiar with the FA units they support.

Another important aspect of the radar technician job is advising commanders on the technical considerations affecting employment of FA radars. It is an interesting and challenging field. The prerequisites are in SP 611-112 and DA Circular 601-73. See your PSNCO and take that first step toward becoming a TART!

Met MOS changes made

Under the new EPMS structure, the Meteorological Equipment Mechanic (35D20, organizational maintenance) and the Meteorological Equipment Repairman (35D30 DS/GS maintenance) MOSs have been eliminated. Replacing these MOSs are the 93F10/H1 and 26B10.

Personnel must first attend the 8-week, self-paced Artillery Ballistic Meteorology Course (93F10). Twenty percent of the graduates are then selected to attend the H1 portion of the 93F10/H1 course. This is a 9-week, and 3-day self-paced course. Upon graduation, the student is awarded the additional skill identifier H1.

This combined course qualifies the student both as an artillery ballistic met crewman and an organizational maintenance technician. The DS/GS maintenance of meteorological equipment is now performed by 26B (radar maintenance) personnel who are trained by adding a 5-week training period to the 26B course.

Ammunition Tactics-I

by LTC William W. Breen

"Their gunnery and tactics were brilliant — too bad about their ammunition."

— portent of an avoidable history

During the course of battle, field artillerymen have historically been required to provide solutions to simultaneous problems in tactical and technical fire direction, fire support coordination, and logistics. Generally, as these problems have become more complex, procedures and equipment have been devised to help commanders and their staffs. Today we are planning to meet the most complex military challenge in history — an attack by Warsaw Pact forces in Europe. Because new materiel and maneuver tactics are now being devised, US forces in Europe will be capable, by the mid-1980s, of having highly effective weapons, properly manned and positioned to meet an attack. However, unless equally vigorous efforts are made to develop and practice *ammunition tactics*, the field artillery supporting those forces will not be prepared to provide the right fire support, at the right time, in the right amounts.

Ammunition tactics, for the purpose of this article, are those procedures followed at battalion level to determine the mix of ammunition to be delivered to a unit and the means and timing of those deliveries.

Within a few years, there will be at least 10 different types of projectiles available for the 155-mm howitzer, our standard cannon (table 1). High rates of fire, shoot-and-scoot tactics, multiple fuze options, and the interchange of ammunition among NATO partners will so increase the number of combinations of ordnance available to a battalion that only the highest order of management will prevent confusion, loss of fire support, and loss of battles.

A "typical battle" (described below) of the 1980s will serve to illustrate the requirement for fully developed and practiced ammunition tactics. The US force will not lose this battle because the supporting fire support units will make optimal use of all the modern equipment and doctrine now under development, along with effective ammunition tactics *not* under development.

The "first battle"

Soviet advance guard units have reported no exploitable gaps in the US defensive line to their front. The US covering force has withdrawn and the Soviet advance guard units are now in contact with a series of strongpoint defenses. If a breakthrough is to be achieved, it must be forced. The main body of a first-echelon motorized rifle regiment has arrived within five kilometers of the forward edge of the battle area (FEBA). The regiment's mission is to breach the defensive line to its front. Each Soviet battalion on line is attacking a reinforced mechanized rifle company. Let's follow the attack of one such battalion.

The battalion has information from the advance guard units on the location of obstacles and some of the US antitank weapons. The attack has been planned in detail. The commander knows that his unit is now at least partially visible to the US defenders. Under cover of an artillery preparation, he plans to reach the line of departure, two kilometers in front of the FEBA, within 15 minutes. At that point, his unit will deploy in attack formation, and self-propelled guns organic to the regiment and weapons of the advance guard units will begin overwatch fires. Following planned routes from the line of departure that provide maximum cover, the unit should be able to reach the infantry dismount point in the preferred formation (figure 1) within 30 minutes.

The US commanders and their fire support coordinators intend to confound the Soviet timetable. Alerted by airborne and ground-based radars, they know the locations of the enemy maneuver columns and the approximate locations of their supporting artillery. As the attackers become visible at five kilometers, the laser designator operators call for Copperhead fire on planned aimpoints. The artillery will continue to "service" visible targets and change aimpoints as the range closes. Reaction times are minimal since the observer is linked directly to the Copperhead platoon. The start of the enemy preparation provides final data on the location of enemy fire units and the US artillery begins its counterpreparation program using DPICM against self-propelled units and APICM against towed artillery. Each attack includes a volley of AP FASCAM to extend the supressive effect. As periods of intervisibility increase, DPICM is fired on groups of attacking vehicles while Copperhead fire is continued against individual tank targets. As the enemy unit begins to deploy and comes within range of antitank weapons, the Soviet overwatch sites are subjected to continuous smoke by artillery and mortars. After the attacker has committed himself to his approach routes, planned aimpoints for FASCAM are selected for firing.

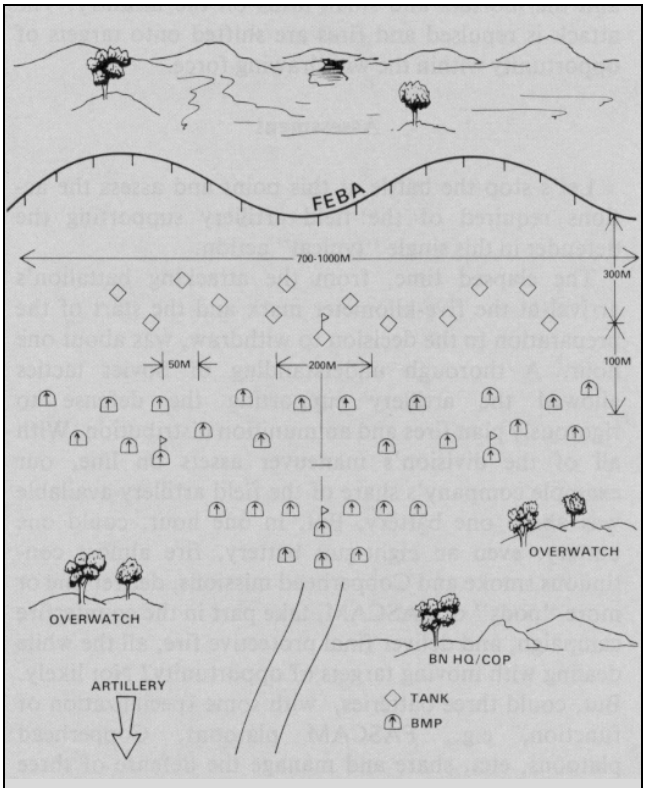


Figure 1. Battalion attack formation at the dismount point.

This application of an "instant obstacle" presents the attacker with three choices — all bad:

- He may continue in the planned formation, maintaining control and covered routes but losing elements in the minefield.
- He can take the time to breach the field, lining up vehicles behind the single tank in each platoon that is equipped with mine clearing equipment (and has been designated a priority Copperhead target).
- He can maneuver around the field, thereby losing cover and control and bunching his vehicles for easier attack by DPICM, Copperhead and antitank guided missiles (ATGMs). The attacker's use of onboard smoke helps him to conceal his choice of maneuvers, but exacerbates his control problem.

Despite the losses incurred by his unit, the Soviet commander is obliged to press on to a final assault. When the attacking tanks are within 250 meters of our defensive position, the Soviet commander orders his infantry to dismount from the BMPs that are (ideally) 50 meters behind the tanks. The BMPs begin to fire into the 50-meter lateral gaps between the attacking infantry squads. As the attacker begins the final assault, the defenders deliver final protection fires with the artillery concentrated on the BMPs, the ATGMs on the tanks,

and the mortars and small arms on the infantry. The attack is repulsed and fires are shifted onto targets of opportunity within the withdrawing force.

Assessment

Let's stop the battle at this point and assess the actions required of the field artillery supporting the defender in this single "typical" action.

The elapsed time, from the attacking battalion's arrival at the five-kilometer mark and the start of the preparation to the decision to withdraw, was about one hour. A thorough understanding of Soviet tactics allowed the artillery supporting the defense to rigorously plan fires and ammunition distribution. With all of the division's maneuver assets on line, our example company's share of the field artillery available was about one battery. But, in one hour, could one battery, even an eight-gun battery, fire almost continuous smoke and Copperhead missions, deliver one or more "pods" of FASCAM, take part in the counterfire campaign, and deliver final protective fire, all the while dealing with moving targets of opportunity? Not likely. But, could three batteries, with some specialization of function, e.g., FASCAM platoons, Copperhead platoons, etc., share and manage the defense of three companies? Maybe. Advancing from "not likely" to "maybe" will be a function of ammunition tactics along with a lot of effort in command and control.

Back to the war.

The *second* battle

The Soviet regimental commander now must decide on the commitment of his second-echelon battalion which has followed the lead battalions by about one hour and is, therefore, ready to attack just as the first-echelon battalions are withdrawing. Unable to exploit success, the regimental commander must determine which defensive position has been damaged the most and is, therefore, most likely to allow him to accomplish a breakthrough with the remaining battalion. This decision cannot be long delayed because the second-echelon regiment is now less than four hours from the FEBA, and the plan calls for strict compliance to the schedule. The Soviet division commander must have a breakthrough point established for exploitation by his second-echelon regiment, and he is expected to have penetrated the FEBA by several kilometers before dark.

While the commanders of the attacking units are mulling over their options, the defenders are reorganizing their positions and preparing to meet the subsequent attacks. Field artillery batteries must be managed with great efficiency during these periods — units must be moved and, in case of severe damage, consolidated; targets in the second echelon found by airborne and ground sensors must be attacked; FASCAM minefields must be renewed; and rendezvous with ammunition reloads must be achieved. Of course, if the attacking commander does not "mull," the second-echelon attack will be underway so quickly that the defenders will be forced to fight from the same positions using ammunition left over from the first attack until resupply is accomplished.

But for this example, let's assume that defeat of the first echelon and long-range attacks on the follow-on units have bought some time for the defenders. Thus, the emphasis will be on how this short time is used to meet the ammunition resupply problem.

To be prepared for the follow-on attacks, ammunition, in specialized mission loads (e.g., the "smoke" guns getting the majority of smoke rounds), must be delivered to new positions concurrent with fire unit arrival. Transfer of loads from service battery to firing battery vehicles must be completed rapidly. This is not the time to start considering the question, "Who gets what?" That was established by procedure and practice long before the "wet runs" began. The battalion S4 and ammunition officer, totally familiar with the plan of operations to include the scheme for compensating for attrition, orchestrate the ammunition pickups and deliveries to assure that artillery fire support is continuous. Turn-around times for the ammunition vehicles have been minimized because the vehicles are travelling only from an ammunition transfer point (ATP) in the brigade rear area to the firing battery positions, and materiel handling equipment (hoists) speeds transfers on both ends of the trip.

Guns don't kill people — *Ammunition* kills people.

As the attack of the second-echelon battalion is being stopped in much the same fashion as the earlier effort, the ammunition planners are preparing to fight an almost identical battle against the second-echelon regiment, scheduled to arrive in a few hours. In addition, they are planning for night operations, assigning mission loads to be fired to disrupt and diminish the second-echelon division which will attempt to move into position during the hours of darkness to renew the attack the next morning. The continued, successful

practice of ammunition tactics guarantees the field artillery units the ability to provide tailor-made fire support at high rates on a great variety of targets. This done, the defense holds and "wins."

In any fight, it's the first blow that counts; and, if you keep it up hot enough, you can whip 'em as fast as they come up."

— General Nathan Bedford Forrest

How did they win?

Victory in this hypothetical battle was achieved because the defenders were able to outgun the attackers over and over again at the critical time and place. The Field Artillery functioned as an integrated system, smoothly melding target acquisition teams, fire direction centers, firing batteries, and the former "poor cousins" — the ammunition sections. Unfortunately, the procedures, manpower, and equipment that made up the victor's ammunition tactics are not now available to the Field Artillery System. Worse, in many instances, they are not even being developed:

• Ammunition was distributed to sections in tailored packages. This permitted each section to deal with only a few members of the expansive 155-mm ammunition family. Of course, preferred general-purpose rounds needed for massed fires, such as HE and DPICM, were included in all packages. Packaging for a particular section supported that section's special function.

• Special functions, based on ammunition type, were performed by howitzer sections, platoons, or batteries, sometimes as part of a closed loop target engagement system (e.g., the Copperhead platoons). Special functions were assigned based on experience, coverage of the supported unit's zone of action, and continuity of operations (there must be more than one unit specializing in any function).

Specialization of functions and tailored ammunition packaging are elements of current doctrine.

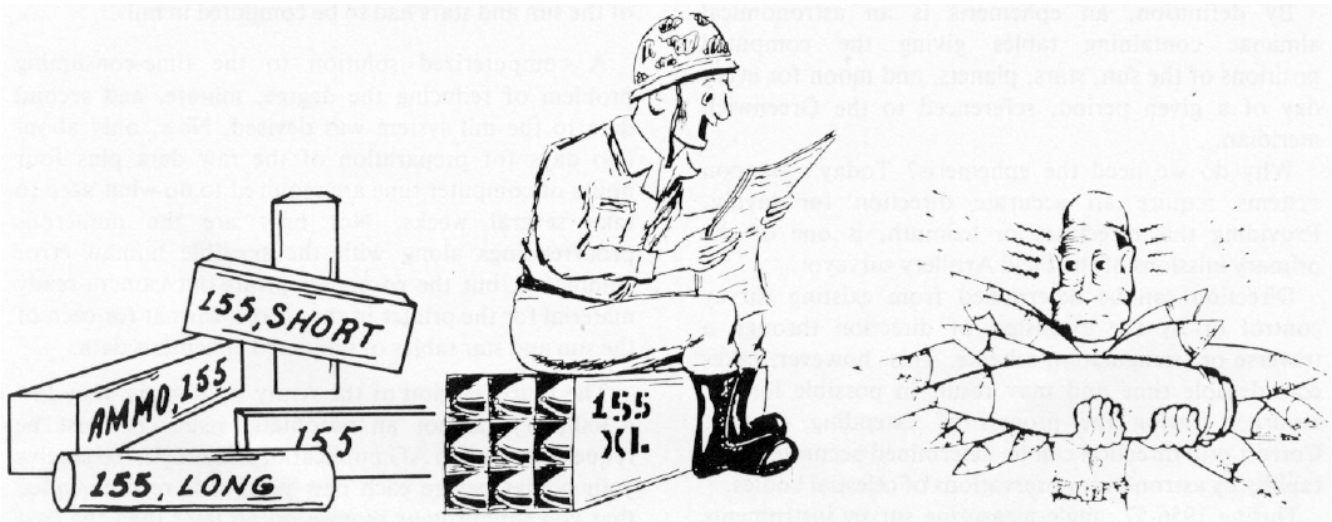
• The ammunition section NCOs were able to operate independently, finding firing points on schedule, day or night.

• The battalion S4 and ammunition officer were as competent as the S3 and his assistants, and they had guidance that permitted them to develop an equally comprehensive plan of action.

Under current TOEs, the S4 section is authorized fewer officers and lower grades than the S3 section. FM6-20, the fire support capstone manual, includes about two pages (of more than 500) on subjects relating

Table 1. The 155-mm family of munitions.

HE — high explosive (perhaps more than one type).
DPICM — dual-purpose improved conventional munitions (ICM).
APICM — antipersonnel ICM.
RAP — rocket assisted projectiles.
Illumination.
WP — white phosphorous.
Smoke, white and colored.
Copperhead — cannon-launched, guided projectile.
FASCAM — family of scatterable mines (antitank, antipersonnel, and others possibly).
Sensor rounds — acoustic locators, TV rounds, etc.
Nuclear.
Chemical.



"Hey, look here, Joe! They've developed *another* round for the one-five-five!"

to ammunition tactics. The ARTEP lists 35 tasks for the battalion operations and FDC section, but only seven for the battalion ammunition section. Hopefully, FM 6-21, FA Cannon Battalion, will be more helpful.

• The battalion ammunition section delivered more than 400 tons of ammunition, in mission loads, daily.

Current capability is about 190 tons. The Ammunition Initiatives Task Force (AITF) has recommended steps to overcome this deficiency. Direction has been given to analyze and test those recommendations.

• There was an ATP in the brigade area. Battalion vehicles were not required to travel to a supply point in the division rear. Battery vehicles never left their battery.

Solving this current deficiency is also an AITF recommendation. Manpower and vehicles for the ATP have not been identified.

• Materiel handling equipment permitted fast ammunition transfer requiring no more than two men per transfer.

An AITF recommendation in this area is to be tested.

• The procedures used had been developed initially from models that had simulated the battle to the rear of the FEBA. Subsequent field tests had validated the procedures and made them doctrine. Training in ammunition tactics by the battalion had assured that the doctrine could be successfully followed in combat.

Our current combat modeling is focused on the area at or to the front of the FEBA. Future field tests will address ammunition movement and handling issues.

The future is NOW

To a great extent we have advance knowledge of the tactics and equipment that our most dangerous adversary would use in a battle such as the one described here. It has been recognized that, to meet this threat, multiple, specialized ammunition types and high firing rates will be necessary. It certainly follows that the development of a plan for the tactical management of ammunition must begin soon. The title of this article, "Ammunition Tactics-I," is meant to imply such a beginning. Actually, it is less than that — perhaps an introduction to a need for a beginning. The procedures described in this article are intended to be no more than strawmen; so burn them if you will. But there is *some* best set of procedures for the Field Artillery team to follow in this kind of situation. And that set must certainly include some well-conceived, thoroughly practiced form of ammunition tactics.

LTC William W. Breen is the Artillery Systems Director, Directorate for Battlefield Systems Integration at the Army Materiel Development and Readiness Command. He is the author of "Survivable, Affordable, and Lonely" in the November-December 1977 FA Journal.

The Army Ephemeris—What, why, and how!

What is the ephemeris and why is it needed in the Field Artillery?

By definition, an ephemeris is an astronomical almanac containing tables giving the computed positions of the sun, stars, planets, and moon for every day of a given period, referenced to the Greenwich meridian.

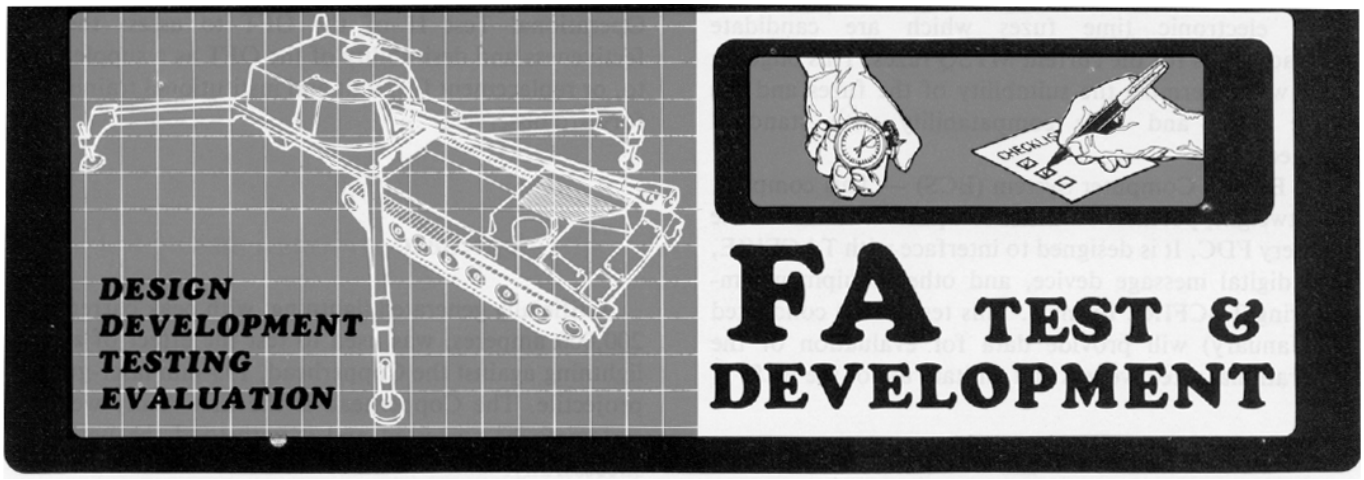
Why do we need the ephemeris? Today's weapon systems require an accurate direction for laying. Providing this direction, or azimuth, is one of the primary missions of the Field Artillery surveyor.

Direction can be determined from existing survey control or by the extension of direction through a traverse or triangulation scheme. This, however, takes considerable time and may result in possible loss of accuracy during the process of extending control. Correct grid direction can be determined accurately and rapidly by astronomic observations of celestial bodies.

During 1956-57, angle-measuring survey instruments were procured with scales in mils rather than degrees, minutes, and seconds. This created a problem in the preparation of the Army Ephemeris, since the locations of the sun and stars had to be computed in mils.

A computerized solution to the time-consuming problem of reducing the degree, minute, and second data to the mil system was devised. Now, only about two days for preparation of the raw data plus four hours of computer time are required to do what used to take several weeks. Not only are the numerous proofreadings along with the possible human error eliminated, but the computer prints out camera-ready material for the printer in the correct format for each of the sun and star tables of tabulated ephemeris data.

The yearly edition of the Army Ephemeris, now FM 6-300-(CY), is not an automatic issue. It must be requested through AG publications channels. To receive your copies before each new year, it is recommended that you submit your requisition no later than the first of September.



155-mm screening smoke projectile

Analysis of the 1973 Mideast War has resulted in increased interest in the development of an improved smoke capability. Most of the current smoke munitions produce smoke by explosive dissemination of white phosphorus (WP) and are generally used in the spotting and marking role rather than in the screening role. When WP is disseminated explosively, it shatters into relatively small particles that burn very rapidly, creating a large heat source which, in turn, causes pillaring and loss of two-thirds of the smoke which could be used for screening purposes.

Development and operational tests are being conducted using two competitive prototype smoke rounds. Both rounds will use the basic M483A1 projectile as the carrier for the smoke payload and the M577 mechanical time fuze. One round will contain submunitions consisting of WP impregnated felt wedges, and the other round will contain submunitions consisting of red phosphorus mix wedges. As the payload is ejected, the wedges are ignited by the ejection-ignition charge and fall to the ground, each wedge becoming a smoke producing source.

The tests at Dugway Proving Ground, Utah, will be completed 3 September 1978.

Modified M548 evaluated

The Field Artillery Board conducted an evaluation of the modified M548 cargo vehicle which has been increased in size and equipped with more power and onboard mechanical handling equipment (MHE).

The stretched M548 is 26.25 inches longer than the present M548, has a turbo-charged power pack, a cross-drive transmission, a separate hydraulic-actuated braking system, an upgraded suspension system, an additional roadwheel, and ballistic protection covering the cargo area.

The internal hoisting system utilizes a three-degree freedom-of-movement beam. The MHE consists of a winching system within the vehicle, a skid ramp that connects the 5-ton ammunition vehicle and the M548 vehicle, and a pallet skid plate.

The concept is to use the MHE to off-load entire pallets of projectiles by hooking the pallet skid plate to the pallet, then by using the winching system, to drag the pallet down the skid ramp and into the M548. The concept and MHE were designed to give the Field Artillery time and personnel savings during ammunition resupply.

A report on the evaluation has been provided to the Field Artillery School.

Tests pending

A few other areas under study by the Field Artillery Board are:

• Battlefield Obscuration — The purpose of the current Battlefield Obscuration Test is to measure the amount of smoke, dirt, and dust on the battlefield due to the firing of artillery and tanks and the movement of track-laying vehicles. This debris will have a major impact on battlefield visibility.

• XM736 — An operational test of the XM736, an 8-inch binary chemical round, will be conducted in August to evaluate the transportability, ease of assembly, and accuracy of the round.

• Electronic Fuzes — The XM587 and XM724 are new electronic time fuzes which are candidate replacements for the current MTSQ fuzes. This ongoing test will determine the suitability of the fuzes and the fuze setter and their compatability with standard projectiles.

• Battery Computer System (BCS) — This compact, lightweight, portable ballistics computer is for use in the battery FDC. It is designed to interface with TACFIRE, the digital message device, and other equipment employing TACFIRE formats. This test (to be conducted in January) will provide data for evaluation of the operational effectiveness and military use of the BCS.

Testing the OFT

Forward observers have always been trained primarily through the traditional live fire exercises conducted on an artillery range. The costs involved with such training have dramatically increased over the years. Many units, primarily the Reserve Components, do not have easy access to a suitable artillery range. The Field Artillery School has long recognized the need for cost-effective training devices and simulators and prepared a formal requirement document for an Observed Fire Trainer (OFT) in September 1972.

The specifications for the OFT call for a portable device capable of being set up within 30 minutes in a standard military classroom or dayroom. It is to be economical, safe and simple in operation and maintenance, and capable of operation on 115/230 volt, 50/60 cycle electrical power, thus permitting worldwide use. The OFT is to display a full color terrain scene representing what the student observer would see from a real observation point. Realistic stationary and moving targets, such as tanks, dismounted soldiers, trucks, etc., are included as part of the terrain scene. A shell burst presentation system is designed to simulate the appearance of air and graze bursts with associated sound effects consistent with the student observer's call for fire and location; weapon type, number, and location; fuze type; and terrain features. A smoke screen capability is also required, to include the effects caused by right or left wind conditions. The system includes a tape recorder/PA system to record the student fire mission to be played back to aid in a critique.

A development contract was let in April 1975 which called for the production of four prototype OFTs for testing. The contractor has designed a computerized projection system which responds to commands as entered by an instructor-operator using the keyboard of a cathode ray tube input device.

The Field Artillery Board is currently conducting Operational Test II of the OFT to assess the effectiveness and desirability of the OFT as a supplement to, or replacement for, unit and institutional training of forward observers.

Copperhead survives lightning test

Artificially generated lightning, with peak currents of 200,000 amperes, was used to test the effect of actual lightning against the Copperhead, 155-mm laser-guided projectile. The Copperhead is the first Army weapon system to be so tested and it withstood the lightning successfully.

White Sands Missile Range electronic technicians subjected the Copperhead to both near misses and direct strikes. Test specifications required the Copperhead to withstand a near miss and remain operational and a direct strike without causing hazardous conditions. The tests demonstrated the effect of the electric and magnetic fields formed by lightning on the Copperhead's structural and electronic components.

The ability to duplicate an accurate profile of a lightning strike is a very recent development. This artificial lightning is expected to answer the Army's questions of what effect actual lightning will have on its sophisticated, electronic laden weapons.

Similar tests are expected for other weapons systems in the future.

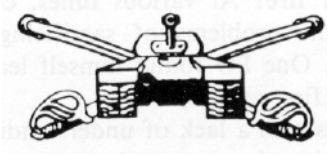
GSRS motor test fired

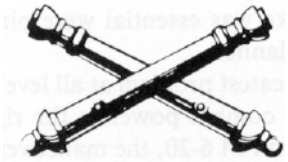
A series of development rocket motor firings to evaluate materials and concepts and to formalize the motor design for the Army's general support rocket system (GSRS) have been completed by a Boeing Aerospace Company team. Motors tested were flight weight and used low-cost case and nozzle materials. A simplified ignition/closure concept and low-cost hydroxyl terminated polybutadiene propellant were used.

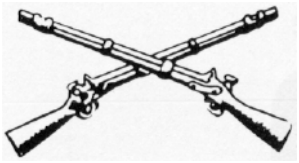
All motor firings in the test series were successful, with ballistic performance close to prediction and high-frequency pressure data confirming stable combustion. The tests, conducted at Redstone Arsenal, AL, proved the structural integrity of nozzles and other components.

The Boeing GSRS team is competing with Vought Corporation to develop the GSRS system and preparing for a missile firing competition for the production contract.

Enhancing combined arms training







by LTC Larry E. Word, CPT Donald D. Loftis, and CPT John T. McQuitty

Tactical engagement simulation, called REALTRAIN (realistic training), is one of the most effective unit training systems in the Army today. REALTRAIN is a two-sided, free-play, platoon-level tactical engagement simulation using numbered panels, telescopes, weapons effects signature simulators, a unique controller system, and an after-action review based on behaviorial science principles. In REALTRAIN, fire support team forward observers move with maneuver units, conduct fire planning, acquire targets, and adjust fire as in a combat environment. Fire markers moving throughout the exercise area are used to simulate air and ground bursts and smoke missions. (A full discussion of REALTRAIN is contained in TC 71-5). An initial evaluation of REALTRAIN effectiveness in Europe showed that units trained with REALTRAIN were as much as 400 percent more effective in the employment of field artillery than units using conventional training techniques.

During the period 30 January through 31 March 1978, the Training and Doctrine Command and the Army Research Institute conducted extensive field tests with the 4th Infantry Division (Mech) at Fort Carson, CO, to validate the effectiveness of REALTRAIN and to refine procedures for the integration of tactical engagement simulation into the Army Training and Evaluation Program (ARTEP). The problems of employing indirect fire by the REALTRAIN participants at Fort Carson are fairly typical of units working together for the first time. As the training progressed, the units worked together to overcome their problems and to maximize the capabilities of their people and their weapons. The indirect fire people and the maneuver people learned the value of close cooperation and the resulting multiplication of combat power.

It should be noted that none of the key personnel (e.g., company commanders, platoon leaders, and FOs) had any previous experience working in a simulation environment where weapons effects were objectively determined and where *all* personnel were vulnerable to enemy weapons. Previous indirect fire training for these individuals consisted of leaders telling controllers, "I would have employed artillery . . . ." in certain locations and receiving automatic credit for casualty and damage effects.

As might be expected, the initial effectiveness of indirect fire during this training was minimal. For the first two days, no casualties attributable to artillery were sustained by either force. Initial plans for use of indirect fire consisted of concentrations on the objective and other randomly selected plots. There was little coordination between the commander and his FO during this planning.

In the operational phase, no appreciation was shown by commanders for the difficulty of deciding where to place the FO to maximize his effectiveness. Should he stay close to the command group to optimize control, or is he better used at a vantage point to facilitate adjustment

of fire? At various times, commanders experienced the problems of sacrificing one of these capabilities. One FO found himself leading an attack and was the first casualty.

There was also a lack of understanding of the FO's need to monitor the command net to acquire intelligence information quickly and continuously and to keep abreast of the friendly maneuver elements' locations and status.

REALTRAIN reinforces the essentiality of integrating fire with maneuver plans for success on the battlefield. (Photo by SP4 Ed Zabel)

During the early exercises, the FO was on his own which resulted in his operating independently of the scheme of maneuver. On at least three occasions, friendly elements were hit by their own indirect fire. Smoke missions were not planned or adjusted in advance, resulting in the delay of maneuver elements' movement. This frequently caused bunching of tanks and APCs in dangerous locations which resulted in unnecessary casualties. Poor coordination between forward maneuver elements and the FO resulted in inaccurate and wasted missions and lengthy delays in getting the rounds on target. For example, tankers tended to give adjustments by cardinal direction because of the difficulty in determining accurate observer-target azimuths from inside a tank. The need for explicit SOPs to handle indirect fire within the team became readily apparent. All leaders and FOs experienced difficulty adjusting missions on the move for targets which they could not directly observe.

As the training progressed, use of indirect fire became a central topic in the after-action critiques. Two primary missions for indirect fire dominated fire planning and execution.

- Known and suspected antitank weapon positions were suppressed before movement.
- Areas where smoke was essential were pinpointed and execution details planned.

The commander's greatest problem at all levels is how to exploit all available combat power at the right time and place. As stressed in FM 6-20, the maneuver leaders and fire support people must examine the fire support influence and its contribution to the battle plan *concurrently* with maneuver considerations. This mutual planning increases the commander's chances of using all fires effectively. A commander may find in some cases that fire support considerations drive the scheme of maneuver. There may be insufficient maneuver assets to make his plan work, or fire support may be able to accomplish a portion of the mission without committing large numbers of troops. As the units in the Fort Carson tests discovered, this detailed pre-mission coordination was the key to success.

The positioning of the FO on a given day was based on the mission and terrain. In the attack, the FO typically located himself on a vantage point initially to observe and to adjust suppression and smoke targets. During this phase, the FO would often dismount, leaving his vehicle in defilade. The FO would use his AN/PRC-77 radio to adjust fire while the recon sergeant monitored the command net and relayed critical information. All FOs managed to acquire extra radios to insure that they never lost their two-net capability. In many cases, because of his vantage point and ability to communicate, the FO relayed critical command and control information between maneuver elements. As contact became imminent, the FO would follow behind lead maneuver elements where initial engagements were expected, moving to high ground whenever possible. Close coordination with lead platoon leaders insured that he was operating from areas that had been cleared previously. Frequently, missions during contact were adjusted by the forward maneuver elements through the FO. During contact, the company commander became active in sorting out the priority of targets.

Units also learned to counter the potential effects of enemy indirect fire. Tankers carried spare antennas inside their vehicles to be able to resume communications when rounds were judged close enough (50 meters) to have damaged the original antennas. Drivers learned to idle tanks at greater than 1,200 RPM to reduce exhaust smoke from quick acceleration. Excessive

vehicle speed was reduced to eliminate dust signatures. Antitank weapon crews began to select positions away from prominent terrain features where indirect suppression missions were likely to fall. These techniques quickly became unit SOP. This is by no means an exhaustive list of good fire support employment techniques. It was obvious to all that only a totally integrated combined arms force could win. Extra time was used in the after-action review to discuss how indirect fire support could facilitate direct fire and maneuver. Some ways noted were:

- Suppressing enemy direct and indirect fires.
- Obscuring the enemy's vision of direct fire gunners and observers.
- Slowing enemy momentum to increase direct fire engagement time.
- Screening and isolating objectives.
- Attacking reinforcements.
- Covering feints.
- Covering retrograde and lateral moves.
- Sealing off enemy counterattacks.
- Enhancing economy of force actions.

What emerged from this experience were fire plans which supported the planned maneuver and operating procedures that were responsive to sudden changes forced by the enemy. The exercise conducted on the last day of testing provides a good example of how quickly units can begin to use this important weapons system effectively. The attacking team requested and received permission to use intensive preparatory fires prior to crossing the line of departure. Their initial missions caused no casualties, but both defending antitank weapons and one tank were forced to move to alternate and less advantageous positions. This displacement denied the defender long range antitank missile shots during the initial phase of the attack. The defender pinpointed the location of the attack and, because that location had been identified as the most likely route of advance, indirect fire had been previously registered there and the FO had positioned himself to observe that area. He shifted from a known concentration and fired for effect, disabling two vehicles in the column. Using corrections from friendly infantry in the area, the FO executed another fire for effect which killed the tank platoon leader and disabled two more vehicles. The delay caused from these casualties allowed the defending infantry to maneuver to knock out additional attacking vehicles. However, tank commanders in the stalled column brought their own indirect fire to bear on the opposing infantry to permit the attacking elements continued movement. The final analysis showed that 40 percent of the attacking force was eliminated by indirect fire.

These observations only reinforce other indirect fire data collected in REALTRAIN exercises throughout the Army. The mechanics of fire adjustment and delivery are our initial training goals; however, proficiency in these areas alone will not place effective fire on the enemy. The team coordination skills mentioned in this article must also be developed and refined to insure that indirect fire fully supports the commander's scheme of maneuver. This level of sophistication in unit tactical performance can only be achieved through repeated exposure to tactical engagement simulation training.

LTC Larry E. Word and CPT Donald D. Loftis were the TRADOC Project Officers for the REALTRAIN exercise at Fort Carson, CO. CPT John T. McQuitty is assigned to the Directorate of Training Developments, USAFAS.

Commanders Update

BG Richard D. Boyle
56th Field Artillery Brigade

COL John W. Symons
1st Infantry Division Artillery

LTC Thomas P. Easum
3d Battalion, 3d Field Artillery

LTC Michael R. Millett
2d Battalion, 4th Field Artillery

LTC Paul T. Weyrauch
1st Battalion, 5th Field Artillery

LTC Edward R. Maddox Jr.
1st Battalion, 6th Field Artillery

LTC Winton Spiller Jr.
3d Battalion, 6th Field Artillery

LTC Ronald D. Cox
1st Battalion, 17th Field Artillery

LTC David W. Hazen
2d Battalion, 17th Field Artillery

LTC James F. Lynch
2d Battalion, 18th Field Artillery

LTC Carl S. Taylor
2d Battalion, 19th Field Artillery

LTC Joseph D. Newsome
2d Battalion, 21st Field Artillery

LTC James B. Fairchild
1st Battalion, 31st Field Artillery

LTC Earnest E. Love
6th Battalion, 33d Field Artillery

LTC Walter R. Willms
1st Battalion, 37th Field Artillery

LTC John A. Lefebvre
1st Battalion, 80th Field Artillery

LTC John R. O'Donnell
1st Battalion, 92d Field Artillery

LTC Jerry M. Sollinger
1st Battalion, 321st Field Artillery

COUNTER with TAC FIRE

by CPT Jimmie H. Henson

Since the first crude catapults hurled stone projectiles outside besieged castles, the problem of suppressing enemy heavy weapons fire has concerned many military commanders. In early wars, the commander would merely adjust his own artillery, if he had any, onto the enemy artillery, because both were within easy sight of each other. These tactics continued generally until WW I, when the common slogan of the era, "A battery seen is a battery lost," took on real meaning.

As the artillery began to fire from woods and behind hills, a method of locating the target (enemy artillery) was needed. The first new method tried was observation from balloons and aerial photography, but both were minimally effective and then only during good weather. Toward the end of WW I, the Allies organized the first true counterfire effort, flash ranging, closely followed by a crude system for sound ranging. Counterfire became so effective that the German Chief of Staff credited the Allies counterfire operations with destroying 13 percent of all the German cannons on the Western Front during the month of March, 1918.

During WW II, sound and flash ranging was improved and experimentation began on a mortar locating radar. Countermortar radar was not perfrected until after the Korean War and counterbattery radar became effective only during the Vietnam War. However, the largest step forward for counterfire was made in late 1956, when a Department of the Army committee was established to consider the feasibility of using the (then new) second generation of automatic data processing equipment. The DA decision led the 1st Cavalry Division Artillery to TACFIRE 21 years later. This is a report of the 1st Cav experience with TACFIRE in Operational Test III.

Counterfire with TACFIRE is many times more responsive than the manual method. No longer does target production require reams of manual files (figure 1) and time-consuming accuracy updates.

It is not unrealistic for the target production element to process 250 to 300 target indicators in one hour, easily developing 50 percent of them into meaningful targets that can be immediately fired upon. The 1st Cavalry Division Artillery Counterfire Information Center (CFIC) competently managed these work loads during training exercises in preparation for the TACFIRE Operational Test III.

Old method	TACFIRE
	A
Analysis of indicators	U
Analysis of rays	T
Analysis of report age and validity	O
Manual bookkeeping	M
Ray overlay	A
Targeting map	T
Reports	I
	C

Figure 1. Counterfire changes with TACFIRE.

The counterfire officer has at his finger tips through the TACFIRE artillery target intelligence (ATI) function, complete information on up to 1,364 targets or target indicators.

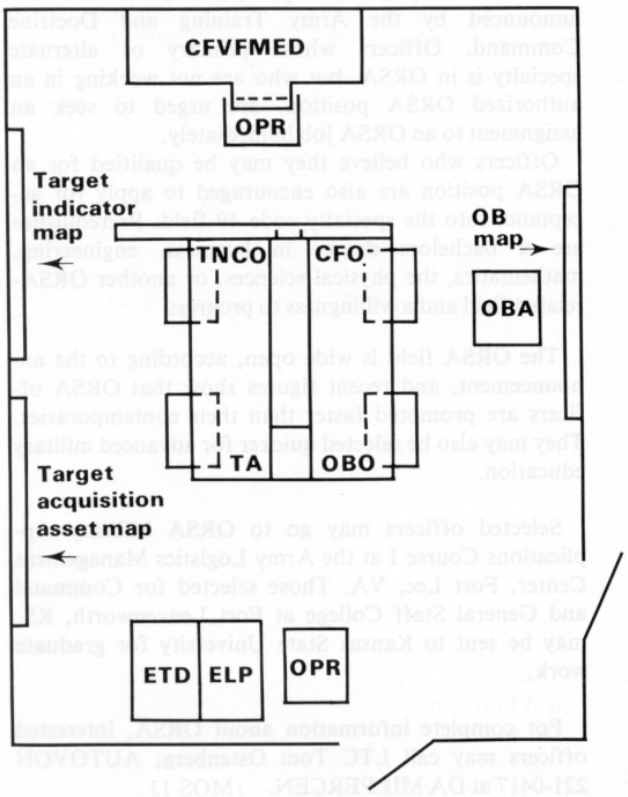
The ATI function is a file that includes information on whether the target was fired or not, any subsequent updates, plus all the information that was originally input to establish the file. These targets or indicators can be retrieved by type, "age", location accuracy, engagement status, zone, geographic area, validity, and degree of protection of the personnel.

Countermortar targets acquired by countermortar radar are input directly to the direct support artillery battalion computer as are forward observer (FO) and fire support officer (FSO) targets. Sound/flash reports, counterbattery radars, and moving target locating radars input targets to the division artillery computer. Regardless of where targets are input, they are stored in the ATI files of the division artillery computer.

A printed copy of all target intelligence data is displayed in the CFIC (figure 2) on the electronic line printer. In the 1st Cavalry Div Arty all target information of a counterfire nature is passed to the target acquisition processing section, which occupies the left side of the CFIC van. If the indicator meets the criteria as a target, it is passed to the counterfire Variable Format Message Entry Device (VFMED) operator who initiates a fire mission. Automatic fire mission recommendations can be generated in the ATI modification file. The TACFIRE computer will generate a fire mission recommendation for targets that meet preselected criteria such as report accuracy. In the 1st Cav Div Arty, if an indicator does not meet the target criteria, it is plotted on the target indicators chart. In either case, when this action is taken, it is passed to the

order (OB) section for integration into overall order of battle. Targets of a non-counterfire nature go directly to the OB section for processing. Data concerning fire unit (battery) locations, situation reports, and ammo updates are also received on the printer in the CFIC and are passed to the officer on duty in the operations van, which is placed back-to-back with the CFIC van.

The Electronic Tactical Display (ETD) provides an electronic graphical display for almost instantaneous composition of different tactical displays on a 16-inch cathode-ray tube. Basically, the ETD can be used to display any information of a graphic nature in the computer's memory. It can be oriented to expand any area of the geometry being displayed. It can also be used to edit target data and display fire unit locations. The greatest feature of the ETD is the ability it gives the counterfire officer (CFO) to display an entire fire plan in a matter of minutes. To avoid the ETD display scope becoming cluttered, an assets map (overlay), showing position and coverage fans of all radars and sound flash bases, is maintained by the target acquisition processing section of the 1st Cav Div Arty.



Legend:

CFO – Counterfire officer
CFVFMED – Counterfire Variable Format Message Entry Device
ELP – Electronic Line Printer
ETD – Electronic Tactical Display
OBA – Order of battle analyst
OBO – Order of battle officer
OPR – Equipment operator
TA – Target analyst
TNCO – Target NCO

Figure 2. Counterfire Information Center.

Nonnuclear fire planning (NNFP) is another function that saves the CFO hours of "stubby pencil" drill. Accessing the computer with the VFMED, the CFO can build a complete fire plan and transmit it to a firing battalion in 5 to 10 minutes. The NNFP program can take 32 separate fire plans, and each plan can have up to 30 fire units, 150 targets, and near unlimited geometry.

With the near immediate access time to the ATI files, the target production effort is not bogged down by manual processing. The division G2 is accessible via a sole user, secure very high frequency "shot." The division fire support element, all FOs, and FSOs, are also immediately available through the computer. The CFIC, with its speed of processing, increased accuracy, and volume of information can easily fire the controlled supply rate of the general support units. To prevent this overfiring, six degrees of counterfire status were developed by the 1st Cav Div Arty, ranging from totally permissive (*all* counterfire targets fired) to totally restrictive (none fired). Additionally, the TACFIRE computer assigns a numerical value to each reported target, based on the ability of the target acquisition agency to accurately locate the target. These criteria are used by the division artillery commander to most effectively use counterfire assets.

For the first time in our history, the counterfire officer has, at his beck and call, a method to accurately control his target acquisition assets and rapidly process indicators into meaningful targets that can be immediately fired upon. His manual bookkeeping is replaced by computer memory, and his dependence on time-consuming processing of indicators is replaced by the speed of computer circuits. TACFIRE has not eliminated the decision process, but it adds more information at much greater speed and accuracy so that the human decision can be sound and timely.

When the article was written, CPT Jimmie H. Henson was the TACFIRE Counterfire Officer, 1st Cavalry Division Artillery. He is currently serving as Headquarters Battery Commander, 3d Armored Division Artillery.

Army promotion list selections

The Secretary of the Army has approved the 1978 field grade promotion plan for temporary Army promotion list selections. Zones of consideration are established for:

- Colonel primary zone — 31 July 1972 and earlier; secondary zone — 1 August 1972 through 30 September 1975.
- Lieutenant Colonel primary zone — 28 February 1971 and earlier; secondary zone — 1 March 1971 through 30 June 1975.
- Major primary zone — 30 September 1970 and earlier; secondary zone — 1 October 1970 through 30 June 1974.

Primary zone selection rates will be commensurate with those experienced in 1977. Secondary zone rates, as in 1977, are 0 to 10 percent for major and 0 to 15 percent for lieutenant colonel and colonel.

Following are selection statistics for temporary promotions by the 1977 boards.

Temporary promotion selection rates

	First time considered	*Previously considered*
COL	44.4%	6.6%
LTC	67.1%	13.8%
MAJ	76.3%	20.2%

As a result of concern about the number of considerations officers have been receiving in the secondary zone, action is being taken to reduce the number of secondary zone considerations to no more than two for each grade. This goal will be met in 1978 for promotion to major and lieutenant colonel. However, the goal will not be met for consideration to the grade of colonel until the board meets in 1981.

In addition to minimum specialty quotas given to the colonel promotion selection board, shortage specialty information will be provided to the lieutenant colonel board. However, for boards considering officers for promotion to lieutenant colonel, lists of numerical shortages by specialty will be provided for consideration only.

ORSA officers wanted

A critical need for officers to work in the Operations Research and Systems Analysis (ORSA) field has been announced by the Army Training and Doctrine Command. Officers whose primary or alternate specialty is in ORSA, but who are not working in an authorized ORSA position, are urged to seek an assignment to an ORSA job immediately.

Officers who believe they may be qualified for an ORSA position are also encouraged to apply for acceptance into the specialty code 49 field. Prerequisites are a bachelors degree in business, engineering, mathematics, the physical sciences, or another ORSA-related field and a willingness to progress.

The ORSA field is wide open, according to the announcement, and recent figures show that ORSA officers are promoted faster than their contemporaries. They may also be selected quicker for advanced military education.

Selected officers may go to ORSA Military Applications Course I at the Army Logistics Management Center, Fort Lee, VA. Those selected for Command and General Staff College at Fort Leavenworth, KS, may be sent to Kansas State University for graduate work.

For complete information about ORSA, interested officers may call LTC Tom Ostenberg, AUTOVON 221-0417 at DA MILPERCEN.

We need 13Foxes

MOS 13F (Fire Support Specialist) was established in C9, AR 611-201, and became effective 1 March 1978. Shortages now exist in grades E5, E6, and E7. Soldiers interested in reclassification to MOS 13F should submit their request through channels to Commander, MILPERCEN, ATTN: DAPC-EPK-A. You can get full details from your MILPO.

Mrs. Bessie H. Wright. (Photo by SP5 Dale Manion)

FA officers check with Mrs. Wright

For more than 22 years Mrs. Bessie H. Wright has played an important role in the careers of thousands of Field Artillery officers. For most, she is "the contact" at the Department of the Army's Officer Personnel Management Directorate, Field Artillery Branch.

In her job as civilian supervisor in the FA Branch, Mrs. Wright deals daily with hundreds of officers calling with problems and questions. Since she started as a file clerk with the old Office of Personnel Operations at the Pentagon, the personnel management system has moved from the typewriter to the computer. Mrs. Wright however derives her job satisfaction from her affection for people.

In addition to her job, Mrs. Wright is den mother to a 27-member cub scout pack for which she has been awarded the President's Cup and the Boy Scouts of America Award of Merit in 1976. She also serves as Matron of Esther Chapter 3, Order of the Eastern Star, presiding over a 33-member Masonic organization. In her church she is president of the 38-member choir and a member of the education committee.

Mrs. Wright recently won the Most Outstanding Citizen Award presented by the Hoffman Company which owns the buildings that house MILPERCEN. The criteria for selection is dedication and loyalty to job and country. She plans to use some of the $2,500 cash prize that came with the award for the church scouting program and the underprivileged boys in her den.

After 28 years of government service and 16 years of scouting work, Mrs. Wright has no plans for retirement and says, "As good as I feel I don't give it much thought." (SSG Rick Martin)

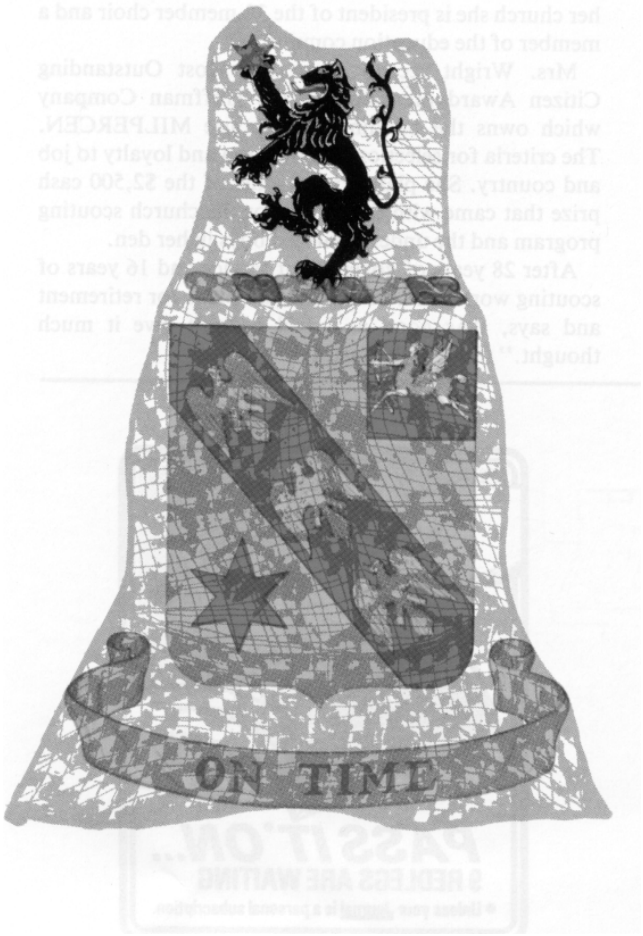
Off-duty schooling recorded

A recent change to AR 623-1 authorizes, on an optional basis, the submission of Academic Evaluation Reports (AERs) on officers who complete undergraduate or graduate degrees during *off-duty* study. Previously, only officers who completed degrees during full-time attendance at an educational institution were authorized to receive academic reports (DA Form 1059-1).

Section II of the academic report must be completed by an appropriate college official. Section III should be completed by the post or installation Education Services officer. An official *final* transcript showing the awarding of the degree must be forwarded with the academic report through official OER/AER channels as described in the regulation.

Lightweight **Screening Systems**

by LT Albert Malich



When the 25th Infantry Division received lightweight screening systems in May 1977, Division Artillery was faced with the question of how to use these systems to get the best possible camouflage for their howitzer sections.

Sufficient screening was available for two possible camouflage configurations for the 105-mm towed M102 howitzer and its M35A2 2½-ton truck prime mover. The howitzer and prime mover could be camouflaged separately (figure 1) or together (figure 2) with the four panels issued each howitzer section.

Camouflaging the howitzer and prime mover separately allows the chief of section to position the prime mover in the best location and also permits a 6400-mil capability for the howitzer. However, this configuration requires that the section personnel be split up, creating a supervisory problem. This option also slows down the occupation time and the time required to provide fire.

Camouflaging the howitzer and prime mover together provides speed, efficiency, and flexibility. A well-trained crew can emplace a howitzer (with prime mover), erect the nets, and be ready to fire in less than 15 minutes. Similarly, the crew can displace the weapon in less than 10 minutes.

Both configurations require the same number of screens and both require a quick release at the front of the net for elevation and firing.

The single configuration requires a quick release at the rear which permits the prime mover with howitzer to be driven out. A quick release across the center allows the net to be split in half should the terrain or tactical situation dictate a separation of the howitzer and prime mover.

The single entity configuration is far more efficient because the time required for erection is one-half that of the separate configuration; the number of screen supports required is approximately half; fewer personnel are required to erect the nets; and the section personnel remain in one location. Section maintenance is enhanced when section integrity is maintained because supervisory responsibility is centralized. Also a minimum amount of equipment is needed on the ground since the prime mover is close to the howitzer, and ammunition storage is simplified because most of it can be stored (in the fibers) on the bed of the prime mover (figure 3). The single entity system can be rolled up and transported atop the canvas of the prime mover (which has its canvas at half-mast) with the support frames

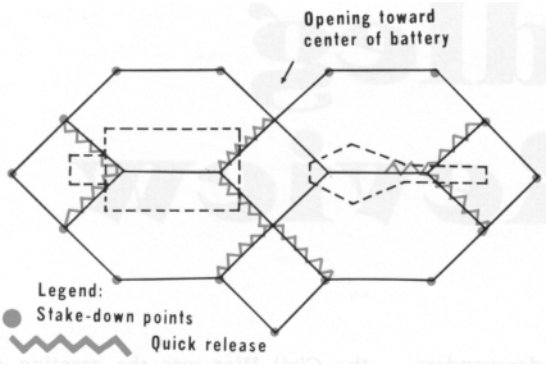


Figure 1. Howitzer and prime mover camouflaged separately.

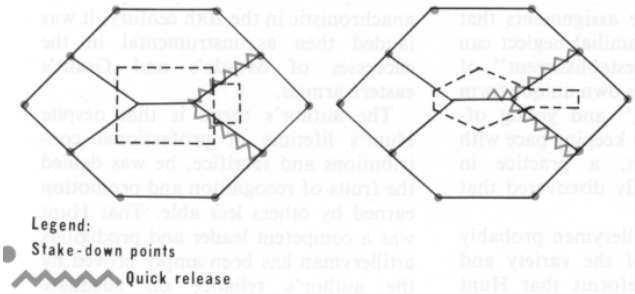


Figure 2. Howitzer and prime mover camouflaged together.

preassembled and carried underneath the troop seats of the truck.

The single configuration also has disadvantages. If the howitzer position is hit by counterbattery fire, damage could occur to both the weapon and the prime mover. This option also presents a much larger profile than the separate system. However, because of the large profile, determination of what is under the net is more difficult. The howitzer does not have a pure 6400-mil capability without displacing the prime mover. This is not crucial when treeline positions are used.

The single entity system works well in Hawaii's terrain and climate; however, on a recent winter exercise in Korea, the screens collected moisture and froze, becoming heavy and unmanageable.

Based on experience, the functional capability, speed, and efficiency of the single entity far outweigh any disadvantages or limitations, and it is presently the "Tropic Thunder's" answer to getting the best camouflage available!

LT Albert Malich is assigned to the 2d Battalion, 11th Field Artillery, Schofield Barracks, HI.

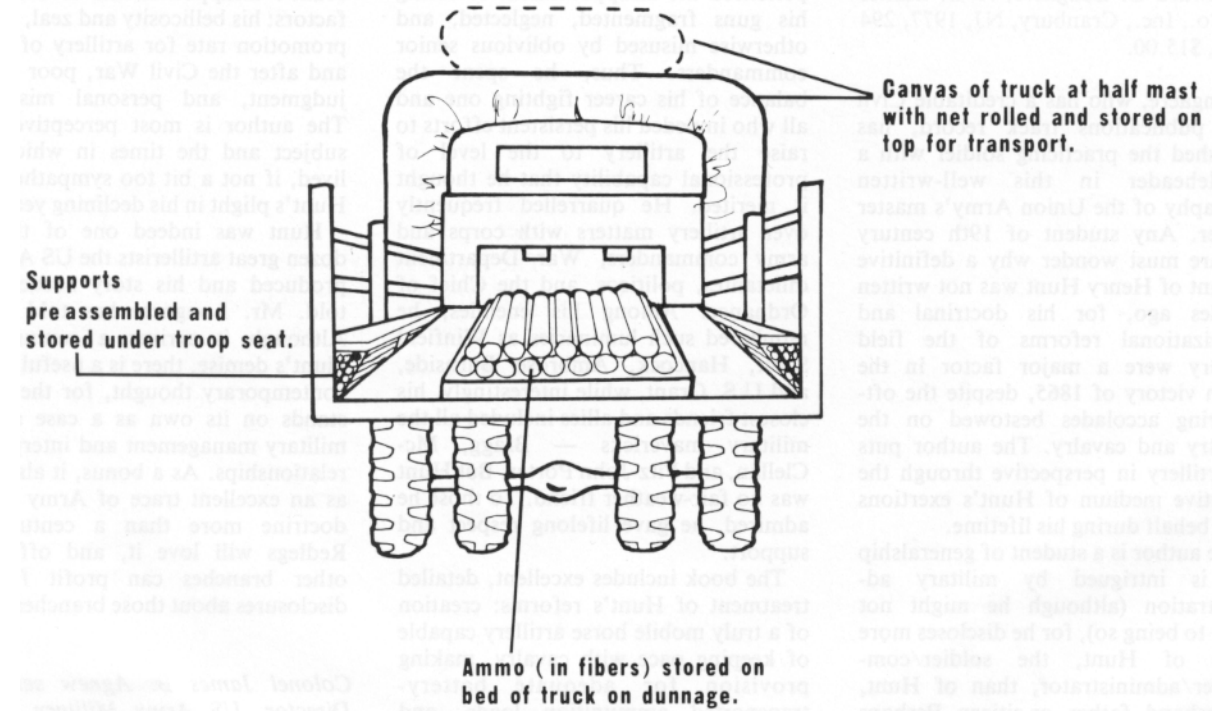
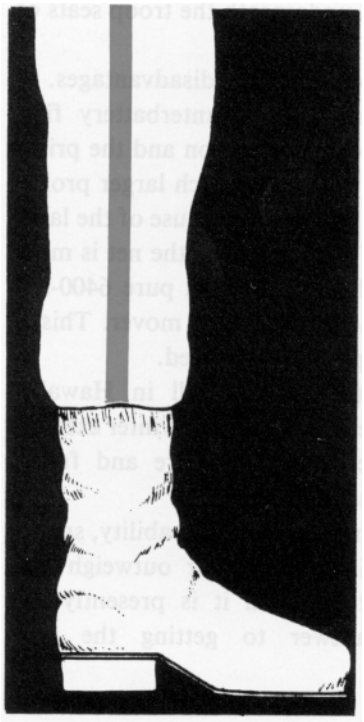


Figure 3. Storage of ammo and screening system for transport.



Redleg Review

THE MAN BEHIND THE GUNS: A BIOGRAPHY OF GENERAL HENRY J. HUNT, COMMANDER OF ARTILLERY, ARMY OF THE POTOMAC, by Edward G. Longacre, A. S. Barnes and Co., Inc., Cranbury, NJ, 1977, 294 pages, $15.00.

Longacre, who has a creditable Civil War publications track record, has furnished the practicing soldier with a doubleheader in this well-written biography of the Union Army's master gunner. Any student of 19th century warfare must wonder why a definitive account of Henry Hunt was not written decades ago, for his doctrinal and organizational reforms of the field artillery were a major factor in the Union victory of 1865, despite the oft-recurring accolades bestowed on the infantry and cavalry. The author puts the artillery in perspective through the definitive medium of Hunt's exertions on its behalf during his lifetime.

The author is a student of generalship and is intrigued by military administration (although he might not admit to being so), for he discloses more facets of Hunt, the soldier/commander/administrator, than of Hunt, the husband, father, or citizen. Perhaps definitive personal information is not reasonably available to document the latter categories, but the reader wonders whether the stern visage characteristic of the subject would drop away in the dining room or bedchamber. In Longacre's defense, the soldier Hunt was so seldom at home because of a melange of disparate assignments that what appears as a familial neglect can be forgiven. The "establishment" of Hunt's period bred its own unique form of "ticket-punching," and young officers were quite busy keeping pace with their contemporaries, a practice in which Hunt unhappily discovered that he did not excel.

Contemporary artillerymen probably are not cognizant of the variety and magnitude of the reforms that Hunt championed during a career that spanned 44 years and two major wars. In Mexico, as a junior officer, he experienced the disappointment of seeing his guns fragmented, neglected, and otherwise misused by oblivious senior commanders. Thus, he spent the balance of his career fighting one and all who impeded his persistent efforts to raise the artillery to the level of professional capability that he thought it merited. He quarrelled frequently over artillery matters with corps and army commanders, War Department dilletantes, politicos, and the Chief of Ordnance. Among his enemies, he numbered such luminaries as Winfield Scott, Hancock, Ambrose Burnside, and U.S. Grant, while interestingly, his closest friends and allies included all the military mavericks — Bragg, McClellan, and Fitz-John Porter. But Hunt was no fair-weather friend. To those he admired, he gave lifelong respect and support.

The book includes excellent, detailed treatment of Hunt's reforms: creation of a truly mobile horse artillery capable of keeping pace with cavalry, making provision for adequate battery-transported ammunition loads, and establishment of corps reserve ammunition trains. His greatest coup of the Civil War was the creation of a central artillery reserve in the Army of the Potomac, whereby the Army Commander could directly influence the artillery action. While maintenance of artillery in reserve subsequently became anachronistic in the 20th century, it was lauded then as instrumental in the successes of Meade's and Grant's eastern armies.

The author's thesis is that despite Hunt's lifetime of professional contributions and sacrifice, he was denied the fruits of recognition and promotion earned by others less able. That Hunt was a competent leader and prodigious artilleryman has been amply proved by the author's reliance on adequate historical evidence to include a body of Hunt's own correspondence. Mr. Longacre properly attributes General Hunt's disappointments to the correct factors: his bellicosity and zeal, the slow promotion rate for artillery officers in and after the Civil War, poor political judgment, and personal misfortune. The author is most perceptive of his subject and the times in which Hunt lived, if not a bit too sympathetic with Hunt's plight in his declining years.

Hunt was indeed one of the half-dozen great artillerists the US Army has produced and his story needed to be told. Mr. Longacre has told it well. Although it arrives a century after Hunt's demise, there is a useful body of contemporary thought, for the volume stands on its own as a case study in military management and interpersonal relationships. As a bonus, it also serves as an excellent trace of Army artillery doctrine more than a century ago. Redlegs will love it, and officers of other branches can profit from its disclosures about those branches.

Colonel James B. Agnew served as Director, US Army Military History Institute before his retirement. He now resides in Falls Church, VA.

WEBSTER'S AMERICAN MILITARY BIOGRAPHIES, G. & C. Merriam Company, Springfield, MA, 1978, 548 pages, $12.95.

The Merriam Company has produced an extremely valuable reference work for military historians. This volume contains concise biographies of more than 1,000 people important to our military history which spans more than 300 years beginning with the Pequot War at Mystic, Connecticut, in 1636 and ending with the Vietnam War.

The key figures include not only the expected uniformed leaders but also the important civilians such as Defense Secretary McNamara, missile scientist Wernher von Braun, cartoonist Bill Mauldin, Ernie Pyle, and others.

Biographies range from Eisenhower's at approximately 1,500 words to the average of 300 words, written in narrative style rather than a simple recitation of dates and places.

Aiding the researcher are addenda which include lists of service secretaries and service chiefs chronologically as well as a list of major battles annotated with the names of key commanders that influenced each battle. Each commander listed can be located in the alphabetically-arranged main section of the book.—Ed.

THE SOVIET WAR MACHINE, (revised edition), edited by Ray Bonds, Salamander Books Ltd., United Kingdom, 1977, 247 pages, $12.95.

Introduced by a brief history of the USSR, the early chapters deal with the evolution of the Soviet Armed Forces from the Red Guard of the Bolshevik Revolution to the present. This is not an attempt at in-depth study, but a good general background is provided. Especially interesting is the discussion of the military/political infrastructure in layman's terms, complete with diagrams. Strategic imperatives of the Soviet Union are discussed as a lead-in to the various branches of the military.

Each military arm is introduced by a short analysis of its current doctrine and developmental trends followed by an item-by-item description and illustrations of its combat equipment. Sufficient vital statistics are provided to fully describe the weapon without becoming laborious.

Characterized by a myriad of color illustrations, photographs, and technical line drawings on quality stock, this book maintains a uniqueness, distinguishing it from the garden variety of war materiel encyclopedias. The distinguished panel of authors, primarily British military, at times tend to lose their objectivity when discussing the Soviet menance. However, this does not measurably detract from the volume's value.

The *Soviet War Machine* makes a welcome addition to the professional soldier's library, not only as reference material, but also as interesting and informative reading.

CPT Tom Barnum, a recent graduate of the FA Officer Advanced Course, is now attending Texas Tech University Graduate School.

ARMOURED FIGHTING VEHICLES OF THE WORLD, by Christopher F. Foss, Charles Scribner's Sons, New York, 1978, 192 pages, $7.95.

Connoisseurs of tanks, reconnaissance vehicles, armored personnel carriers, infantry combat vehicles, self-propelled guns (including antiaircraft missile systems), and armored load carriers, will find this revised third edition a must for reference purposes and a valuable addition to the publisher's series on military hardware.

There are 230 photographs, some in color, of armored fighting vehicles from 27 nations, listed in alphabetical order from Austria to Yugoslavia. The development history of each vehicle is provided along with variants in design, weaponry, and capability. Nations employing each vehicle are noted.

Data on each vehicle include the crew size, vehicle measurements, armament, speed, range, fuel, engine, ammunition, and fording, trench, and gradient capabilities.

The book discusses new Soviet self-propelled artillery and emphasizes the need for NATO standardization in weapons and armor. Most of the photographs have not been previously published according to the author.

For the military buff or for researchers and writers in need of an accurate reference on the numerous armored fighting vehicles in existence today, this work is cheap at the price.—Asst. Ed.

LONELY VIGIL: COAST-WATCHERS OF THE SOLOMONS, by Walter Lord, The Viking Press, New York, 1977, 262 pages, $12.50.

Walter Lord has written a long-overdue tribute to a group of unique individuals whose courage and ingenuity gave the allied cause immeasurable help during the dark days of 1942-43. In this superbly written account, the reader is transported deep behind enemy lines in the Solomon Islands for a very different look at war in the South Pacific.

The mission of the Australian Coastwatchers was to provide intelligence by reporting on Japanese land, sea, and air movements. Jack Read on Bougainville, with his "40 bombers heading yours," gave the beleagured pilots and Marines at Guadalcanal's Henderson Field that ever so critical two-hours warning. Admiral Tanaka's "Tokyo Express" was observed and reported by a number of other Coastwatchers stationed along that stretch of disputed sea between the islands which came to be known as "The Slot."

The Coastwatchers were more than just spectators watching the war from the best seats in the theater. They aided in the rescue of downed pilots, evacuated missionaries and nuns, and picked up survivors of sinking ships, including LT John F. Kennedy and the crew of PT109. Some, like Donald Kennedy and the Marist priest Father Emery de Klerk, actually carried on their own war against the Japanese.

At the side of the Coastwatchers through all of this were the natives of the Solomons. It is their story too, for they served as guides and scouts, transported radios and wounded, provided canoes, and joined in the fight against the enemy.

Lonely Vigil is the first full account of the Coastwatchers as a group. It is a valuable contribution to the story of World War II.

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