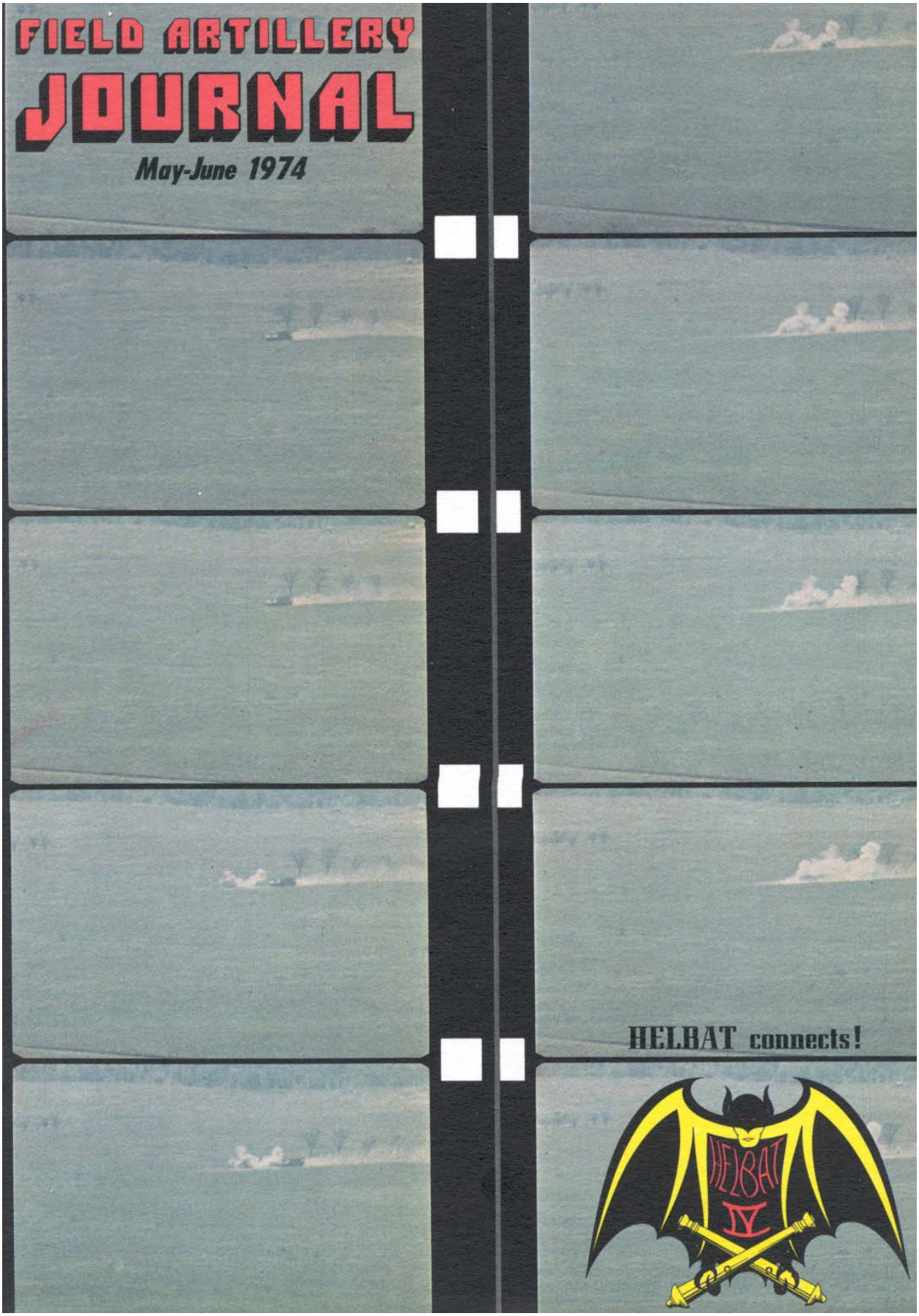
FIELD ARTILLERY JOURNAL

May-June 1974



FIELD ARTILLERY JOURNAL

Volume 42 **May-June 1974** **Number 3**

The **Field Artillery Journal** is published bimonthly at the US Army Field Artillery School for the same purpose stated in the first **Field Artillery Journal** in 1910:

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

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

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Requests for subscriptions should be mailed to Bookstore, US Army Field Artillery School, Fort Sill, OK 73503.

All letters and articles should be addressed to Editor, **Field Artillery Journal,** PO Box 3131, Fort Sill, OK 73503.

Shown on the front cover is a 16-mm film sequence shot during the HELBAT IV exercise at Fort Sill. The impacting round is an inert 105-mm shell with a spotting charge. A painting by J. B. Dunn depicting a Redleg circa 1888 is shown on the back cover. The painting was presented to the Fort Sill Museum by Mr. Dunn.

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a word from the editor

Those of you who have been following our masthead will notice a new entry this month. Ms. Jacqueline Snyder, our new managing editor, joined our staff in April just in time to help out with this issue. Jacqueline came to the *Journal* from the Post Information Office at Fort Knox. On behalf of the *Journal* staff and Redlegs everywhere—Welcome aboard, Jacqueline.

You will note in this issue that we again have included a subscription blank. As we have indicated in the past, we are limited in our free distribution to units. We would hope that the free copies are being distributed down to battery level for the perusal of junior officers and NCO's. Therefore, we are targeting our subscription campaign to field grade officers and senior NCO's—those who can best afford it. Everyone's assistance is requested in seeing to it that the free copies stay in circulation within the unit and are not limited to only a few.

We believe you'll find some very interesting reading in this month's issue. MAJ Jean Reed provided the material for our cover story, the HELBAT IV tests conducted here at Fort Sill. As you will see, some very exciting things have been done in these experiments. Two of our authors have taken close looks at our current field artillery organization and come up with rather interesting conclusions. LTC Keith Painter documented the case for the field artillery brigadier, and MAJ Bob Klein has proposed the formation of a field artillery division. COL William Shea, FA Branch Chief, has contributed an article supporting revisions to the current ATT/ORTT to include testing of the battalion commander.

MAJ Bob Edwards, Gunnery Department, after thorough research has written an excellent article, "The Greatest Gun." We have reason to believe that many of the photos of "Dora" have never before been published in this country.

SP5 Alan Jacobson of the 56th Artillery Brigade has provided another first for the *Journal*, the first article to be published from the enlisted side. We are always on the lookout for articles by NCO's and other enlisted men.

The German and British Liaison Officers assigned to the School have also provided articles for this issue. LTC Gerhard Dobbert has given us an excellent description of the German artillery of today, while LTC R. D. Upton has furnished the information on the new British towed 105-mm light gun.

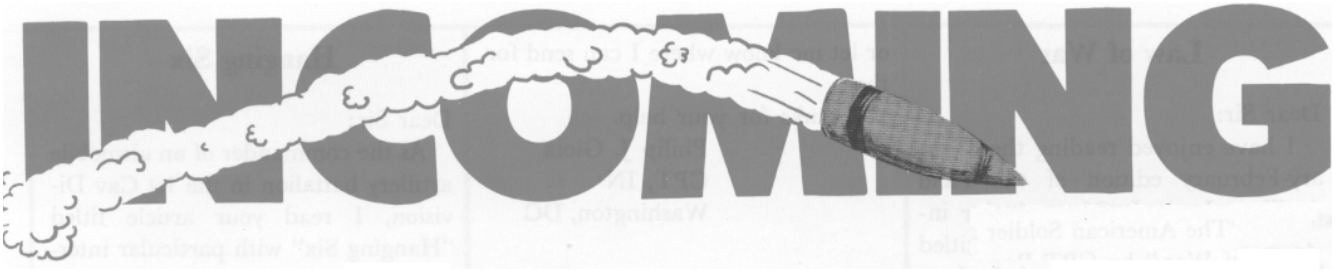
For the information of commanders, CPT Joseph Ferraro of the Field Artillery School Brigade has written a review of the advanced individual training that Redleg enlisted men undergo here at Fort Sill. CPT George Coburn, 1st Cav Div Arty, has submitted an article on an innovative training program for aerial observers originated by the men of "Red Team." The effects of extremely cold weather on field artillery is the subject of an article by CPT Jack Hall, who was also the author of the artillery portion of the 172d Brigade's cold weather SOP. Rounding out our articles for this issue is one on a little known but most ingenious and innovative ancient artilleryman, Mehmet the Great, written by CPT Burt VanderClute II.

You'll find most of our standard features and also a new one, "Yesterday's Artillery." The author, Mr. Lynn Sims (CPT, USAR), is a student of revolutionary artillery and a professor at The King's College, Briarcliff Manor, New York. He has planned a series of short articles on revolutionary artillery that will include a description of the guns, the types of ammunition and their use, methods of fire, the training of gun crews, and other related items.

Although we are beginning to receive some response to our new format, we still heartily encourage ALL Redlegs to become contributors, either by submitting articles for publication or information about your unit or just by writing a letter letting us know your opinion of the magazine.

Enjoy your *Journal!*

editor



letters to the editor

New Journal

Dear General Ott:

Thanks for your "first edition" of the **Field Artillery Journal,** which I have read with great interest.

We at Fort Benning look forward to future editions and will be watching for articles of interest to Infantrymen.

On behalf of all Infantrymen and the Redlegs at Fort Benning, best wishes for success in this commercial printing venture.

Thomas M. Tarpley
Major General, USA
Commandant,
US Army Infantry School

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Dear Sir:

Thank you very much for the serial-numbered copy of the first commercially printed **Field Artillery Journal** since 1950. This issue has entered the collections of the Field Artillery Museum as an item of enduring significance to Field Artillerymen everywhere.

The January-February 1974 **Journal** is a hallmark issue, fully worthy of its distinguished predecessor of the 1911-1950 era. With the present auspicious rebirth, it will, I am sure, carry on in the same splendid tradition. Its continuity with the past is clearly attested by the fact that today's **Journal** is receiving contributions from the same esteemed and venerable Redleg who was contributing to yesterday's **Journal** of 1924—LTC Fairfax Downey. Its link with the future is equally evidenced by the forward-looking articles in the current issue.

I congratulate you, your talented staff, and all concerned, from General Ott and General Koch on down, for this outstanding achievement.

Gillett Griswold
Director of Museum

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Dear Sir:

Thank you for the copy of the first commercially printed **Field Artillery Journal** since 1950. Congratulations on an outstanding publication!

I first started reading the **Field Artillery Journal** in 1941. In the past 23 years in which it was not published, I am convinced that it left a vacuum. You can be proud that through your efforts, supported by the Commandant of the Field Artillery School, this vacuum has been filled in an outstanding manner.

Herbert S. Holland, Jr.
COL, GS
Comptroller, USAFACFS

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Dear Sir:

Congratulations on your latest issue of the **Field Artillery Journal.** It is well on its way to being the topnotch professional magazine that artillerymen have needed for quite some time.

May I suggest that you vary your layout somewhat with greater use of photographs and styles, which should add to the visual attractiveness of the magazine.

Keep up the good work.

John P. Courte
CPT, FA
Associate Editor, **Soldiers**
Alexandria, VA

Dear Sir:

The US Army Military History Research Collection would like to be placed on the distribution list for the **Field Artillery Journal.** Congratulations on the interesting and thought-provoking articles that have appeared in your issues to date. The **Journal** will be a welcome addition to this research collection.

Mathilde Y. Carter
Acquisitions Librarian
Carlisle Barracks, PA

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56th Brigade

Dear General Ott:

Recently I received a copy of the revitalized **Field Artillery Journal** and was very pleased with the excellent job you and your staff are doing to keep Field Artillerymen everywhere informed.

Since all of the Army's operational Pershing assets are concentrated here in Europe in the 56th Brigade, many Field Artillerymen have little knowledge of this weapon system, although it is a member of the Branch weapon family. Inclosed is an article depicting the Pershing mission in Europe as a vital link in the NATO alliance. We would appreciate your consideration of this article for publication.

Again, I congratulate you on the fine job you are doing and wish you continued success with your publication.

Milton E. Key
BG, USA
CG, 56th FA Bde

The article is included on page 24 of this issue. We appreciate the support of the 56th Brigade.—Ed.

Law of War

Dear Sir:

I have enjoyed reading the January-February edition of the **Field Artillery Journal.** Of particular interest to me was the article titled "The American Soldier and the Law of War," by CPT Roger G. Darley.

As an instructor in an ROTC assignment, I can see a need for the newly commissioned officer to be cognizant of these rules when he enters active duty. With so much misunderstanding regarding the conduct of war, this article would be a valuable addition to any of our instruction.

Therefore, request permission to reproduce Captain Darley's article for distribution to military science students at the University of Hawaii. So that we can reproduce and distribute the article before our semester ends on 19 May 1974, request that we be furnished an advance copy of part II of the article.

Michael V. Farrell
CPT, FA
Asst PMS

Parts I and II have been dispatched.—Ed.

Montage

Dear Sir:

Allow me to compliment you on the great montage used on the cover of your January-February 1974 issue; artwork of that caliber is becoming increasingly difficult to find in the military history field.

As the principal instructor in military history at Georgetown University, I'd very much like to get a copy or two of that montage, frame them, and use them in my office and classroom.

I realize you'll probably be inundated with requests like this, but I would really appreciate it if you could break a couple of copies away or let me know where I can send for them.

Thanks for your help.

Philip J. Gioia
CPT, IN
Washington, DC

Trophy Room

Dear Sir:

As you may know, the 2d Battalion, 2d Field Artillery, has one of the finest history/trophy rooms of any Field Artillery regiment. We are always looking for information and artifacts to improve our display of the history of our regiment, which dates back to the Revolutionary War.

We noted with pride the letter from MAJ (Ret) R. K. McMaster, a former member of the 2d Field Artillery, in your latest issue of the **Journal.** It is because of people like Major McMaster that we have been able to enhance the collection in our history room. Any publicity concerning our constant search for information documenting the regiment's activities, as well as other items related to its past, would be of assistance. We would be grateful if you would publish a notice in your next issue requesting anyone with knowledge of the history of the 2d Field Artillery to contact us at the following address: Commander, 2d Bn, 2d FA, Fort Sill, OK 73503.

Charles J. Buel
LTC, FA
Cdr, 2d Bn, 2d FA

Hanging Six

Dear Sir:

As the commander of an airmobile artillery battalion in the 1st Cav Division, I read your article titled "Hanging Six" with particular interest.

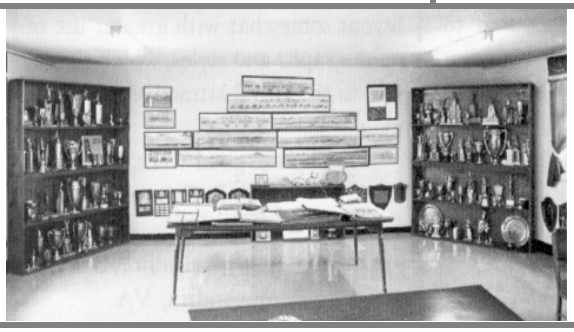
At one time I thought that this would be the way for a battery to move. However, having participated in numerous mid-intensity-type FTX's, I cannot visualize a situation in which such a move would be desirable.

I say this, not because of the nonavailability of the CH-54 Sky Crane, for we have available the CH-47 Super C, which has the capability of lifting six M102 howitzers simultaneously, but because of tactical and logistical considerations.

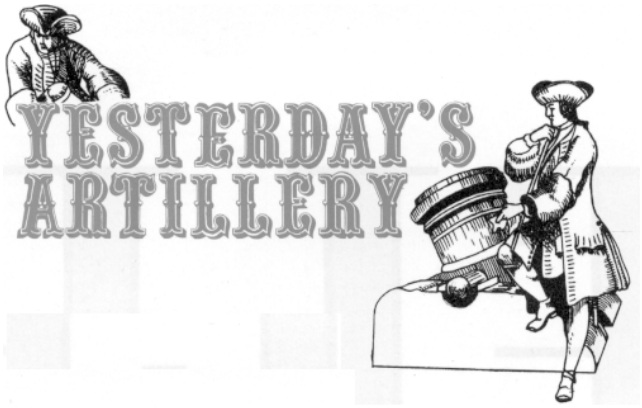
Assuming a tactical environment with the priorities being mobility, flexibility and continuous fire support, the following considerations would point toward employing another combination to move the battery while using the same number of sorties.

To rig six howitzers together, the entire battery must be taken out of action rather than phased out, which precludes the availability of continuous fire support. In addition, in an airmobile battery, the very limited number of vehicles available to move the howitzers within the pickup zone extends the time required to move them to a central point for rigging.

continued on page 58



Trophy Room, 2d Bn, 2d FA.



Colonial Cannon Procurement

Equipping the American Army with cannons, like equipping the Army with anything, was difficult. General Washington said, "No trouble or expense must be spared to obtain them," and General Knox stated that the procurement of cannons was something ". . . on which the fate of America in a great measure depends." Three effective means were found.

The most reliable way was to capture British guns. Early in the Revolutionary War, rebel units confiscated cannons from local authorities; some fell back into British hands, but most were used by American units. After the Battle of Trenton in 1777, General Greene ordered that the six captured Hessian pieces be bored out for 6-pounders. At Bennington, the outflanked British left two cannons on the field. However, opportunities were missed. Early in the war, New Hampshire men failed to capture heavy guns at Fort William and Mary. The British transported those 45 pieces to Boston and thus forced General Washington to wait for General Knox to bring the Fort Ticonderoga guns east.

Coastal cities accumulated tubes from armed merchant ships. These guns were generally reused to outfit privateers preying on British shipping. Some tubes were mounted on garrison or ship carriages; however, to be useful to the Army, a tube had to be mounted on a travelling carriage, which was a scarce item. In 1775 New York City collected 300 tubes, but they were left unguarded and Tories either spiked them with rattail files or plugged them with stones.

Local production was another means of procurement, and the Continental Cannon Committee was formed for coordination purposes. The Continental Congress regarded the casting of pieces as "absolutely necessary." James Byers was awarded a contract in 1775 to make brass 6-pounders, each weighing about 650 pounds, at 4 shillings a pound. In 1776 Daniel Hughes of Maryland sought a contract for casting cannons. His workmanship was poor initially, but it improved to "very good." That same summer, the Maryland Council of Safety wrote Hughes that ". . . we must have the cannon we contracted with you for." Several months later the frustrated Council observed that no cannons were available at any price.

It was hoped that General Knox could exert influence on ironworks owners in his native Massachusetts, but little was produced from that area. Mr. Faesch owned several blast furnaces in New York and New Jersey, and the New York City Committee of Safety directed that all brass doorknockers and city church bells be removed and sent to Newark for casting. Mr. Faesch later cautioned Knox that the Faesch furnaces could be a British target and requested guards.

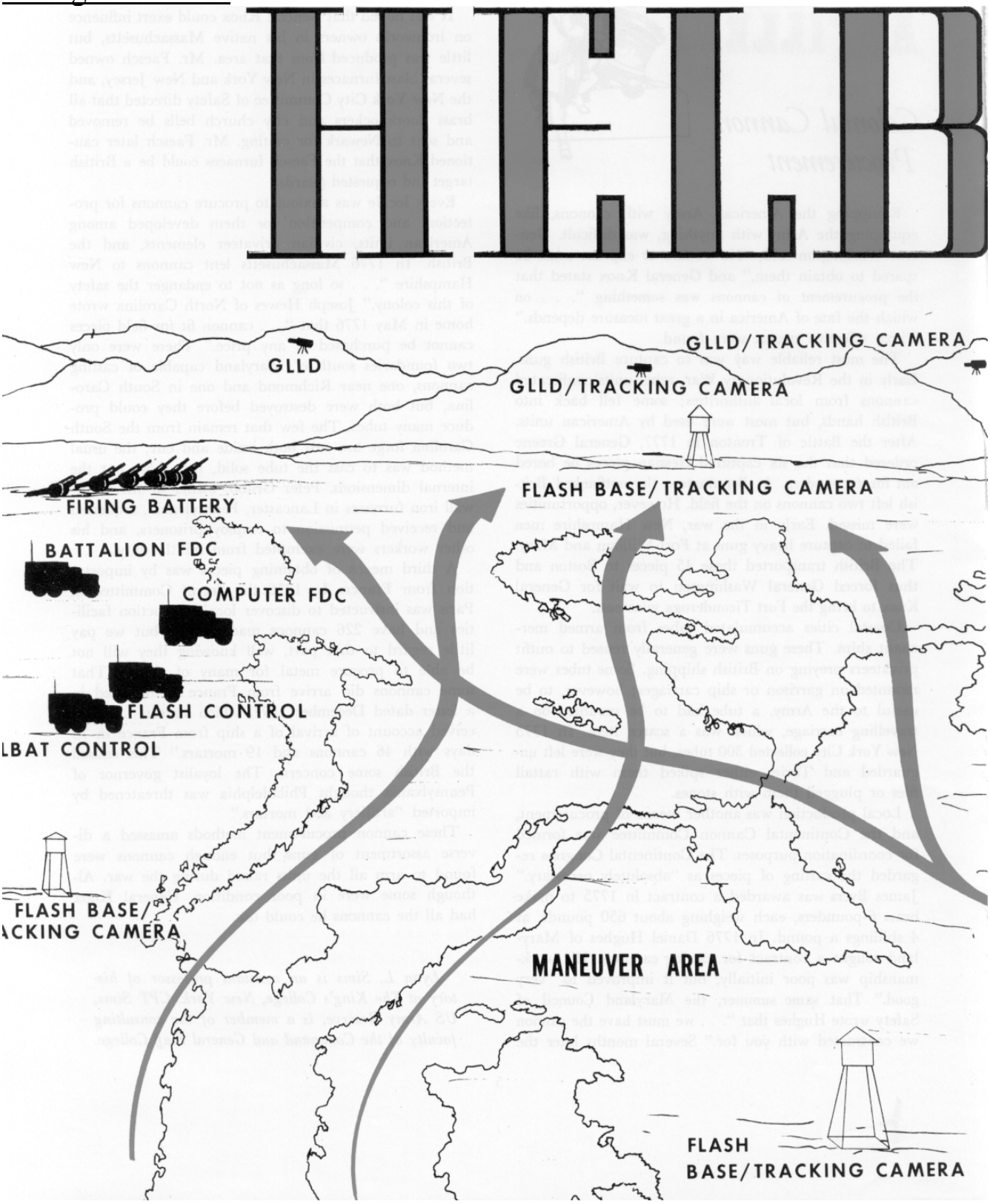
Every locale was anxious to procure cannons for protection, and competition for them developed among American units, civilian privateer elements, and the British. In 1776 Massachusetts lent cannons to New Hampshire ". . . so long as not to endanger the safety of this colony." Joseph Hewes of North Carolina wrote home in May 1776 that ". . . cannon fit for field pieces cannot be purchased at any price." There were only two foundaries south of Maryland capable of casting cannons, one near Richmond and one in South Carolina, but both were destroyed before they could produce many tubes. The few that remain from the South Carolina forge are cast both inside and cut; the usual method was to cast the tube solid, then bore out the internal dimensions. Peter Grubb, owner of the Cornwall iron furnaces in Lancaster, Pennsylvania, requested and received permission to employ prisoners, and his other workers were exempted from militia duty.

A third means of obtaining pieces was by importation from France. In 1776 the Secret Committee in Paris was instructed to discover local production facilities and have 226 cannons made, ". . . but we pay little regard to that part, well knowing they will not be able to procure metal for many of them." That some cannons did arrive from France is indicated in a letter dated December 1777, which states: ". . . received account of arrival of a ship from France in 75 days with 46 cannons and 19 mortars." This caused the British some concern. The loyalist governor of Pennsylvania thought Philadelphia was threatened by imported "artillery and mortars."

These cannon procurement methods amassed a diverse assortment of guns, but enough cannons were found to arm all the units raised during the war. Although some were in poor condition, General Knox had all the cannons he could use.

Lynn L. Sims is an assistant professor of history at The King's College, New York. CPT Sims, US Army Reserve, is a member of the consulting faculty of the Command and General Staff College.

testing at Fort Sill



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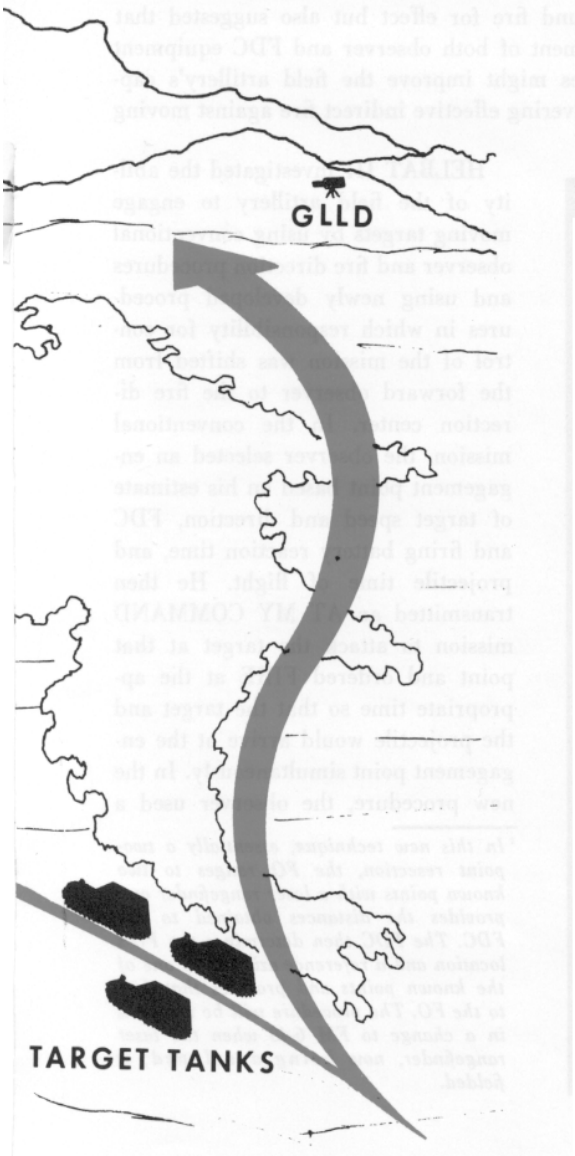


by

MAJ Jean Reed

"Gentlemen, I do not have to tell you the situation is grave. Every effort to mass our armored forces has failed. The American artillery is placing pinpoint indirect fire directly on our tanks the minute they move into the open."

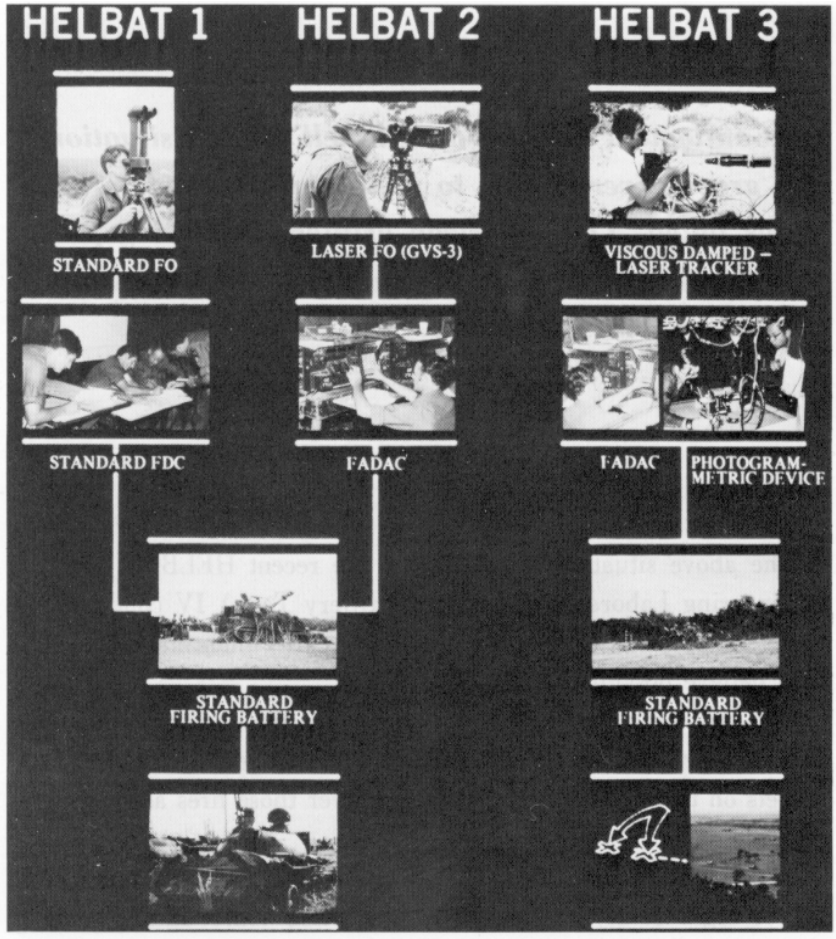
The above situation is fiction, but the recent HELBAT (Human Engineering Laboratory Battalion Artillery Tests) IV conducted at Fort Sill may have brought it closer to reality than many artillerymen believe possible.

The mission of field artillery emphasizes the necessity to deliver fires with great accuracy and, in view of the large number of critical targets on the modern battlefield, to deliver those fires as rapidly as possible.

Field experiments in HELBAT IV have indicated the feasibility of significantly reducing the response time and improving

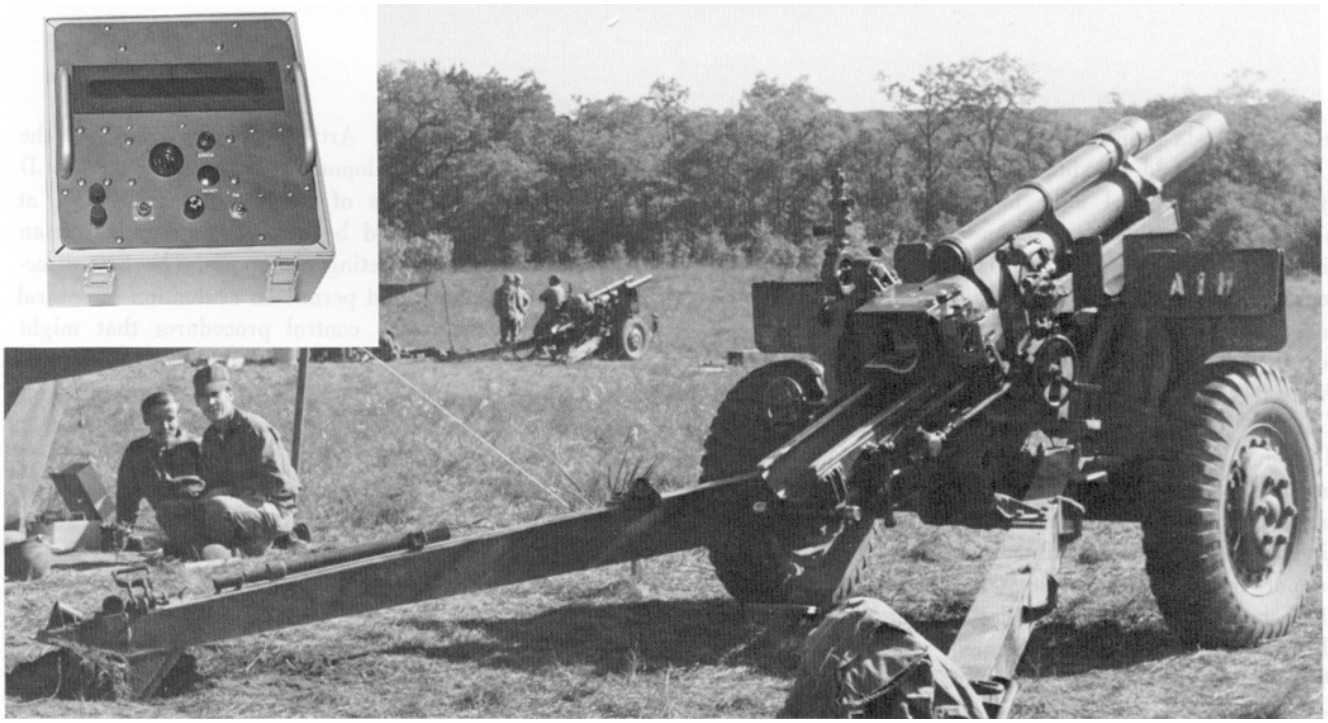
the accuracy of field artillery against moving targets through the use of automatic data processing in a fire control system that links the observer directly to the firing section. Results of the HELBAT series of experiments are providing justification and guidance for future materiel development requirements and improved fire direction techniques for today's field artillery.

The HELBAT experiments began in 1969 as an exploratory study by Army Materiel Command's Human Engineering Laboratory (HEL) to measure the frequency, source, and magnitude of human error in field artillery systems during predicted fire (met + VE) missions. HELBAT I analyzed the response time and accuracy of conventional fire against stationary targets by measuring total system error and error contributed by various components of the system (observer, fire direction center, survey, etc.). The results of the experiment indicated that more than half (53 percent) of the total system error could be traced to the inability of the forward observer (FO) to accurately locate himself and, hence, the target on the ground. The results of HELBAT I prompted an in-depth study of the conventional forward observer and the development of new equipment and techniques to reduce observer errors. HELBAT II, conducted in 1971 at Fort Hood, tested a set of newly devised techniques, including the introduction of the laser rangefinder for determining not only the distance from the FO to a target but also the FO location and direction to the target.[1] Use of the laser rangefinder produced a reduction in the mean radial error of target location from 490 meters for the FO using conventional "map-spot" techniques to 21 meters for the FO using the laser rangefinder and the new techniques. The FO using the laser rangefinder was also able to locate accurately the impact points of the adjusting rounds and to reduce the time and ammunition required for adjustment and for registration. HELBAT II improvements in target location, and an equally important shortening of the time required to achieve it, not only indicated that the laser rangefinder and observer procedures adapted to it could provide part of the information needed to achieve accurate first-round fire for effect but also suggested that further refinement of both observer and FDC equipment and procedures might improve the field artillery's capability for delivering effective indirect fire against moving targets.



HELBAT III investigated the ability of the field artillery to engage moving targets by using conventional observer and fire direction procedures and using newly developed procedures in which responsibility for control of the mission was shifted from the forward observer to the fire direction center. In the conventional mission, the observer selected an engagement point based on his estimate of target speed and direction, FDC and firing battery reaction time, and projectile time of flight. He then transmitted an AT MY COMMAND mission to attack the target at that point and ordered FIRE at the appropriate time so that the target and the projectile would arrive at the engagement point simultaneously. In the new procedure, the observer used a

[1] *In this new technique, essentially a two-point resection, the FO ranges to two known points with a laser rangefinder and provides the distances obtained to the FDC. The FDC then determines the FO's location and a reference azimuth to one of the known points and provides that data to the FO. The procedure will be included in a change to FM 6-40 when the laser rangefinder, now being developed, is fielded.*



HELBAT IV howitzer section during a break in firing. Inset upper left is the weapon section data display unit that provides charge, deflection, fuze setting, and quadrant to the howitzer section.

laser rangefinder in a mount that allowed him to track a target smoothly and without interruption and furnished distance, direction, and vertical angle to the FDC. Using this data, the FDC determined target location; determined target rate based on successive locations; computed firing data to an engagement point selected on the basis of the FDO's estimate of future target path, gun crew reaction time, and projectile time of flight; sent that data to the firing battery; and then ordered the battery to fire at the appropriate time.

The new procedure did reduce the target miss distance by approximately one-half (from 700 meters to 450 meters) in comparison to the conventional procedure, but the time lag within both systems (approximately 14 minutes from acquisition of the target to impact of the rounds in the target area) and the inability of either the observer or the FDC to accurately predict future target positions with the equipment used led to unsatisfactory results. The ability of the field artillery to attack moving targets with indirect fire was marginal, at best.

Analysis of the results of HELBAT III led to the conclusion that when the forward observer has the capability to accurately locate a moving target, the system response time provides the major source of error in bringing effective fire onto the target. The major lag times in the experiment were due to the relatively slow lasing rate of the laser rangefinder used, the slowness of the FDC using both conventional and trial procedures, and radio procedures normally used by the field artillery. Both USAFAS and HEL felt that the firing accuracies could be significantly improved by reducing response time through the use of automatic data transmission and processing. To do this would require an integrated fire direction system connecting the observer, the fire direction center, and the howitzer section. Field evaluation of such a system using experimental and commercially available hardware and computer software developed specifically to solve the gunnery problem for the experiment would provide information on operational requirements for future field artillery automatic data processing systems and could serve as a proving ground for computer software for the moving target gunnery problem. The results could provide the field artillery community with quantitative accuracy and response time data for use in tradeoff analysis to determine the optimum indirect fire system for the attack of moving targets.

The basic scheme used in the experiment was to data link the observer's laser rangefinder to a computer, which would solve for the predicted intercept point on a real-time basis, and compute and transmit to the howitzer section the firing data required to hit this point. In HELBAT III, live fire at real moving targets had been impossible because of troop safety. In HELBAT IV, this shortcoming was eliminated by the development and use of a projectile that could be fired safely at a specially armored, manned target tank.

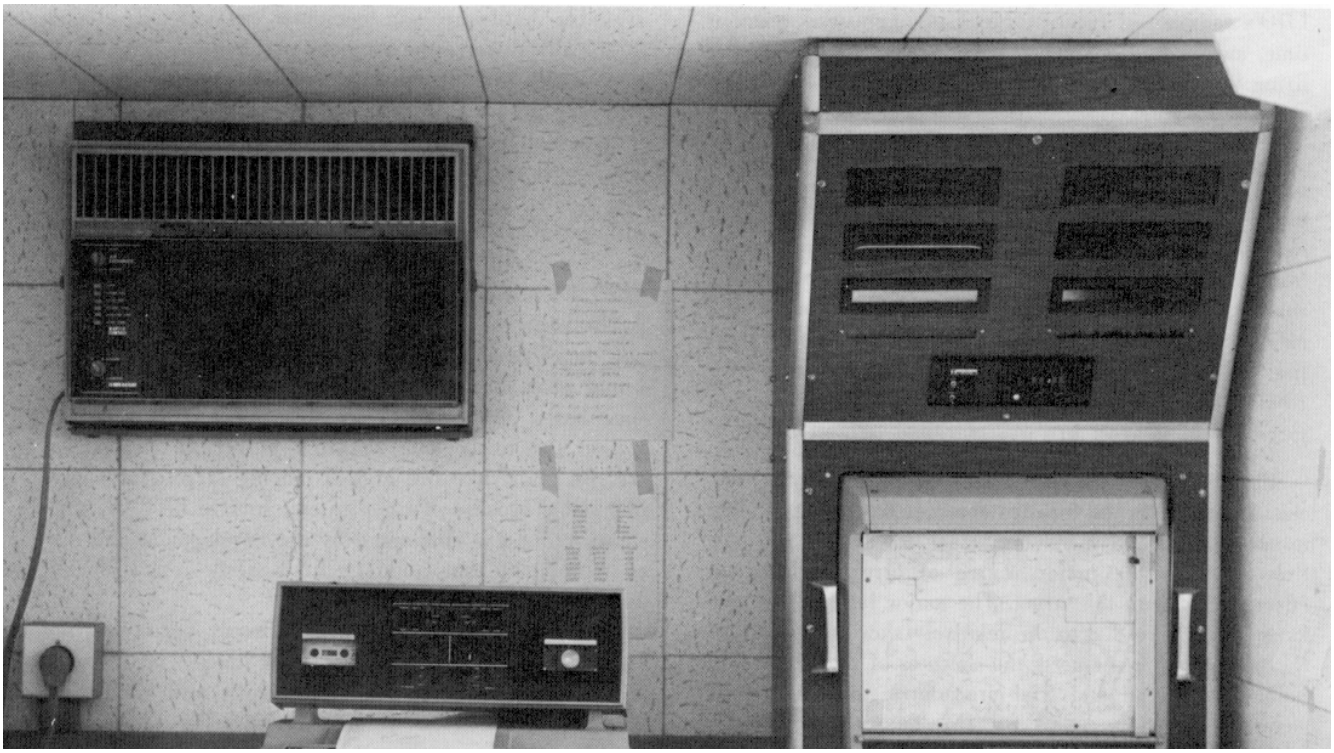
Detailed planning for the experiment began in December 1972. The experiment would involve many parts of the AMC development community and the Field Artillery Center. The Human Engineering Laboratory would provide overall test integration, the evaluation

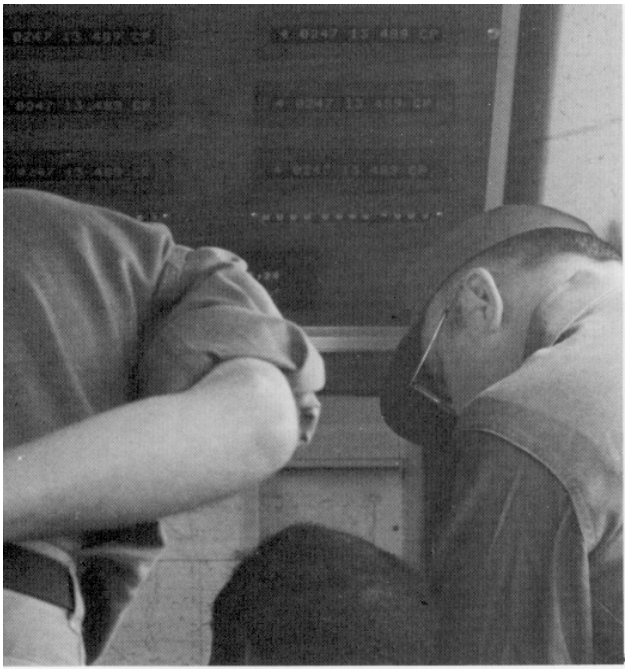
team, and data reduction and analysis. Missile Command (MICOM) would provide advanced development prototypes of the ground laser locator designator (GLLD) planned for use with the cannon-launched guided projectile (CLGP). Frankford Arsenal would provide the integrated fire direction system (data links, computer system, and weapon firing data display and computer software) that would be the heart of the system. Picatinny Arsenal would develop the special ammunition needed (an "inert" 105-mm projectile with spotting charge). Test and Evaluation Command would conduct the ammunition safety test for the projectile and the target tank. The Field Artillery School would provide the operational concept and coordinate the troop and test site support by III Corps Artillery, the Field Artillery Board, the School, and the Field Artillery Center. Other agencies, the Army Environmental Hygiene Agency, Combined Arms Center Development Activity, Operational Test and Evaluation Agency, Headquarters, Training and Doctrine Command, and Headquarters, Department of the Army, would participate in and closely monitor various aspects of the experiment.

In addition to the primary objectives of the experiment, a wealth of data was to be produced in many areas of interest to the Field Artillery community. For the first time, advanced development prototypes of the GLLD would be in the hands of user troops and HEL, at MICOM's request, would be able to conduct a human factors test of the competing prototypes. The first direction system fielded would permit an evaluation of several different command and control procedures that might be used with either conventional munitions or the cannon-launched guided projectile, ranging from an observer equipped with the laser rangefinder/designator, a FADAC-equipped FDC, and a standard firing battery using standard artillery communications procedures to a completely automatic fire direction system in which the GLLD-equipped observer would be data linked through the computer to a firing data display at the howitzer section. For each combination considered, it would be possible to measure response time and the accuracy achieved (miss distance relative to the target).

Planning and preparation for the experiment continued through the spring and summer of 1973. Quanah Range at the western edge of Fort Sill was selected as the field site. Lanes for the target tanks were cleared in the impact area, and observation posts were selected in the Wichita Mountains on the northern edge of the

HELBAT IV automated fire division center. Shown (left to right) are the programer's console, computer operator's terminal, X-Y plotter with battlemap, and firing data display.





The firing data display unit shows charge, deflection, fuze setting, quadrant, and pieces to follow for each of the six howitzers in the firing battery.

range. The HEL-designed armor kit was installed on three M48A3 tanks, and tank crews from Company B, 40th Armor, were trained in operation of the target tanks. The 2d Battalion, 18th Field Artillery, the self-propelled 8-inch howitzer unit selected to provide troop support, prepared the field site and trained its battalion FDC in the new gunnery procedures to be used and its Battery B on the towed 105-mm howitzers to be used in the experiment. Two additional three-man fire direction teams, who would operate the Frankford Arsenal automatic FDC, were selected and trained. Forward observer teams from III Corps Artillery and the FA School Brigade received refresher training in observed fire procedures and the new procedures to be used and in operation of the GLLD.[2]

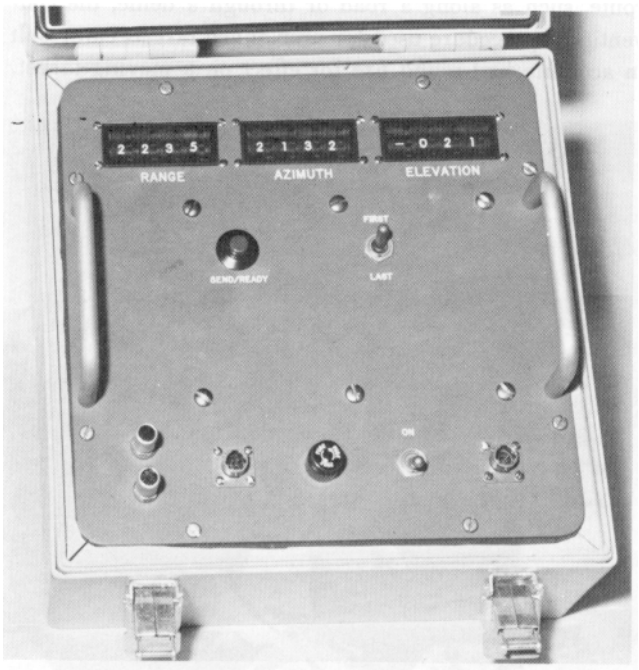
The test team from Human Engineering Laboratory moved into the field for HELBAT IV on 24 September 1973. As is the case with any field equipment, a number of problems were experienced in installing field instrumentation and the experimental integrated fire direction system. By 15 October, most of those problems had been solved and the entire team—HEL and Fort Sill—settled down to data collection in earnest. On a representative experimental day, howitzers were registered, 10 target runs were made through the impact area, and 10 missions in various combinations were fired using 50 to 90 rounds of test ammunition. The experimental control site and the observation posts were popular places and were visited by senior officers and Department of the Army civilians from all participating and monitoring agencies throughout the test.

At the close of the experiment on 28 October, all participants were well satisfied with the results of HELBAT IV. A successful first attempt had been made at automating technical fire control from the forward observer to the howitzer section. Based on the results of the last 2 days of firing, significant improvements in response time and firing accuracy were evident over that which had been achieved in HELBAT III. For the conventional moving target mission, the response time was approximately one-third and the miss distance approximately one-half of that achieved in HELBAT III. The conventional system used in the experiment permitted firing within 400 meters of a target moving cross-country and should be adequate for the use of terminal-homing munitions such as CLGP. In those situations in which the target was constrained to move along an easily recognizable route, such as along a road or through a defile, the conventional procedure used for preplanned targets can result in accurate first-round fire for effect on a moving target.

Ground laser locator designator (GLLD), one of two competing advanced development prototypes used in HELBAT IV.

[2] *In the training of the forward observer teams in standard procedures, emphasis was placed on the use of preplanned targets along an assumed target path as well as on the attack of targets of opportunity as described earlier in this article. The use of these techniques significantly improved the accuracy achieved by the conventional observer. These procedures will be the subject of a future article in the Field Artillery Journal.*

In the foreground is an M48A3 target tank used in HELBAT IV. The turret has been removed and replaced by 1¾-inch armor plate. In the background is an M60A1 tank used in a subexperiment of HELBAT IV.



MODEM (modulator-demodulator) interface between the GLLD and the automated FDC. The MODEM automatically transmits range, azimuth, and elevation to the target from the GLLD to the FDC.

(In one case the rounds were within 37 meters of the target.)

The test demonstrated that an automated fire control system, as was used in HELBAT IV, can provide the field artillery with the capability to successfully engage moving targets. Very rapid response times from acquisition of the target by the observer to impact of the first volley in the target area and between subsequent volleys were achieved. Very accurate fires were also achieved, close enough for fire for effect with conventional projectiles on targets moving cross-country. The system used in the experiment demonstrated the capability of predicting future target positions accurately and firing on them quickly and accurately. The response time of the system was reduced essentially to the time required for the howitzer section to set firing data, load, and report READY, plus time of flight of the projectile, plus a very few seconds required to transmit and compute firing data from the observer.

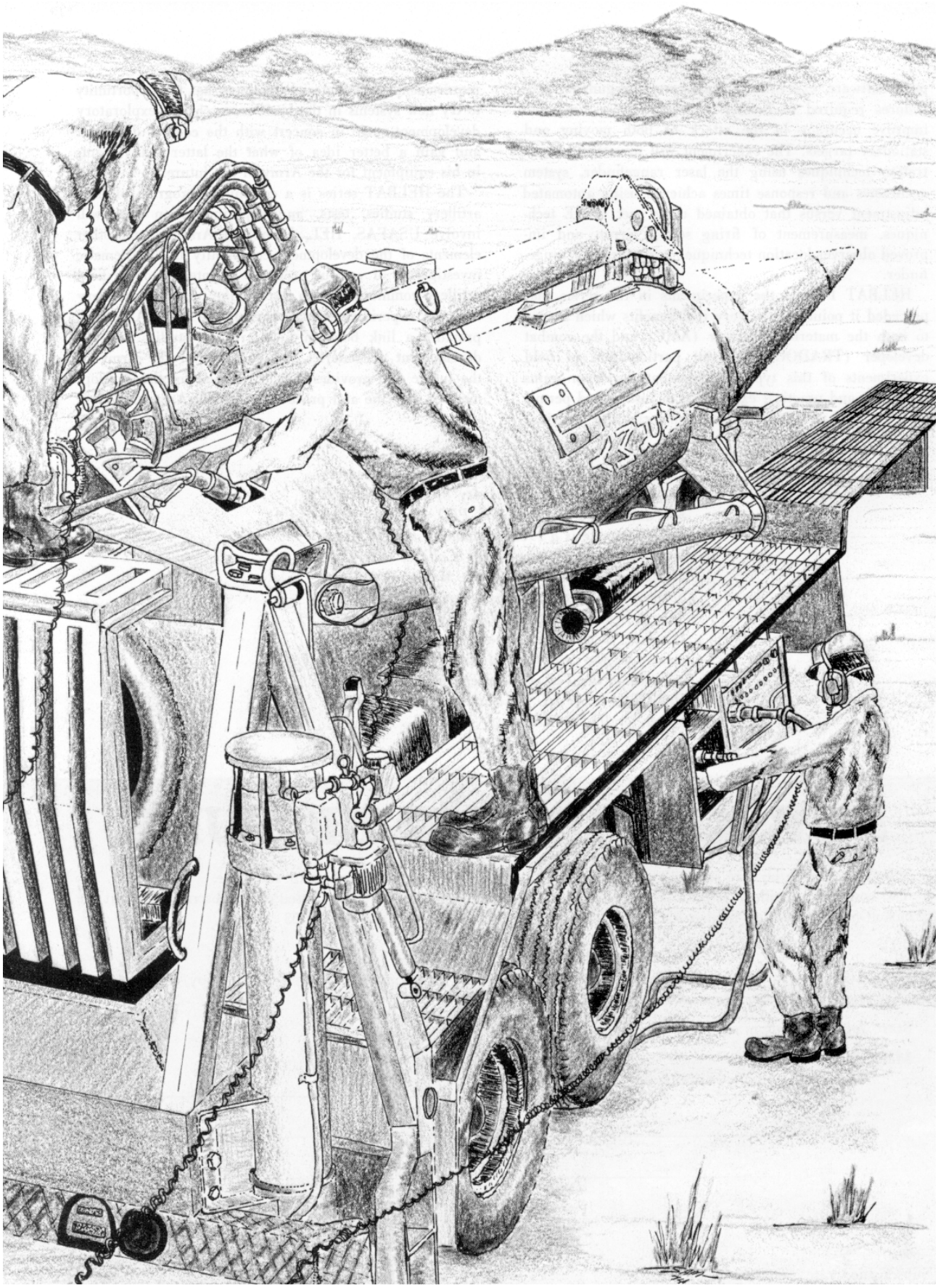
Following the experiment it was evident that continued experimental effort was required and was desirable in this area. Planning and preparation for HELBAT V began immediately and is continuing for an experiment in September-October 1974. The experiment will further develop and verify the fire direction techniques used in HELBAT IV. Using the lessons learned in HELBAT IV, HELBAT V will investigate improvements in computer

software, experimental hardware, and gunnery procedures required to further reduce response time and improve accuracy in the attack of both moving and stationary targets. The experiment will investigate registration techniques using the laser rangefinder, system accuracies and response times achieved using automated adjustment versus that obtained using met + VE techniques, measurement of firing section error, and improved observer location techniques using the laser rangefinder.

HELBAT IV and the experiments in the series that preceded it point out the very real benefits which accrue to both the materiel developer (AMC) and the combat developer (TRADOC) by joint participation in field experiments of this type. The combat developer gains field data and practical experience to justify and permit more detailed definition of future materiel and doctrinal requirements. The materiel developer has the opportunity to try new systems in the basic research and exploratory development stage in concert with the combat developer and gain a better idea of what the latter really wants in his equipment for the Army of the future.

The HELBAT series is a continuing program of field artillery studies, tests, and experimentation that will involve USAFAS, HEL, Frankford Arsenal, and other elements of the development community in a systematic investigation of various problems of interest to the field artillery community. As a part of the total field artillery test and experimentation program, the HELBAT series provides a link between field artillery studies and the development of materiel and doctrine for the Army of the future and provides a field test bed for the development of doctrine and procedures for the Army of today.

MAJ Jean D. Reed holds BS and MS degrees in physics from the University of Oklahoma and has done work toward his PhD at Georgetown University. He is a 1969 graduate of the US Army Command and General Staff College, where he completed requirements for the Master of Military Science and Tactics. His assignments include troop duty in Vietnam with MACV and the 1st Cavalry Division. A member of the research and development specialty program, Major Reed is currently assigned to the Test and Experimentation Division, DACCTD, USAFAS. He was the USAFAS project officer for HELBAT IV.



an overview

FIELD ARTILLERY AIT TODAY

by
CPT Jerrold S. Ferraro

A young soldier arrives at Fort Sill from basic training—tired, hungry, bored, apathetic, and perhaps wondering if enlisting in the Army was such a good idea. The task for the Field Artillery School, and particularly the Field Artillery School Brigade, is to convince this young soldier that his superiors care about his welfare and to insure that the training is important, relevant, and exciting to him.

His transformation from a basic trainee to a field artilleryman begins the moment he arrives. When he reports to the brigade personnel section, many of his questions are answered in a multimedia briefing geared especially to the things that concern him. In the briefing, he is welcomed to the brigade and shown an overview of what he will be doing for the next 7 weeks. His first day in the brigade is set aside for administrative processing with emphasis on his financial affairs. After his administrative problems have been solved, the young soldier can give his full attention to the instruction he will receive.

On the first day of training, the new AIT soldiers are introduced to the equipment that they will be using during their training. All cannoneer and fire direction personnel participate in a live-fire exercise on their first morning of training. Later that day, the new AIT soldiers attend a firing exercise conducted by AIT soldiers in their fourth week of training. During this exercise, brigade personnel introduce the entire family of artillery weapons, present the members of the artillery team, and show the interaction between the members as they perform their duties. This initial introduction stresses to the individual the importance of the training he will undergo and provides a stimulus for the coming weeks. From that moment on, 85 percent of the training received by the AIT soldiers is performance oriented. Instruction is presented to small groups with a maximum of "hands on" training for the soldier. For the cannoneer trainee, the team concept is reinforced during his third week of training when he is given the opportunity to perform as a forward observer and as a member of a fire direction center during a field exercise. As he progresses through his training, he participates in airmobile operations that include instruction in the latest methods of rigging and transporting artillery. All personnel experience "go/no go" proficiency testing throughout their training. This type of testing stresses the individual's ability to perform the task. Any AIT soldier who fails a go/no go test receives remedial training after duty hours and retakes the test 1 week later.

While other AIT soldiers concentrate on one system, cannoneer personnel are trained on and fire all types of cannon artillery, with primary emphasis on the M102 and M109. During nearly 2 weeks of instruction on self-propelled artillery, his training includes basic cannoneer

Cannon Training

Field artillery weapons and ammunition	**37**	**hours**
Communications	**8**	**hours**
Field training exercise	**63**	**hours**
Firing battery	**34**	**hours**
Field artillery crew maintenance and operator training	**61**	**hours**
Reinforcement training, review, and proficiency testing	**18**	**hours**
	221	**hours**

duties, familiarization with maintenance, and instruction on driving the vehicles. All personnel receive an orientation on the 8-inch howitzer and the 175-mm gun.

The brigade also emphasizes the importance of noncommissioned officers to the Army and the soldier's future welfare. The AIT soldiers' immediate NCO supervisor conducts and is totally responsible for the first-day shoot. As the first week progresses, the new soldiers are introduced to the first sergeant and battalion command sergeant major and thus the entire NCO chain of command, one link at a time. Primary instruction for which the brigade is responsible is conducted by the NCO's. Drill sergeants are used as artillery instructors. The NCO's are also assigned additional responsibilities, such as safety officer during firing, a responsibility traditionally reserved for commissioned officers.

An innovation within the brigade has been the introduction of peer instruction. In the missile battalion, AIT soldiers who have completed 3 or more weeks of training are used as instructors for those AIT soldiers in their second and third weeks. In the cannon battalions, fast learners are used to help slow learners. This program has proved extremely successful for both trainers and learners.

Extensive use of the peer instructor system has reduced the student/teacher ratio to a very favorable 4:1. Brigade instructors oversee the peer instruction to insure uniform quality. The prestige of being designated a peer instructor has proved to be a powerful motivation factor. The young missile AIT soldier exerts every effort to prepare himself to teach his fellow AIT soldiers.

The FA School Brigade realizes that many outstanding 13A10 AIT soldiers are not sufficiently challenged by their training. To make the 13A10 course more challenging and also turn out a better soldier, on 1 December 1973 the brigade instituted a 13B20 hands-on equipment proficiency test for selected AIT soldiers. As of 14 December, 24 of the 83 trainees tested had qualified. While the brigade is not authorized to award MOS 13B20 to an AIT graduate, the soldier who passes the 13B20 test receives a certificate of training at his higher skill level and a letter is placed in his 201 file informing the gaining unit of his accomplishment.

Missile Training

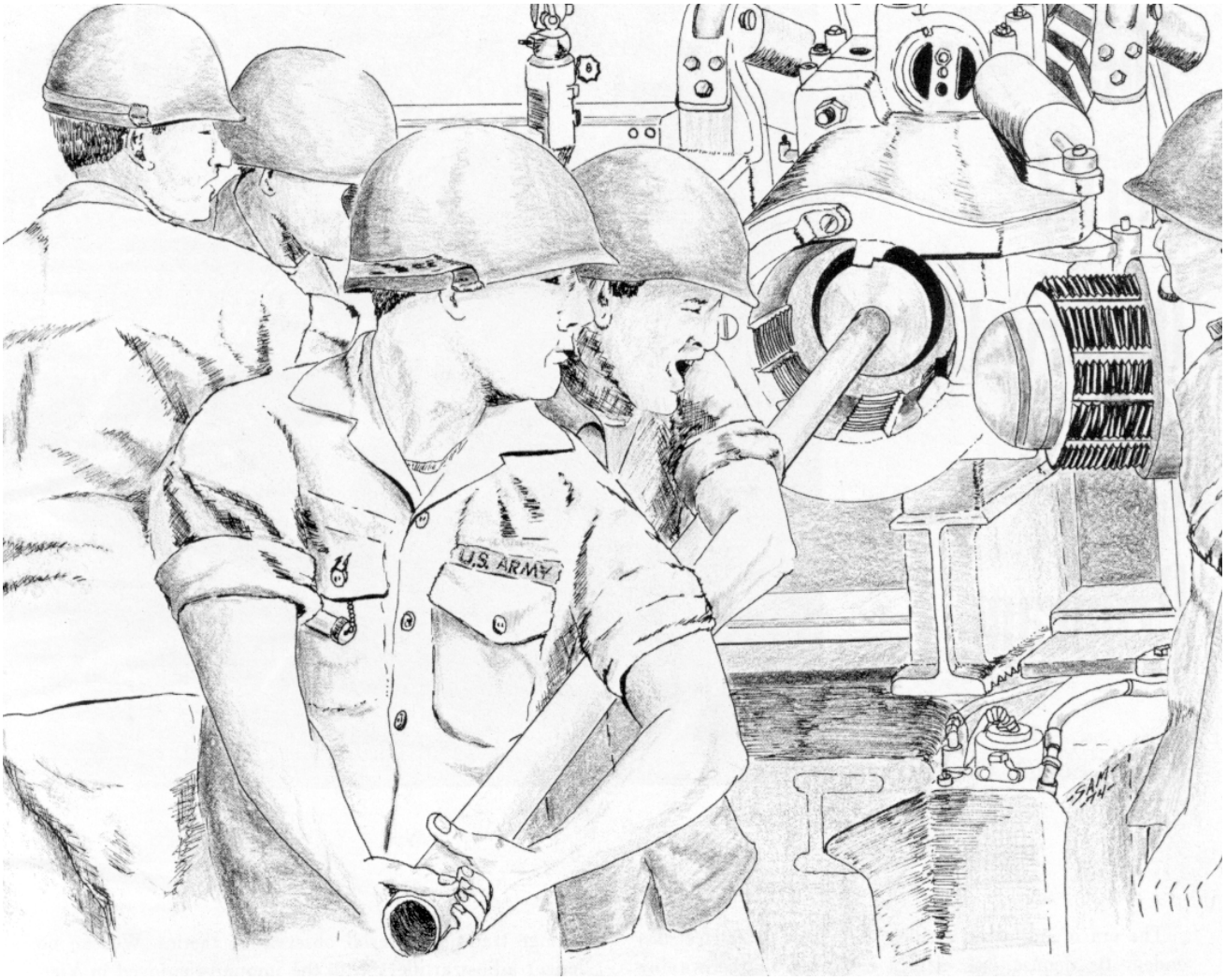
Programmer-test station, azimuth laying, and power-producing equipment	**35**	**hours**
Erector-launcher	**32**	**hours**
Missile, missile assembly	**67**	**hours**
Firing battery operations	**54**	**hours**
Communications	**8**	**hours**
Operator/crew maintenance responsibilities	**10**	**hours**
	206	**hours**

The Gunnery Department, USAFAS, was tasked with the responsibility of conducting MOS-related instruction for 13E20 AIT soldiers effective 1 July 1973, and this has resulted in more standardized instruction material. A FADAC examination has been added. All examinations are reviewed the day the examination is given. A precision fire shoot is conducted the day prior to the precision fire examination.

Communication is the key in AIT training. The cadre in the training battalions, the students attending the School, and the units in the field are requested to provide data concerning the knowledge and proficiency of the graduates. Only this type of feedback will lead to improvements in the instruction.

In August 1973, a questionnaire was sent to all major artillery commands to determine the degree of knowledge and proficiency of recent artillery AIT graduates. As a result of replies to the brigade's survey, several changes have been initiated in 13A10 and 13E20 training. The 13A10 training has been changed to reflect increased emphasis on the M102 and M109 howitzers. Training on the M102 howitzer has been increased from 5 days to 8 days to include four live-fire exercises. Training on the M109 howitzer has been increased from 7 days to 8 days. In addition, all AIT soldiers receive 8 hours of training on the M110 howitzer. AIT soldiers scheduled for assignment to M110 units receive training on the M110 howitzer instead of the M109. Training on the M114 howitzer remains at 8 hours. The M101 is used for one live-fire shoot and to fire School support requirements during the AIT soldier's fourth week of training. Training on fuze setters has been increased from 1 hour to 2 hours, and increased emphasis has been placed on fuzes and fuze setters during simultaneous training. Communications training has been increased from 6 hours to 8 hours for 13A10's and 13E20's. (Communications training is no longer conducted in basic combat training.)

During the AIT soldier's non-training time, he is encouraged to participate in any of the various athletic activities conducted by the brigade (as many as 25 each week). This well-rounded athletic and recreation program, which includes organized league competition in all major sports, is oriented toward the desires of the young soldier and is a tremendous asset to the brigade. Large gains are made in unit identification and espirt de corps while giving the individual a means of self-expression.



His participation in these activities leads to a greater sense of pride in himself and a better understanding of teamwork. Today's volunteer soldier exhibits a strong interest and a desire to participate in unit-oriented athletics. Participation and spectator attendance have been heavy in softball, flag football, basketball, and volleyball.

Fort Sill is located in an area containing many diverse activities to occupy the AIT soldier's off-duty time. The brigade takes advantage of this by arranging weekend trips to Dallas Cowboy and University of Oklahoma football games; the Cowboy Hall of Fame, the Firefighters' Museum, and the zoo in Oklahoma City; and the Possum Kingdom Recreation Area. The wife of the AIT soldier is not neglected. She is given a tour of post facilities, and she participates in the off-post tours with her husband.

The brigade exists solely to provide field artillery units with the most knowledgeable and proficient soldiers possible. The real measure of success is the AIT graduate's performance in his initial assignment. Requests for copies of the questionnaire or other comments may be addressed to the Commandant, US Army Field Artillery School, ATTN: ATSF-TPC, Fort Sill, OK 73503.

CPT Jerrold S. Ferraro is a 1966 Distinguished Military Graduate of Niagara University. He received a master's degree in human relations from the University of Oklahoma in 1973. Captain Ferrero has served in Vietnam and has commanded units in Germany and Hawaii. He has served as Operations and Training Officer, S3 Division, Field Artillery School Brigade, since January 1972.

The Aerial Observation Pilot Program

by
CPT George C. Coburn

The era of adjusting artillery fire from 1,500 feet has ended. Its demise was clearly indicated in the waning years of the Vietnam conflict when the enemy fielded a sophisticated air defense system. The surface-to-air missiles (SAM) and antiaircraft weapons in North Vietnam proved more than effective against our tactical air operations. In the south, the seige of An Loc and the invasion of Military Region I in 1972 saw automatic weapons, antiaircraft cannon, and ground-to-air missiles, manned by competent crews, force an end to observers flying in lazy circles at 1,500 feet over the target. Simply stated, the Army found that it could ill afford to mark targets with "flaming helicopters" and accordingly looked for survivable tactics.

It is imperative that we change our tactics. The history of tactical development and training cannot be divorced from the history of weapons development. Our choice of appropriate tactics depends upon a realistic appraisal of the weapons systems of the enemy. The small, lightweight, mobile surface-to-air missiles SA-6 and SA-7 developed by the Warsaw Pact nations have forced the artillery to change traditional aerial observation tactics. We can no longer adjust artillery with the impunity enjoyed in Vietnam; the attrition resulting from such action would override any tactical advantage gained.

An assessment of the order of battle of the Warsaw Pact armies and the strong possibility that our next encounter will be with such a well-trained and well-equipped army make it even more apparent that conventional aerial observation tactics are not equal to the demands of providing effective artillery adjustments.

The air defense capabilities of the enemy have forced the air observer (AO) to seek survivability by using nap-of-the-earth flying tactics. This imposes greater operational problems on the AO; for example, how can he effectively accomplish the mission? Will both the pilot and aircraft be equal to the task of low-level navigation both to and from a target area? Will the aviator be artillery oriented and aware of target acquisition requirements? The problem presented by the air defense threat and the divergent natures of the training of the aviator and that

of the artilleryman is clear: Is it possible for an aerial observer to survive in a conventional conflict and still perform his vital role?

The challenge of this well-defined problem was taken up by the Red Team of the First Team (1st Cavalry Division) to qualify existing doctrine and develop new tactics into a viable concept of operations for the air observer. This resulted in the Aerial Observation/Pilot Program (AOPP). The objective of this program is to develop training that unites the aviator and the artillery observer into a functional team using their combined skills for the specific purpose of aerial observation against a sophisticated opponent.

The crux of the problem rests with efficient teamwork between the aviator and the artilleryman. These two individuals must be welded into a team in which each has understanding and appreciation of the operational problems of the other. The aviator must become more than a pilot; he must appreciate artillery tactics and adjustment-of-fire requirements. The artillery observer must be trained in air tactics to enable him to understand the aircraft limitations, the requirements of employing an aircraft by using nap-of-the-earth techniques, and the best means of assisting the pilot in navigation, geographic orientation, and communications.

The concept of cross-training as it applies to a team tasked with aerial observation in a conventional conflict has never been more valid. The aircraft used in the nap-of-the-earth artillery observation role becomes a focal point of coordination and planning by the pilot and the observer. Reaction time for the pilot is compressed in low-level flying; therefore, the combined task of flying, navigating, and communicating must be shared with an able individual who is trained to assist the pilot. The observer will become a copilot with inherent duties accompanying that position during the navigation phase of a mission.

Upon arrival in the target area, the team must analyze the terrain, determine the optimal flight paths for best cover and concealment, and decide on specific areas for very limited exposure from cover to permit the observer to adjust fire.

The conduct of an aerial fire mission is complicated because the locations of firing batteries may not be known. The technique of adjusting on the gun-target line may have to give way to other means for orientation of the observer and the fire direction center. The use of cardinal directions and prominent terrain features may satisfy this requisite of artillery adjustment.

During the conduct of a fire mission, it is now the pilot who must assist the artilleryman. He must understand the need for geographical orientation and precise exposure times for accurate and timely adjustments of fire. The need for skilled teamwork will be consummated by the operational success of such a team.

The training to meet the needs of this team is divided into four major areas: crew coordination, navigation, communications, and artillery observation procedures. The 1st Cavalry Division Artillery began training pilots and artillery observers in March 1973. The program consisted of 43 hours of instruction and practical exercises including 17 hours of flight time.

Results obtained by AOPP-trained teams in live fire exercises have demonstrated that this concept is valid and effective. With this program the Red Team has expanded the role of the aerial observer by providing him in-depth training as a target acquisition means using the assets of aerial field artillery, conventional artillery, and tactical air.

The concept of aerial observation is not new, but it does require refinement to meet the needs of fast-moving, fluid warfare as envisioned in a conventional war. Artillerymen and aviators employed as teams must have the confidence and expertise that can result only from an intensive training program. To understand the need for this training, one has only to imagine himself as an aerial observer with an aircraft and a pilot on a mission to support a maneuver unit somewhere in Eastern Europe where the enemy is real and the terrain unfamiliar. The importance of geographical orientation and map reading is readily apparent. The modus operandi must be established because, once a team is committed, there is no time and little opportunity to develop the skills needed for the mission. It is in this environment that the aerial observer must function.

The successful accomplishment of such a mission can be achieved only by training today in order to develop the skills and tactics required in deploying against a sophisticated adversary.

CPT George C. Coburn, presently assigned to the 1st Cavalry Division at Fort Hood, graduated from OCS and received his commission at Fort Sill in 1965. Following tours in CONUS and Korea, he graduated in 1968 from the Army Aviation School. Captain Coburn served in Vietnam with the 9th Infantry Division and the 145th Combat Aviation Battalion from July 1968 to July 1969. After attending the Field Artillery Officers Advanced Course in 1970, he was selected for the Officer Undergraduate Degree Program. Captain Coburn graduated with honors from Embry-Riddle Aeronautical University in 1971.

Challenge the Commander TOO

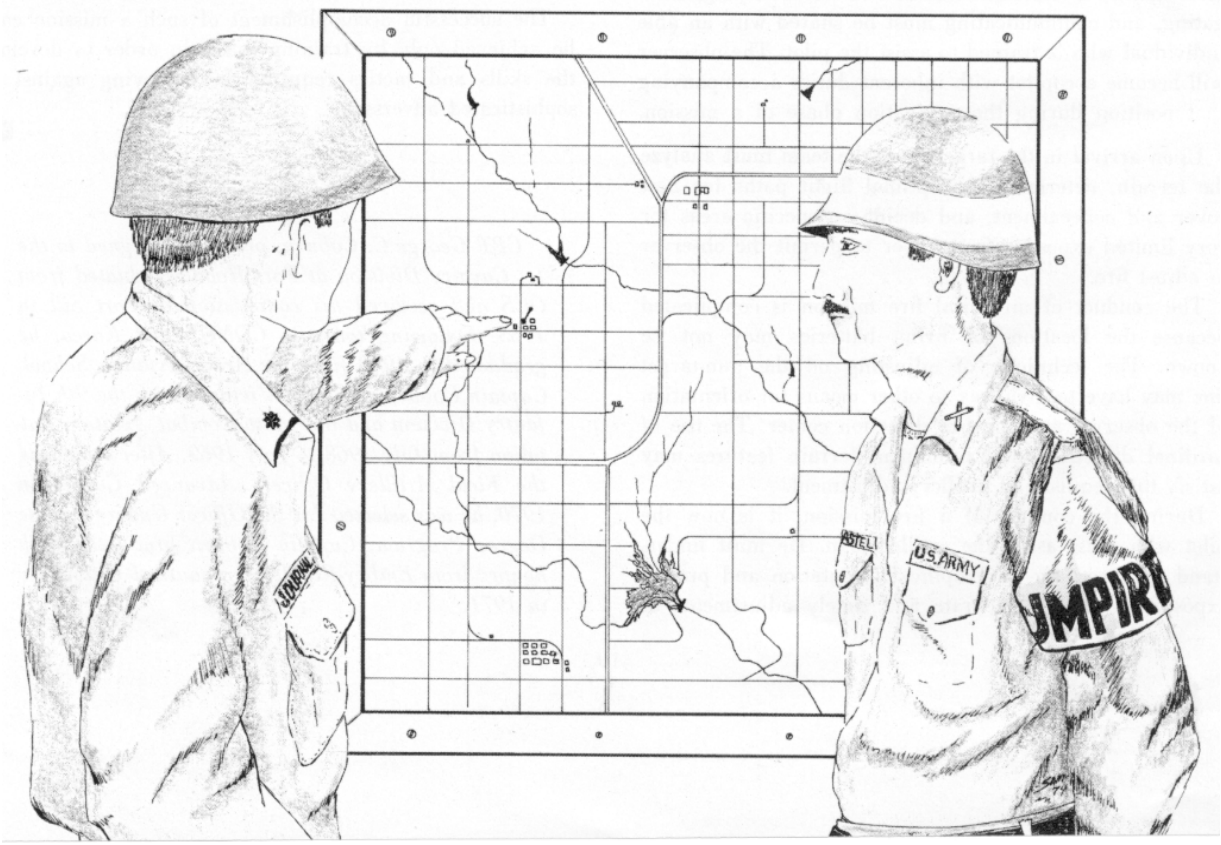
by
COL William L. Shea

"Keep the troops busy, but don't let them dig any foxholes or destroy any vegetation!" Another field exercise or, more likely, an ATT or ORTT is in the offing for the unit receiving those orders.

Few exercises show less imaginative planning than the battalion-level operational readiness training test or Army training test conducted within the Field Artillery. Ignoring local restraints, most units plod off with a testing scheme that, although technically challenging, is usually gruelling, unrealistic, and boring. Furthermore, the battalion commander and most of his staff enjoy a relatively "free ride," contributing little to a performance that has been carefully rehearsed and is carefully acted out for the benefit of the umpires.

Lest the reader think that this is a recent malady to add to the long list of things perceived to be wrong with today's Army, let me say that, to my knowledge, battalion tests have been conducted in this manner for at least a quarter of a century. As a battalion commander, I considered that my real contribution ceased 30 minutes after I had been briefed by the chief umpire. The reasons for this were simple: The battalion was well trained, and the "rehearsals" for the test had been detailed and almost exactly like the test itself; therefore, the troops knew what to expect. An analysis of the training area requests gave me the general location where the test would be conducted, and that in turn gave me approximately where each event would take place. The scenarios changed little. Given all of this, and a little luck, what counted most was my ability to stay alert and "look good." The ones who hurt most were the young soldiers who had to "look good." Constraints imposed and artificialities inherent in this type of exercise force the trooper who should be engaged in improving his own or his unit's position to appear "gainfully employed" for the benefit of the umpire; otherwise, a lack of motivation or esprit might be noted during the critique of the test.

These shortcomings led me to experiment with the test



while serving in the 7th and 2d Infantry Divisions. My objectives were (1) to produce a fast-moving test to overcome the constraints and artificialities that resulted in boredom being inflicted on the troops and (2) to test the commander and his staff. An analysis of the test proved that it provided plenty of flexibility. It was determined that the precision fire events slowed the test to a snail's pace. With this as a starting point, a modified concept of testing was evolved to separate precision and area fire events for the *battalion-level* tests. The battery tests were left untouched in order to teach the basics. If battery tests are considered as part of the whole, the objections to separating the precision and area events during battalion testing are overcome. The next step was to introduce an element that would result in the battalion commander and his staff being tested. The sameness of the scenario had to go in order to accomplish this objective. The concept evolved into a four-phase exercise.

Phase I—Alert, Load Out, and Move. As div arty commander (test director), I knew the date the battalion was to move out, but this information was not disseminated. The chief umpire, my executive officer, assembled the test umpires on a date we determined in advance. However, if the unit attempted to jump the gun by loading vehicles, etc., no alert was called that day and training inspections were held instead. Once this was understood, the commanders cooperated and this phase was conducted from a standing start. The battalion loaded up and moved tactically to the field with the umpires observing the operation. Once in the field, any vehicles returning to garrison were strictly controlled.

Phase II—Training. This 2- to 3-week phase belonged to the battalion commander. The div arty staff officers limited their visits primarily just to dropping in to see if there were problems with which they could help.

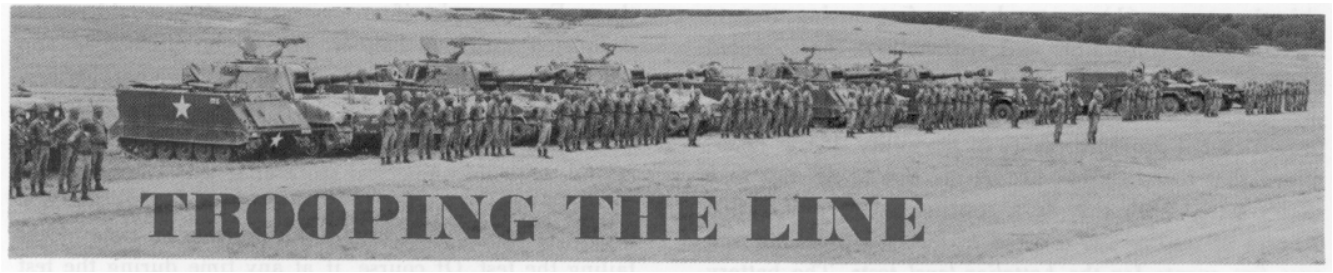
Phase III—Precision Fire. At an announced time, date, and place, subsequent to phase II, the umpires tested the battalion on precision fire procedures. This was done in an "administrative" environment with no tactical requirements whatever. This phase usually started between 0800-0900 hours and was completed by midafternoon. Although this phase was demanding for those actually involved, the remainder of the battalion was permitted to engage in useful activity (such as maintenance) or simply to sack out.

Phase IV—Tactics. Upon completion of phase III, the battalion commander was briefed on the general tactical situation and given a mission. Since there was no scenario per se, he received information from his liaison officer and forward observers and radio messages from "higher headquarters and the supported unit" that would cause him to react. Without a sequence of events, the chief umpire could call up events as rapidly as he could handle them. For example, if an emergency shoot could not be completed with one battery, he simply disengaged and let another group of umpires try with another battery. In most cases, all batteries fired an emergency mission. The missions were scored as either successful or unsuccessful, with no numerical score attached. The final mission required a night displacement to support the maneuver elements. Failure to be in position on time meant failing the test. Of course, if at any time during the test the chief umpire considered the battalion lacking, he could call for a conference with the test director to determine whether to stop the test at that point and fail the unit.

The point of failing a unit may upset some "oldtimers"; however, I never relieved an officer for failing an ORTT or ATT, since I believe it to be a training vehicle. Assuming good officers and men, I laid failure to a lack of training; therefore, failing the test indicated that the unit needed more training. The commander was told why his unit failed, given time for maintenance and more training, and retested. This usually resulted in pride being injured a bit. However, as long as the troops are provided what they need to perform in combat and survive, I consider the mission accomplished. Besides, you cannot flim-flam the troops. They know when they have performed well and when they have fallen short of the mark.

The phasing of this approach can be modified, as can the conduct of any phase. What impressed me most about this technique was that it provided flexibility, presented a challenge, and held the interest of the troops without sacrificing any standard established for the test. The most important point is that training must be realistic, meaningful, and challenging to gunner and cook alike. At no time can local constraints be permitted to bore the hell out of our men. And any test that fails to challenge the commander is not really a test.

Colonel William L. Shea was designated Chief, Field Artillery Branch, in October 1973. Colonel Shea went to Branch from duty with the Office of the Deputy Chief of Staff for Military Operations, DA. His commands include the 2d Infantry Division Artillery and the 7th Infantry Division Artillery in Korea and the 3d Battalion, 6th Field Artillery, at Fort Sill. He is a graduate of the Army War College and the University of Nebraska at Omaha. He was commissioned from OCS and has been awarded the Legion of Merit (OLC) and the Bronze Star Medal with V device.



Redleg Rangers

The Infantry/Armor Branch, EPD, MILPERCEN, is accepting volunteer applications for assignment to the 1st Battalion (Rangers), 75th Infantry, which is currently being organized at Fort Benning, Georgia. The Army's newest battalion is scheduled to be permanently relocated at Fort Stewart, Georgia, shortly after 1 July 1974.

Enlisted volunteers must either be airborne *and* ranger qualified or be willing to attend airborne and/or ranger school if selected for assignment to the new battalion. Applications will be accepted from Redlegs in MOS's 13A (E3's only) and 13E (E5's and E6's only).

Applications should be forwarded to Commander, US Army Military Personnel Center, ATTN: DAPCEPC-CI, Room 572, Hoffman Bldg. I, 2461 Eisenhower Avenue, Alexandria, Virginia 22331. For additional information, interested soldiers should contact MILPERCEN's Infantry/Armor Branch (SSG Mitchell, Autovon 221-8058/8059) or SFC Spain, PSNCO, 1st Battalion (Rangers), 75th Infantry (Autovon 784-4915).

Wanted

Redlegs in ranks E1 through E7 who hold, have held, or would like to hold MOS 15D, 15E, 21G, 27D, or 82C. If you desire a CONUS or a long or short overseas tour, you are in luck. Notify the FA Section, EPD, MILPERCEN, by submitting DA Form 2496 through channels.

TURNAROUND TIMES

In selecting individuals for reassignment, the FA Section, EPD, MILPERCEN, tries to follow the tour rotation sequence of CONUS, long overseas, CONUS, short overseas, CONUS, long overseas, etc. As of June 1974, the forecast turnaround times (in months) between CONUS and overseas assignments are as listed below. These figures will probably be good through December 1974.

MOS	E9	E8	E7	E6	E5	E4	E3	E2/1
13B			18	18	18	18	18	12
13E			18	18	24	24	24	24
13Z	48	24	24					
15B			18	18	18	18	18	18
15D			12	12	12	12	12	12
15E			12	12	12	12	12	12
15F			12	12	12	12	12	18
15J			12	12	12	12	12	12
15Z	48	24						
17A						12	12	12
17B			24	24	24	24	24	24
17C					24	24	24	24
17D			24	24	24	24	24	24
17E			30	30	30	30	30	30
17Z	48	24	24	24				
21G			18	18	12	12	12	12
21L		36	36	36	12	12	12	12
21M				24	24	24	24	24
21R				24	24	24	24	24
21S				24	24	24	24	24
21T				24	24	24	24	24
21U		36	36	36				
21V		36	36					
31D				12	12	12	12	12
27D				18	18	18	18	18
46A							12	12
46L				24	24	24	24	
46N			12	12	12	12	12	12
82C		36	24	24	18	18	18	18

Debate Ends

Which Is……..Oldest?

The July 1973 issue of the Field Artillery Journal included an article by Ensign Donald G. White which stated that the Newport Artillery Company "is acknowledged to be the oldest continuous commissioned military unit in the United States." In a letter published in the January-February 1974 issue of the Journal, LTC Roy C. Goff, commander of the 1st Bn, 201st FA, West Virginia National Guard, informed us that the 201st was the older of the two units. LT Martin J. Dwyer, a member of the Newport Artillery Company, wrote the Department of Military History to request adjudication. LT Dwyer was kind enough to provide us a copy of his letter. We have published it along with the reply from the Department of History.

From: 1LT Martin J. Dwyer, Artillery Company of Newport, Rhode Island Militia
To: US Army Center of Military History, Washington, DC 20315
Subj: Historical Data
Encl: (1) Copy of letter published in Field Artillery Journal, Volume 42, Number 1
(2) Copy of charter published in book form in 1858

The Artillery Company of Newport in the State of Rhode Island and Providence Plantations is always glad to hear about other oldtimers but still insists upon its claim to being the "oldest unit with continuous service" over that of the 1st Battalion, 201st Field Artillery.

a. The 1st Battalion, 201st Field Artillery, West Virginia Army National Guard, states it has a statement of lineage and honors showing its lineage back to 17 February 1735.

b. The 3d Infantry claims to be the "oldest unit with continuous service in the Active Army." I don't know whether they consider National Guard or organized militia as "inactive."

c. The 1st Company, Connecticut Governor's Foot Guard, claims to be the "oldest unit with continuous service in the United States" and is supported by a statement of such signed by President Nixon in 1971. (The company was organized in 1771.)

d. The 1st Battalion, 211th Field Artillery, Massachusetts National Guard, has a statement of lineage and honors showing lineage back to 5 March 1638 and that it was organized by Captain Myles Standish (State Adjutant General or equivalent), and this statement is signed by Major General J. C. Lambert, Adjutant General, US Army. The statement does not list any discontinuities of service, but the unit claims to be only the *third* oldest unit in the State of Massachusetts.

The 1/211 realizes that prior to the Revolutionary War, all military units organized and chartered were so done by the authority of the King of England. Rebelling against this authority revoked their charter, and therefore a discontinuance of service exists, even though the name of the unit persisted and officers and men remained under arms.

The Artillery Company of Newport (Newport Artillery), chartered in 1741 under the authority of King George II of England, was assigned the mission of "nursery of skillful officers . . . for the whole Militia." (Oldest artillery school with continuous existence? Oldest service school with continuous existence?) The company never fought against the British as a unit. Members of the company served with other commands, but the unit never violated its charter. When the British evacuated the Island of Rhode Island, they removed all public records (including the Artillery Company files), and due to the misfortunes of war, this particular ship sank near New London, Connecticut. From private papers, a list of the

continued on page 42

56th Field Artillery Brigade

PERSHING

in Europe

by
SP5 Alan C. Jacobson

The officers and men of Pershing units in Europe play an important role in the NATO umbrella of defense.

The parent organization for Pershing in Europe is the 56th Field Artillery Brigade, a command assigned directly to USAREUR and located in Schwaebisch Gmuend, about 30 miles east of Stuttgart. The brigade has four subordinate units: the 1st Battalion, 41st Field Artillery, also located in Schwaebisch Gmuend; the 1st Battalion, 81st Field Artillery, located in New Ulm, about 50 miles southeast of Stuttgart; the 3d Battalion, 84th Field Artillery, located in Neckarsulm, about 50 miles north of Stuttgart; and the 2d Battalion, 4th Infantry, with headquarters and one line company located in Ludwigsburg, 15 miles north of Stuttgart, and two line companies colocated with their supported battalions.

The 2d Battalion, 4th Infantry, is the only infantry unit in the United States Army that is organic to an artillery unit. This is an indication of what the 56th Brigade is all about—teamwork. The brigade is one of the few units in the Army to employ as many as 74 different enlisted MOS's, from clerks and medics to topographic-instrument repairmen and helicopter technicians. The brigade is really a combined arms team, drawing manpower not only from artillery but also from infantry, signal, engineers, and ordnance. For example, soldiers from the Signal Corps might have MOS 26L, tactical microwave systems repairman; the Corps of Engineers supplies a number of MOS's, such as 52B, power generator equipment operator/mechanic; the Infantry Branch is represented by MOS's 11B, 11C, and 11F. Unlike most units, the brigade has, within its Pershing battalions, organic direct support capabilities that enable quick repair of most of its equipment.

The Pershing missilemen, however, are those who are

directly responsible for insuring that the Pershing mission is accomplished. They complete their advanced individual training at Fort Sill, Oklahoma. This 8-week AIT course is designed to familiarize MOS 15E personnel with the various components of the Pershing system and introduce them to the specialized job skills required by Pershing. Upon graduation, selected personnel attend the Pershing Laying Specialist Course to acquire more advanced knowledge of the unique system for gaining direction for the missile. The most advanced systems course taught at Fort Sill is the Pershing System Maintenance Course for selected warrant officers and enlisted specialists. Noncommissioned officers prepare for their supervisory responsibilities by attending the Pershing Noncommissioned Officer Course. The Pershing equipment studied in these courses includes the erector-launcher, a combined launching platform and transporter for the missile; the programmer-test station, which contains the system computer and solves the gunnery problem; the power station, which provides high-pressure and conditioned air and all electrical power for the system; and the battery control central, an expandable van used as the command and control center.

As mentioned above, teamwork plays an important part in the 56th Brigade. The intricacies of the Pershing system demand that members of the brigade know their jobs thoroughly, and those who work directly with the missile itself, with few exceptions, must be able to move from one job to another with proficiency. This teamwork extends to everyone in the brigade, for without the assistance of the various support personnel, the equipment wouldn't operate for very long. In addition to cooperation and teamwork, training plays an important part in the 56th Brigade soldier's routine. Garrison training, periodic field training exercises, and duty at the combat alert status (CAS) site, where firing batteries are on 24-hour alert, help to maintain the high state of readiness required by Pershing's mission in Europe.

In many respects, the culmination of training in Europe is the artillery/ordnance and operational test firings that take place in Utah and Florida. For these tests, selected units in Europe return to CONUS for actual firing of the Pershing missile. The artillery/ordnance firings, conducted to test equipment improvements, take place at Blanding and Green River, Utah. For the operational test firings, the crews, missiles, and related support equipment are taken intact from the CAS site and transported to Patrick Air Force Base, Florida, home of the Air Force Eastern Test Range, where the missiles are fired just as they would be in Europe. No one knows who will be "tapped" for an operational test, and this keeps the crews on their toes.

Being a member of the brigade does not mean all work and no play. Travel to the many nearby countries occupies much of the soldier's off-duty time. Armed with a 3-day pass, a soldier can see many of the wonders of "old world" Europe.

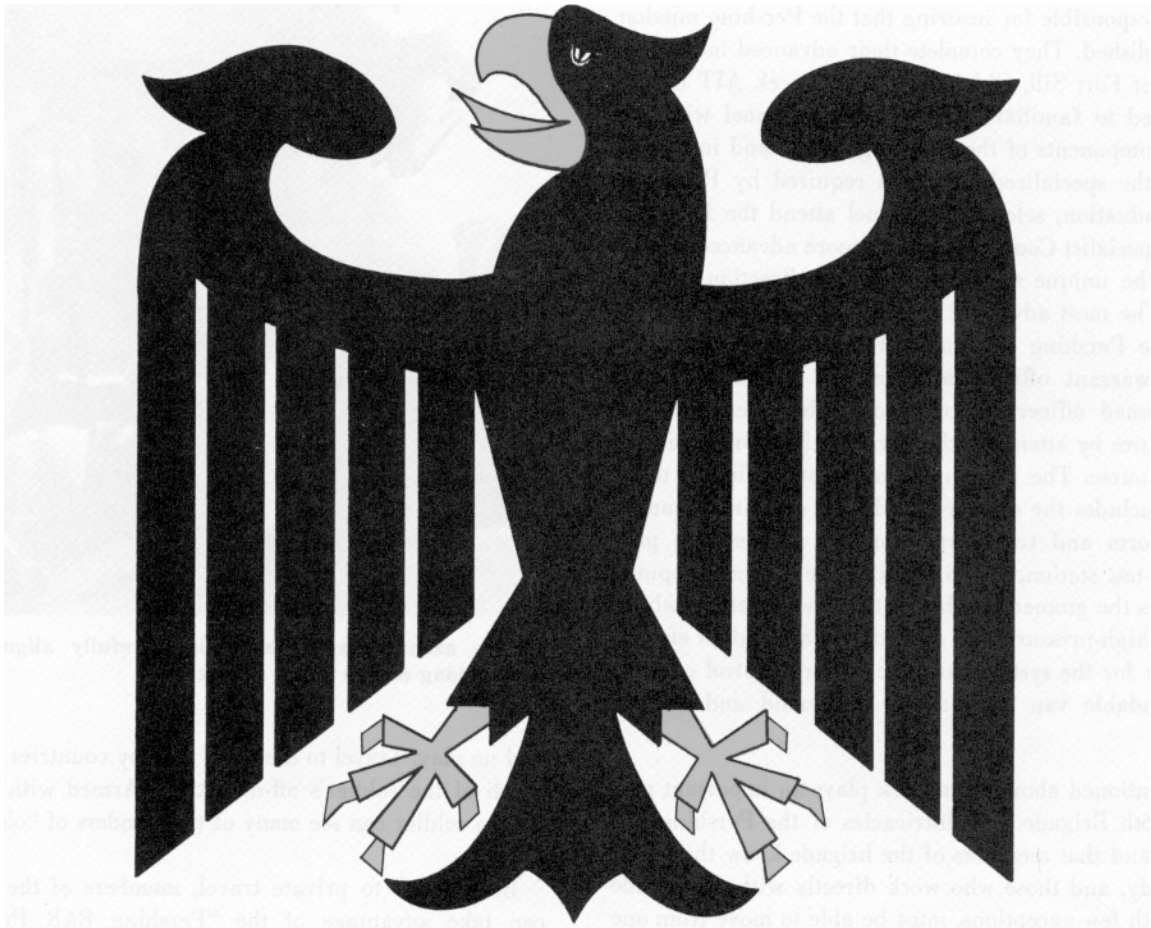
PHOTO COURTESY OF STARS AND STRIPES

The azimuth laying specialist carefully aligns the Pershing on the firing azimuth.

In addition to private travel, members of the brigade can take advantage of the "Pershing R&R Program," whereby 3-day passes are authorized and transportation is made available to take the soldiers and their wives to an Armed Forces recreation center at Berchtesgaden, Garmisch, or Chiemsee in the Bavarian Alps. Also available to members of the command is the Berlin Orientation Tour, which includes a week of administrative leave in Berlin to see the sights.

"Quick, Reliable, Accurate," the motto of the 56th Field Artillery Brigade, is appropriate to the teamwork that encompasses all members of the brigade. The Pershing system is one of the primary deterrents to worldwide conflict. The officers and men of the 56th Brigade realize this, and they work hard to get the job done. When they can, they take the opportunity for travel and new experiences; but above all, they accept the responsibility that is theirs.

SP5 Alan C. Jacobson, a native of Wilmington, Delaware, received his BS in radio and television production from Ithica College, Ithica, New York, in 1971. He took his advanced individual training at Fort Sill and is presently assigned to the 56th Artillery Brigade in Germany.



The Artillery of the Federal Republic of Germany

by

LTC Gerhard U. Dobbert

The German artillery provides the firepower for the defensive land forces of the Federal Republic. It is fully integrated into the ground combat organizations at brigade, division, and corps levels. As a North Atlantic Treaty Organization member, the Federal Republic conducts joint defensive operations with other NATO forces. These operations are facilitated by common equipment, integration of German forces into the NATO command, and thorough training of these forces to support NATO operational plans. The forward geographical position of the Federal Republic in the NATO defense scheme heightens the criticality of target acquisition and high mobility weapon systems. German tactical organizations must be highly flexible in order to adapt to changing role and mission requirements. In addition, the high population density of the area requires detailed coordination and control of fire support to minimize noncombatant casualties and facilitate destruction consistent with mission accomplishment.

The German artillery may be best described along

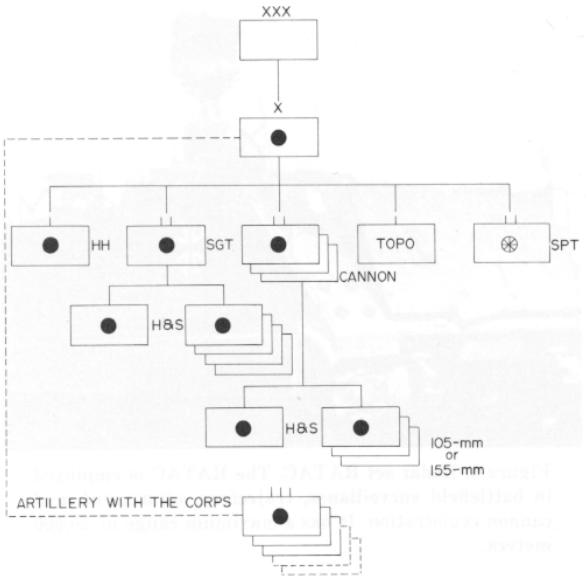


Figure 1. Corps artillery organization.

functional lines. It consists of artillery command staffs at corps, division, and brigade levels; firing artillery consisting of rocket artillery, armor artillery (self-propelled), field artillery (towed), and mountain artillery; and target acquisition artillery with sound ranging, flash ranging, radar, and drone systems. All cannon battalions contain three batteries, each of which has six cannons.

The corps artillery for each of the three corps in the

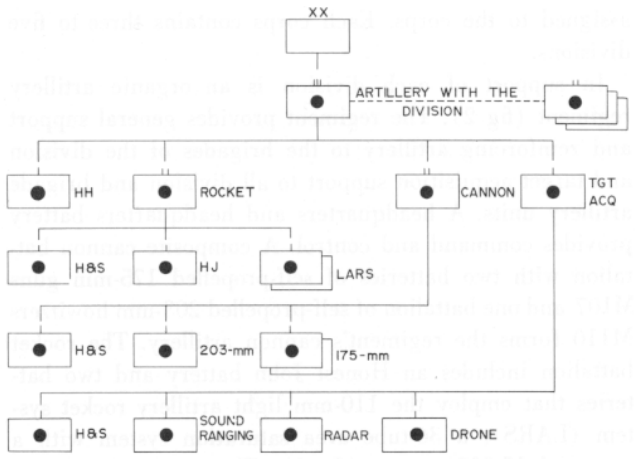
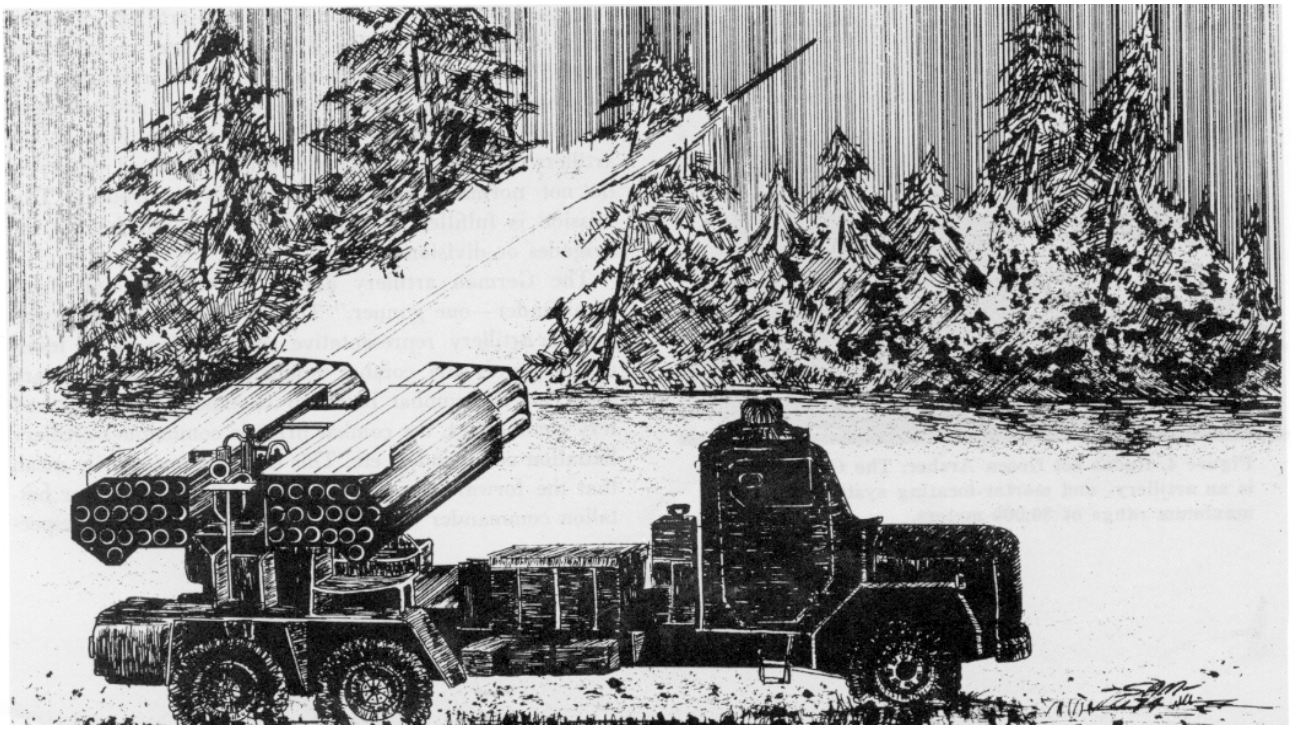


Figure 2. Division artillery organization.

German Army is divided into headquarters control, firing, and support elements (fig 1). The corps artillery headquarters and headquarters battery contains command, fire direction, communication, and service elements for the corps artillery commander. One missile battalion with four Sergeant systems (soon to be replaced by Lance) provides general support to the corps. Three cannon battalions provide reinforcing artillery to the divisions of the corps. Service elements consist of a topographical battery and a support battalion. The topographical battery conducts, records, and coordinates corps artillery survey operations, prints maps, and distributes maps and survey data to corps units as required. The support battalion transports, maintains, and secures special ammunition

Figure 3. Light artillery rocket system (LARS). The LARS is mounted on a 7-ton truck and can fire a salvo of 36 rockets in 18 seconds.



assigned to the corps. Each corps contains three to five divisions.

In support of each division is an organic artillery regiment (fig 2). The regiment provides general support and reinforcing artillery to the brigades of the division and target acquisition support to all division and brigade artillery units. A headquarters and headquarters battery provides command and control. A composite cannon battalion with two batteries of self-propelled 175-mm guns M107 and one battalion of self-propelled 203-mm howitzers M110 forms the regiment's cannon artillery. The rocket battalion includes an Honest John battery and two batteries that employ the 110-mm light artillery rocket system (LARS), a 36-tube area saturation system with a range of 15,000 meters (fig 3). The target acquisition battalion provides a highly centralized target acquisition capability to division artillery units. It contains three batteries. The sound ranging battery employs the sound ranging system 064. The radar battery employs two Green Archer self-propelled artillery- and mortar-locating radar sets (fig 4) and two RATAC self-propelled moving-target-locating radar sets (fig 5). The drone battery employs 12 drone aircraft, each equipped with two cameras that provide a day-night photographic capability for deep surveillance of the battle area (fig 6).

Each brigade has an organic direct support artillery battalion (fig 7). Each armor, mechanized, and light infantry brigade artillery is equipped with three batteries employing the self-propelled 155-mm howitzer M109G, which is a German modification of the US M109. The brigades of the mountain artillery division are equipped with the lightweight 105-mm mountain pack howitzer.

Each battery fire direction center has a battery computer

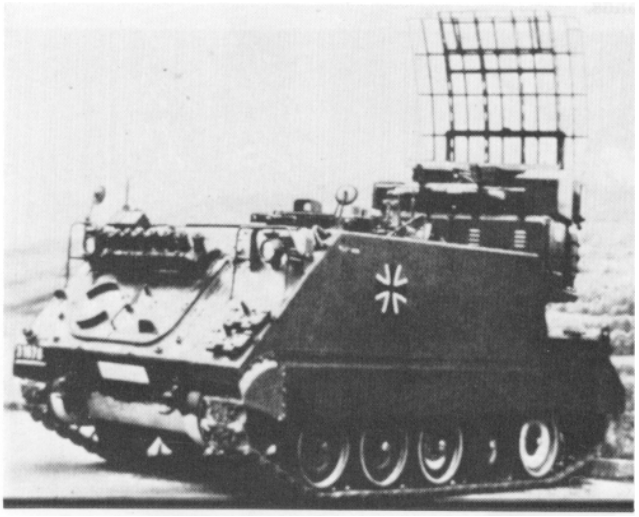


Figure 4. Radar set Green Archer. The Green Archer is an artillery- and mortar-locating system and has a maximum range of 30,000 meters.

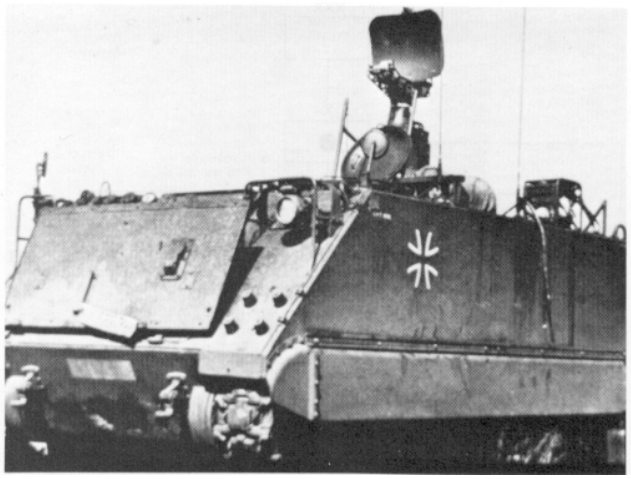


Figure 5. Radar set RATAC. The RATAC is employed in battlefield surveillance, trajectory adjustment, and cannon registration. It has a maximum range of 20,000 meters.

and can calculate its own fire commands. This allows the battery to operate independently from the battalion fire direction center.

The commander of a direct support battalion acts as an advisor to the maneuver force commander for the employment of all organic and attached artillery units. His fire coordination responsibilities include the heavy mortars of the infantry. His place is normally with the brigade commander. In his absence he is represented by the deputy battalion commander or the liaison officer. The battalion S2 is in the division artillery S2 radio net. Therefore, it is quite normal that the division G2 receives the most up-to-date information on the enemy and the battlefield situation more rapidly through artillery channels—from the forward observers to the battery commanders to the battalion S2's to the artillery regiment S2 to the division G2. The division artillery commanders expend a lot of effort and training in this reporting system because they know that responsive and effective reporting increases the influence and reliability of the artillery within the division. German forward observers do not normally act as forward air controllers. This mission is fulfilled by Air Force teams attached to the brigades or divisions.

The German artillery abides by the principle "one commander—one gunner." This is applied in force commander-artillery representative relationships at all levels of command—the combat company commander-forward observer, the combat battalion commander-artillery battery commander, the combat brigade commander-artillery battalion commander, etc. This does not necessarily mean that the forward observer or the artillery battery or battalion commander will be closely proximate to his respective

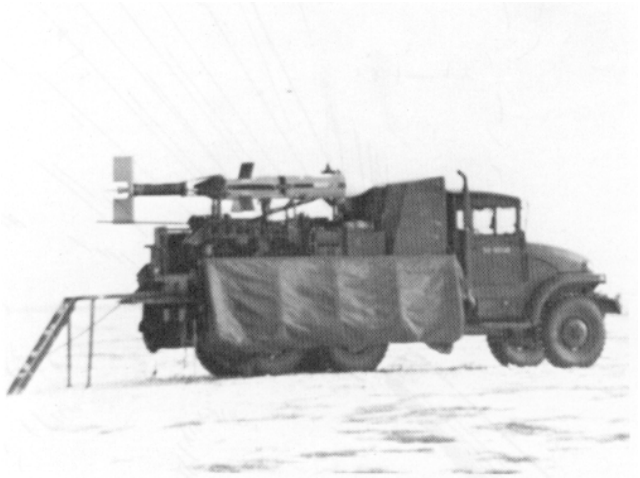


Figure 6. Photographic drone aircraft. A Canadian-developed system, the drone is launched from a truck mount and has a range of 100,000 meters.

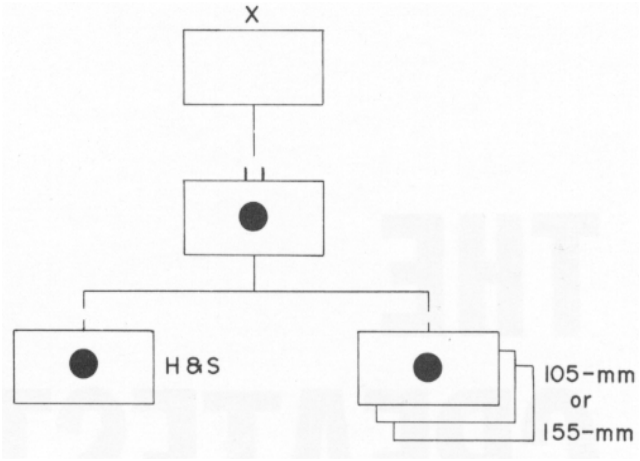


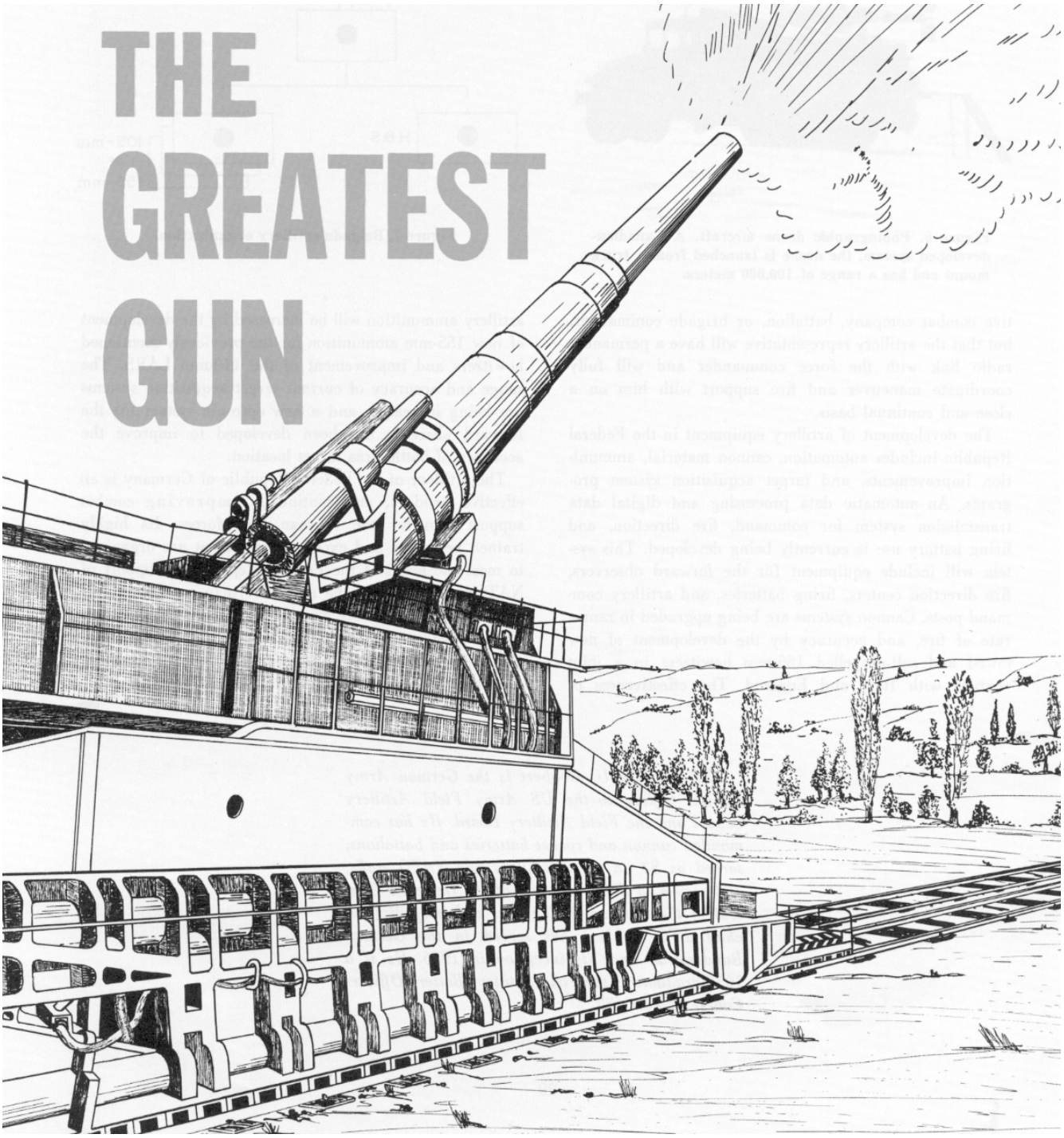
Figure 7. Brigade artillery organization.

combat company, battalion, or brigade commander, but that the artillery representative will have a permanent radio link with the force commander and will fully coordinate maneuver and fire support with him on a close and continual basis.

The development of artillery equipment in the Federal Republic includes automation, cannon material, ammunition improvements, and target acquisition system programs. An automatic data processing and digital data transmission system for command, fire direction, and firing battery use is currently being developed. This system will include equipment for the forward observers, fire direction centers, firing batteries, and artillery command posts. Cannon systems are being upgraded in range, rate of fire, and accuracy by the development of new towed and self-propelled 155-mm howitzers in a joint venture with Italy and England. The effectiveness of artillery ammunition will be increased by the development of new 155-mm ammunition for the previously mentioned howitzers and improvement of the 110-mm LARS. The range and accuracy of current target acquisition systems are being increased, and a new optronic system for the forward observer has been developed to improve the accuracy of battle area target location.

The artillery of the Federal Republic of Germany is an effective, modern, and continually improving combat support arm for the German land forces. Its highly trained personnel and excellent equipment are organized to meet the needs of the Federal Republic in support of NATO operations. As the major German contribution of firepower to the NATO punch, it is a potent and highly effective deterrent to armed aggression. As a flexible and responsive fire support means for the German Army, it can provide the needed support to land forces in combat.

LTC Gerhard U. Dobbert is the German Army Liaison Officer to the US Army Field Artillery School and the Field Artillery Board. He has commanded cannon and rocket batteries and battalions, served as S3 on corps artillery and NATO staffs, and served in the directorate of the Inspector General of the German Artillery as a deputy division chief. LTC Dobbert has served in the German Bundeswehr since its inception in 1956. He is a 1957 graduate of the Field Artillery Battery Officers Course at Fort Sill.


THE
GREATEST
GUN

An in-depth article on the greatest gun ever built – with previously unpublished photographs of the firing on Sevastopol.

by
MAJ Robert Edwards

There were worse places than Sevastopol, it seemed, for a Russian soldier in the late spring of 1942. True, the city was in its eighth month of siege, more than a hundred miles behind the German lines, but its defenders were occupying strong positions and they had just spent the winter in warmth and comfort compared to their comrades on the frozen northern fronts.

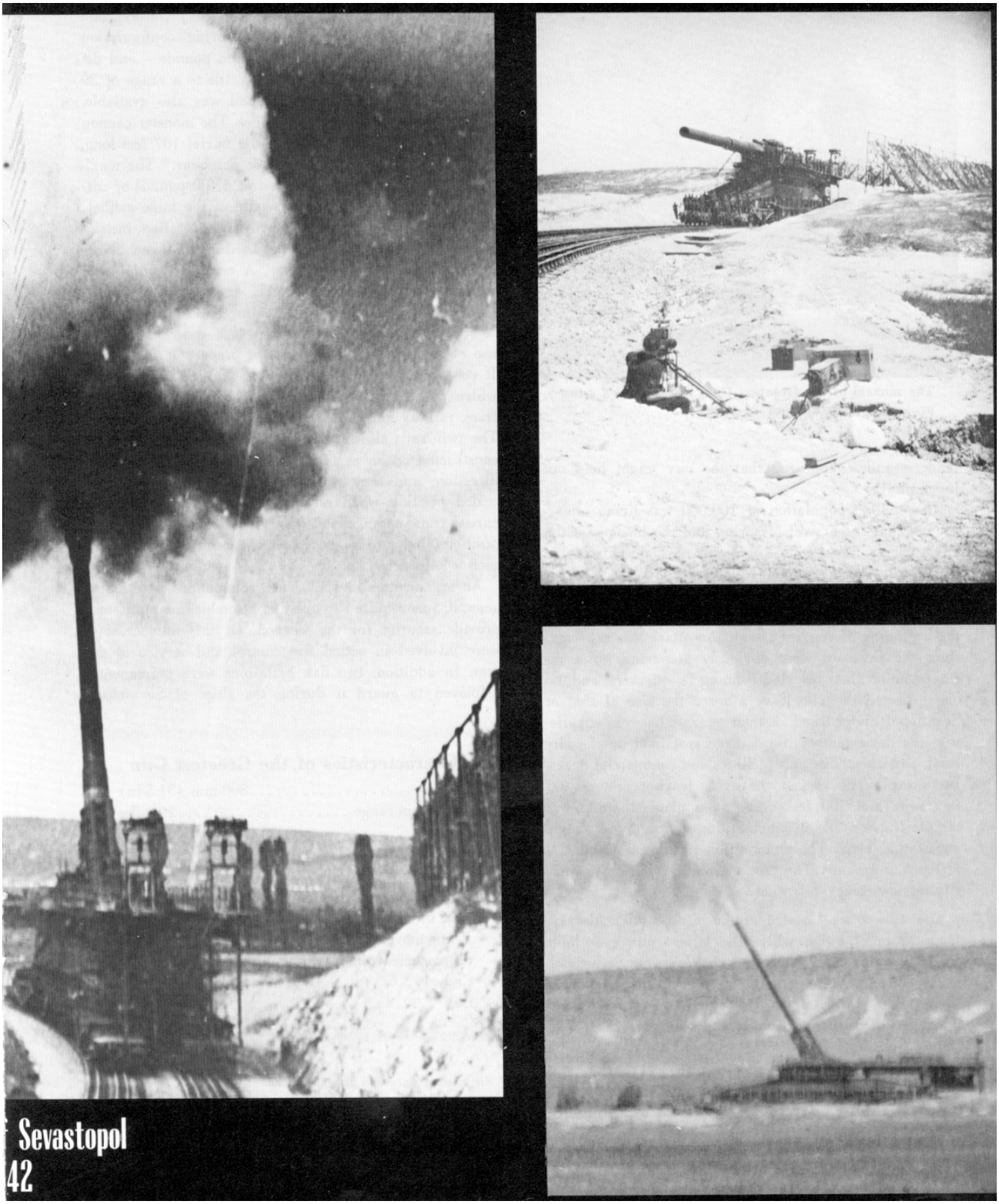
After surrounding the city from the landward side the previous October, the German Eleventh Army had been repulsed twice by Major General Ivan Petrov's forces, and the Russians had taken advantage of the winter months to further strengthen the vital seaport's formidable defenses.

Historically, a siege was nothing new for Sevastopol. Its older fortifications were constructed between 1806 and 1825, and these had shown great strength during the Crimean War when, in 1854 and 1855, they had held off an army composed of British, French, Italians, and Turks for more than 11 months.

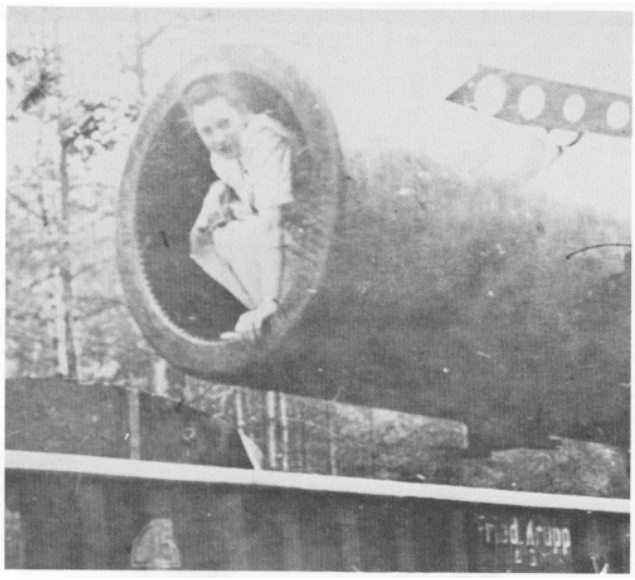
Beginning in 1939, the Russians had devoted special attention to moderizing and enlarging the defensive works. By 1942, the city was defended by 19 modern forts and 3,600 pillboxes and smaller permanent installations. Added to these were broad, deep ditches that barred the way to tanks, 137,000 mines, 220 miles of trenches, and extensive wire obstacles. These defenses were installed in three belts, the outer enclosing an area about 12 miles wide. The 107,000-man garrison was organized into seven rifle divisions, five separate marine infantry brigades, and numerous smaller formations—some 70 battalions in all. German press accounts labeled Sevastopol "the strongest fortress of the world" and declared that neither the Maginot Line nor their own West Wall could compare with it.

The manmade defenses were complemented by terrain that had little vegetation and sharp hills and ravines alternating across it. In spite of German air superiority, the Soviet Black Sea Fleet continued to deliver reinforcements and supplies at night. As in the Crimean War, the defenses of Sevastopol in 1942 had become a legend in the rest of Russia. Morale was high among the defenders,


The Siege of
19



Sevastopol
42



The muzzle of the Greatest Gun, which fired a 4-ton projectile a distance of 29 miles.

and it appeared that the city might hold out indefinitely.

The civilian population of 100,000 was living underground, but the arrival of spring and the blooms on the city's cherry trees made life almost normal. This idyllic situation was about to change, however.

At 0300 on 3 June, the fortress city was shaken by the massed fires of more than a thousand guns, clearly the beginning of another assault. An attack was expected, since the Germans were obviously preparing for a resumption of their previous summer's offensive and no one expected them to leave a force the size of that at Sevastopol undisturbed in their rear. What was surprising was the extent of the damage sustained by the city itself, particularly its port facilities and commercial docks. Huge explosions racked the area, leaving craters 100 feet wide and 100 feet deep. Even more stunning was the destruction of an ammunition dump by a single devastating blast. The ammunition had been stored 100 feet below ground! The city was under attack by a terrifying new force—but what?

The answer was located at the city of Bakhchisaray, some 20 miles away, where the largest gun ever built was firing projectiles as heavy as boxcars into Sevastopol. Designed and manufactured by the Krupp armament works, this leviathan was the culmination of 7 years' research and development and the descendent of the notorious "Big Bertha" that had flattened Belgian forts in 1914.

This now-legendary weapon was so enormous that difficulty arises in separating fact from fantasy when describing it. Originally known as "Heavy Gustav" and later as "Dora," the gun in its firing configuration weighed 1,350 tons—nearly 3 million pounds— and delivered a 4-ton high-explosive projectile to a range of 29 miles. A 7-ton armor-piercing shell was also available, with a maximum range of 13 miles. The monster cannon had a caliber of 800 millimeters, a barrel 107 feet long, and a rate of fire of three rounds per hour.* The maximum propelling charge consisted of 4,400 pounds of cordite and was 15 feet long. In spite of the huge caliber, a short shell case was used, to provide obturation, instead of the expanding rings normally used in the breechblocks of large and medium artillery. A complete round—the maximum charge, the projectile, and a ballistic windshield (ogive) fitted during loading—was 26 feet long.

The outsized weapon required 4 to 6 weeks and the use of a giant overhead crane to prepare it for action. It could be fired only from an 80-wheeled railroad car, which was so wide that it required a strengthened twin-track railway and had to be assembled at the firing site. The twin rails also served two other purposes: they were constructed on an arc that was used to lay the gun for direction, and they provided for movement to a concealed position when no firing was taking place. The curved track arrangement was typical of railway artillery positions, but never before had one been constructed on such a large scale.

An organization of 1,420 men, commanded by a major general, was required to operate, assemble, maintain, and provide security for the weapon. Of this number, 500 were involved in actual fire control and service of the gun. In addition, two flak battalions were permanently employed to guard it during the siege of Sevastopol,

Characteristics of the Greatest Gun

Caliber	800-mm (31.5-in)
Maximum range	29 miles
Weight	1,350 tons
Tube length	107 feet
Projectile weight	AP, 7 tons; HE, 4 tons
Propellant weight (max)	2.2 tons
Rate of fire	3 rounds per hour
Prime mover	Rail
Emplacement time	4-6 weeks
Crew	500
Cost	$4 million

* *All sources agree on the gun's caliber, but some discrepancies exist in listings of other characteristics. Where these occur, the most frequently listed or most modest figures are used.*

although the Soviet air threat was negligible there.

The origin of this fantastic weapon can be traced to 1935, when the German Army Ordnance Office asked the Krupp organization to determine what weight and speed of projectile would be required to smash the massive defenses of the Maginot Line, which was then under construction. This inquiry resulted in preliminary blueprints for siege guns with calibers of 700, 800, and 1,000 millimeters.

Nothing further was done on the project until March 1936, when Hitler visited the Krupp works and asked about the giant gun's feasibility. He was told that such a weapon was theoretically possible although some problems could be expected in forging the huge parts needed for such a solid piece of ordnance.

Hitler did not issue any instructions at that time, but Krupp began preparing detailed plans and, in early 1937, discussed them with the army's experts. The 800-mm version had been selected by then, and high-ranking Wermacht officers, still smarting from the Kaiser's use of navy gunners to operate the famous Paris Gun in 1918, were very eager to receive their secret weapon.

Production of the huge weapon was well advanced when the war began, but technical difficulties prevented its completion in time for the drive against France in 1940. As a result of Hitler's continued inquiries about the project's progress, Krupp assigned it the highest priority, and early in 1941 the weapon was ready for its initial test firing. Later that spring it was fired again, this time at the Hugenwald range with Hitler and other top Nazi leaders as witnesses.

By this time, the only uses the army commanders could visualize for the gun were cross-channel bombardment (with the attendant risk of Royal Air Force intervention) and possibly against Gibraltar (if the Spanish would cooperate).

Nevertheless, the project was so near completion that there appear to have been no reservations about completing it—especially since Krupp was paying the development bill. As for the scarcity of targets, Hitler would soon solve that problem.

It is unlikely that the gun was ready for action by the time the Soviet Union was attacked. Even if it had been, its huge dimensions and lengthy preparation for firing would hardly have been consistent with Germany's covert buildup for the attack.

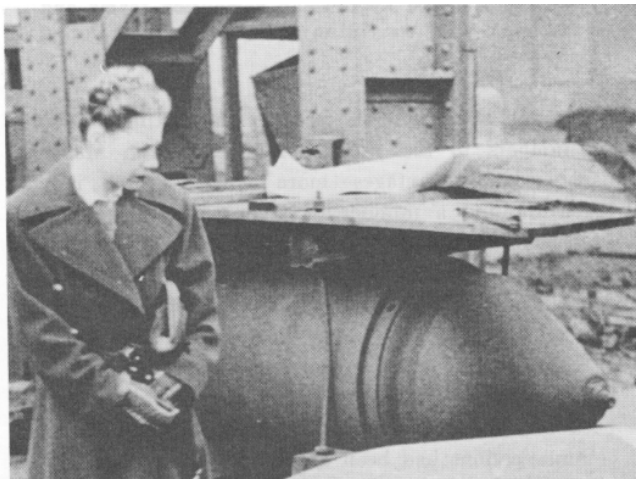
By the winter of 1941-42, the monster gun had been turned over to the army. Named "Heavy Gustav" by its builders—in honor of Gustav Krupp von Bohlen und Halbach, the husband of Big Bertha's namesake—the weapon had been completed at a cost of 10 million reichsmarks ($4 million). The lines around Sevastopol had stabilized with the onset of bad weather, and it was apparent that the city could not be taken before spring, if then. Clearly, here was a suitable target for Heavy Gustav. Preparations were begun to move the gun to the distant battlefield.

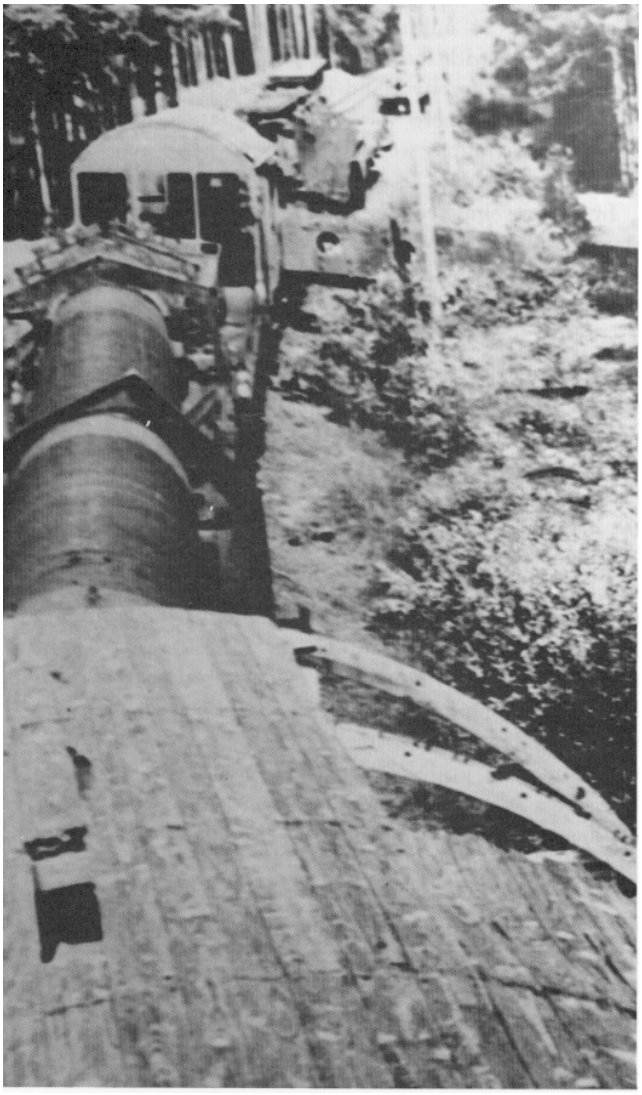
In its traveling configuration, the gun and its associated equipment required 60 railroad cars. These were moved to the vicinity of Sevastopol in April and construction was begun on the massive firing mountings. By 3 June, when the bombardment began in preparation for the attack, Heavy Gustav was ready. One change had taken place. As often happens, the manufacturer's nickname had not survived after the equipment reached the troops. By the time the gun went into action, it had been rechristened "Dora" by its crew. The identity of the original Dora is uncertain.

Though the gun had been designed for attacking fortified positions, its primary targets at Sevastopol were the port facilities within the actual city. Its accuracy had apparently proved insufficient for attacking point targets. The slow rate of fire made adjustment of fire by observers impractical, so a system of "mapshooting"—applying all possible corrections and firing without observation at a grid location—was used. This required large area targets, such as the harbor area. Destruction of the underground ammunition dump was probably just a lucky shot.

While the Sevastopol garrison was strengthening the city's defenses during the winter, the Germans also had been busy. Colonel General Erich von Manstein, author of the plan that had broken France's defenses 2 years earlier, was commanding the Eleventh Army, and he had two Rumanian and seven German divisions ready for

Two shells of the type used in the siege of Sevastopol.





The greatest gun on a siding near Grafenwoehr. When found by Major Busbee, the weapon had been heavily damaged by German demolition teams and the train itself was in an advanced stage of decay.

the assault by June. This force was approximately equal in numbers to the Russian force, but von Manstein had two vital advantages—more than 1,300 guns, including Dora and a number of other siege weapons, had been assembled, and the VIII Air Corps, with more than 600 aircraft, was in support. Against this, the Russians could muster 600 guns but only 53 aircraft. Other Soviet air units were too far away to provide any assistance.

After a 4-day artillery and air preparation, the Germans and their allies attacked. Sevastopol's air force had been knocked out of the fight by the second day and communications had been damaged, but it was soon apparent that the defensive works and the soldiers who manned them had hardly been affected. Opposition was fierce, and the attack soon bogged down into a series of local battles. The German artillery and air superiority isolated the individual strong points and pinned down the Soviet reserves. With communications gone and no hope of reinforcement, thousands of pillbox and gun crews made their final stands in fights that, for the most part, are unrecorded.

The turning point finally came on 18 June, when Fort "Maxim Gorki" (as the German artillery observers had named it) fell. This massive strongpoint, more than 300 yards long by 40 yards wide, was constructed to a depth of three stories underground. Its main armament consisted of four 280-mm cannon mounted in two armored naval turrets. The fort had its own water and power supplies, field hospital, canteen, engineering shops, ammunition lifts, arsenals, and underground battle stations. Every room and corridor was protected by double steel doors that had to be blasted open individually. The zeal with which the fort was defended is best illustrated by the fate of its 1,000-man garrison—only 50 prisoners were taken, and these had all been wounded.

The fall of "Maxim Gorki" broke the backbone of Sevastopol's northern defenses. The Germans captured the northern half of the fortress and launched an amphibious operation across Severnaya Bay on the night of 28-29 June in conjunction with renewed infantry assaults from the east.

On 1 July, Fort Malakhoff, the dominating height on the eastern edge of the city, was captured. The capture of this fort had ended the earlier siege in 1855, and this was again the case in 1942. The city was occupied on 2 July and the final capitulation took place 2 days later, although isolated groups held out longer. The Germans reported losses of 27,000 killed, wounded, and missing compared to Russian losses of 30,000 killed and 90,000 captured. Some of these were undoubtedly civilians, as the total figure exceeds the number of military defenders.

But what of Dora? Realistically, the monstrous gun had contributed very little to the victory. About 40 rounds had been delivered, and these undoubtedly had considerable effect on their points of impact; however, this represented a poor return on the manpower and money invested.

The real heroes of Sevastopol, from the German viewpoint, were the infantrymen and combat engineers who had braved the Russian fire, placed demolitions against fortifications, and plunged into the ruins to dislodge the defenders. They suffered heavy losses, and it was their sacrifice that made the victory possible.

This 6-foot ballistic windshield (ogive) was used to protect the fuze from premature detonation.

Major General Petrov had escaped from the doomed fortress by sea on the night of 29-30 June. He was not criticized by his superiors and was later promoted and placed in command of an army group. Von Manstein was promoted to field marshal following his army's victory at Sevastopol. He survived the war, remaining on the Eastern Front for its duration.

Dora's subsequent history is not so well documented. Some of the siege artillery at Sevastopol was moved to Leningrad, but Dora apparently was not included. There are reports that the gun was used to fire about 30 rounds in the vicinity of Warsaw in 1944, but this action is denied by other sources. Early stories of the weapon also suggest that it was used to attack targets across the English Channel, but this is unlikely in view of the Western Allies' air capability and the absence of substantiating data.

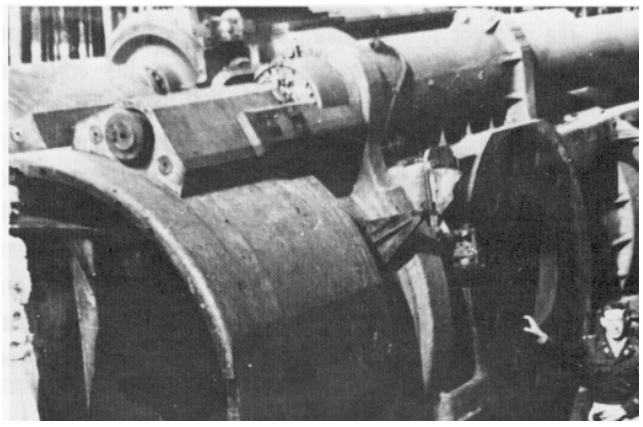
German references to Heavy Gustav and Dora led postwar historians to believe at first that at least two identical 800-mm weapons existed. The US Third Army discovered one (with a spare barrel) near Grafenwoehr, partially destroyed and resting on the remnants of 14 railroad cars. The Ninth Army found an additional barrel and some ammunition in the remains of the Krupp factory at Essen. It was also suspected that another of the giant guns might have been captured by the Russians.

There are a few dissenters, but most researchers now agree that only one 800-mm gun ever existed and that it bore the names "Heavy Gustav" and "Dora" at different times. Surprisingly, recent historians have overlooked the gun discovered in the Grafenwoehr area—although it is definitely verified by Third Army records and by eyewitness accounts and photographs (which, when compared with those taken by the Germans at Sevastopol, leave no doubt that it is at least the same model as was used in the siege). These annalists' reports conclude that either the materials found at Essen were the remains of Dora or she simply vanished (presumably in eastern Europe). The two-gun theorists account for both weapons with these explanations.

On the basis of evidence now available, it is this author's belief that only one of the giant guns ever was built and this was the one found by the Third Army near Grafenwoehr. The weapon parts recovered at Essen appear to have been just that—the remains of equipment used in development and testing, replacement parts for Dora, or components of additional weapons that Krupp hoped the army would order. It is very hard to believe that the gun would be returned to the factory after it had been accepted by the army and used in combat. The possibility that an additional gun was captured by the Red Army is also very remote. Until now, almost 30 years after the end of the war, no Soviet history has supported this idea, and it seems certain that the Russians—despite their penchant for secrecy—would surely have taken advantage of the propaganda value inherent in the capture of such a massive war machine.

Although Dora certainly survived the war, her ultimate fate is a mystery. Since she was located in the American occupation zone, she must have been destroyed under the supervision of US authorities, but, strangely, there seems to be no record of her final disposition.

The gun's sleigh and recoil mechanism mounted on its special flatbed railcar. The man is believed to be Major Busbee, who sent these photographs of the greatest gun to the Field Artillery School after the war.



There are undoubtedly former members of the occupation force who know what became of Dora, but their story has not been told; until it is, her disappearance will remain a riddle.

Another unusual aspect of the huge weapon's story is that its manufacturer never earned a pfennig from the project. After spending millions on its development, the gun's namesake (Gustav) presented it to Hitler as a gift (although there is no record that the Fuehrer ever acknowledged its receipt). Krupp undoubtedly expected to build additional copies of the behemoth—at a selling price of 7 million reichsmarks each—but the army had seen enough at Sevastopol to conclude that no more were needed.

Dora's statistics are certainly impressive and the damage she caused to Sevastopol's dock was massive, but what was her actual military value? Historically, this greatest of guns occupies the same position as Japan's Yamato-class battleships of the same era—a conventional weapon enlarged to gigantic, superdimensional proportions. Matched against other weapons of her type, Dora would have been invincible; but at the time she was built she was already as obsolete as the dodo. An emplacement time of 4 to 6 weeks and a proportional period for displacement would make any weapon almost useless in a war involving any movement, particularly against an enemy equipped with an effective air force (the Germans had complete air supremacy at Sevastopol in 1942). In addition to its vulnerability, the weapon delivered a small volume of fire in return for its huge cost, though this was largely unobserved. That Dora was used only once (or twice, depending on the source) is very significant.

The enormous weapon also failed to achieve any important psychological effect. In 1918, life in Paris had been paralyzed when the city was attacked by the Paris Gun from a range of 70 miles. News of the Paris bombardment spread rapidly through all the Allied capitals, and military resources were diverted from other missions on a priority basis to deal with the long-range menace. Dora never accomplished anything on this scale. She merely added her weight to more than a thousand other cannon already bombarding every part of Sevastopol and, while this weight was massive, it is doubtful that more than a few of the city's defenders even knew she existed. In fact, her existence remained generally unknown to the Allies until after the war.

Still, from an artilleryman's point of view, Dora really must have been something to see. Considering her place as history's greatest gun and the certainty that nothing like her will ever be built again, it has to be considered a minor tragedy that she wasn't preserved for display at Fort Sill or Aberdeen.

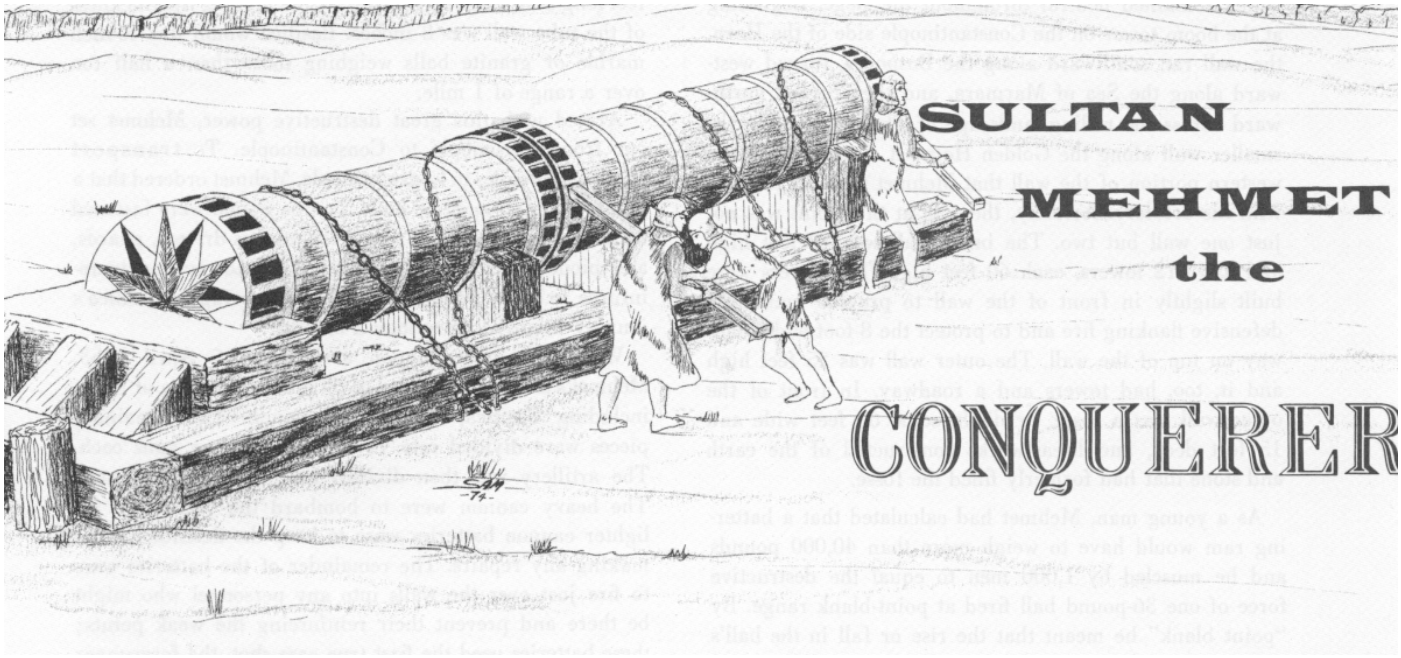
MAJ Robert R. Edwards has a BA in journalism from Arkansas Polytech and is a graduate of the Field Artillery Officer Advanced Course. He was assigned as battalion, division artillery, and division G3 advisor in Vietnam and has also served in Germany and at Headquarters, Department of the Army. Major Edwards is presently assigned to the Gunnery Department of the Field Artillery School.

The rare photographs shown on the preceding pages were discovered by the author while researching the article in the Morris Swett Technical Library at the US Army Field Artillery School. The collection of 28 photographs was attributed by library records to Major Busbee, who sent them to the School shortly after World War II. The man in the photograph on page 37 is believed to be Major Busbee; none of the females were identified. The photographs of the gun firing are logically assumed to be copies of captured German photographs.

The Ordnance Museum, Aberdeen Proving Grounds, has one of the shells of the giant gun, but museum personnel knew of no one who could say with certainty what happened to the gun after the war.

The German Liaison Officer at Fort Sill is forwarding a copy of the article to German military historians in an attempt to determine the fate of the greatest gun that was ever built.

If anyone, particularly veterans of the US Third Army, has any information about the giant gun, please contact the editor of the JOURNAL.



by
CPT Burt A. VanderClute II

Few modern artillerymen are aware of or appreciate the contributions made to cannon artillery by Sultan Mehmet (or Mohammed) II (1430-1481). Known as "the Conquerer" because of his conquest of the great walled city of Constantinople, Mehmet has been called by J. F. C. Fuller "the first really great gunner in history." Among his innovations are the first coordinated use of huge siege guns, the first use of indirect high-angle fire employing a forward observer to spot and adjust the impacting rounds, and the first use of true case, or cannister, shot.

To understand the originator of these artillery techniques, some knowledge of Mehmet's background is necessary. He was the eldest son of Sultan Murat II. His mother was a beautiful slave girl of Albanian origin. Mehmet was of average height but was strikingly handsome and highly intelligent. Educated alternately by his stepmother, Mara Branhovich, and his tutor, Jacobo of Gaeta, an Italian Jew, the young Sultan became master of six languages, mathematics, and history. He was especially impressed by the great generals of antiquity—Alexander, Cyrus, Caesar, and Hannibal. It is recorded that when he was in his teens, he told his tutors that he wished to conquer more land and see more things than the great Alexander and Julius Caesar. This wish came true, and much of the credit is due to the Sultan's creativity in, and extensive use of, artillery.

Mehmet's father died in 1451, and Mehmet rushed to Adrianople (now Edirne in Western Turkey) to become sultan at the age of 21. Almost immediately he set about planning the fall of Constantinople. His father had laid siege to the city earlier, but Emperor Constantine and the Byzantines had survived. Mehmet believed that the key to conquering the city lay in the destruction of the city's walls.

Thirteen miles of wall surrounded the city. Four miles of the wall ran along the northern portion of the city and

bordered on the Golden Horn, an inlet of the Bosporus. This portion of the wall, being only about 25 feet high, was of less substantial construction than the remainder. A boom of heavy chain and floating logs prevented access to the Golden Horn, headquarters of the Byzantine fleet. This boom could be raised and lowered through the use of two towers, one on either side of the inlet. On the northern side of the Horn was the city-state of Galata, which remained neutral throughout the siege. Beginning at the boom tower on the Constantinople side of the Horn, the wall ran southward along the Bosporus, turned westward along the Sea of Marmara, and then turned northward across the rolling landscape of Thrace to rejoin the smaller wall along the Golden Horn. It was the landward western portion of the wall that Mehmet planned to force with his artillery. Actually, the wall at this point was not just one wall but two. The inner wall was 40 feet high and had 112 towers, each 60 feet high. The towers were built slightly in front of the wall to provide maximum defensive flanking fire and to protect the 8-foot-wide roadway on top of the wall. The outer wall was 25 feet high and it, too, had towers and a roadway. In front of the outer wall was a fosse, or ditch, some 60 feet wide and 15 feet deep, and breastworks constructed of the earth and stone that had formerly filled the fosse.

As a young man, Mehmet had calculated that a battering ram would have to weigh more than 40,000 pounds and be muscled by 1,000 men to equal the destructive force of one 36-pound ball fired at point-blank range. By "point blank" he meant that the rise or fall in the ball's trajectory would not exceed the ball's diameter. He knew that if he could cast a cannon of sufficient size, the walls would present no problem. As fortune would have it, a Christian renegade named Urban volunteered his services as an artillerist and cannon maker. Hammer-Puigstall relates the following interview, which took place at Mehmet's headquarters in Adrianople:

Mehmet: Can you cast a cannon that will shake the walls of Constantinople?

Urban: I can cast cannon of any caliber whatever and reduce to dust the walls of Constantinople even as those of Babylon. I am sure of my art. But I cannot determine how the pieces shall be transported.

Mehmet: Commence the casting. The transportation will be decided upon later.

Urban immediately began work on a half-scale model of the great bombard he envisioned would crumble the walls of Constantinople. When the model was finished, he offered to demonstrate it for the Sultan, and his first shot sank a Venetian ship that had drifted within range. The Sultan was elated at the effectiveness of the gun's first round and ordered that work on the great gun begin immediately.

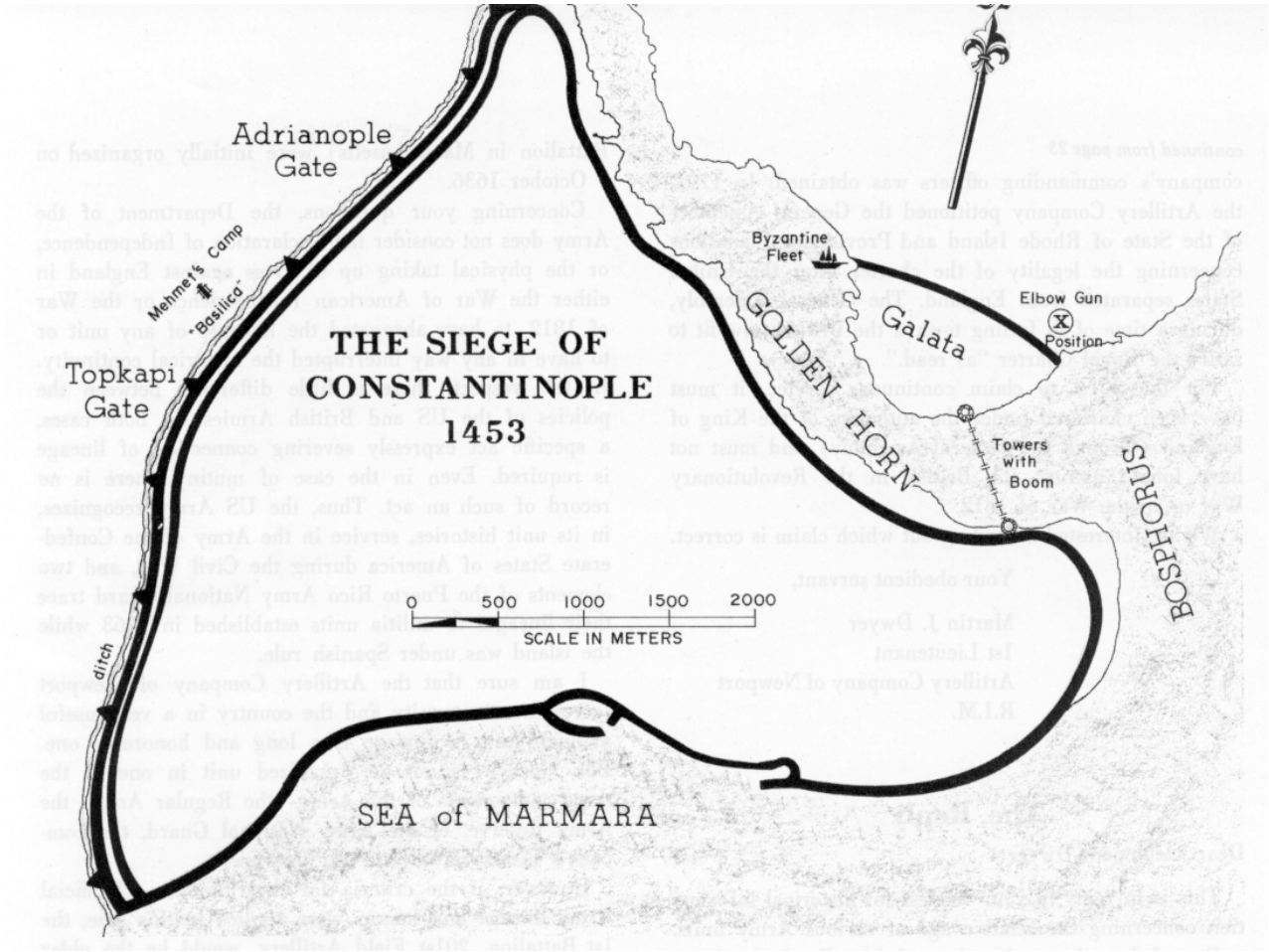
The casting required many days and enormous quantities of bronze and steel. When finally the metal had solidified, the clay casts were broken and the great gun was exposed. Steel bands were placed around the piece to add strength, and then the whole was polished until it gleamed. When finished, "Basilica," for so it was named, was 32 feet long and weighed 17 tons. At the muzzle, the thickness of the tube wall was 8 inches. Basilica would fire 40-inch marble or granite balls weighing more than a half ton over a range of 1 mile.

Armed with this great destructive power, Mehmet set out from Adrianople to Constantinople. To transport Basilica 150 miles to Constantinople, Mehmet ordered that a giant, flexible wagon be built. To this wagon were fastened 60 oxen. More than 500 men were used as drivers, guards, and pioneers to widen and level the roadway and to reinforce existing bridges or build new bridges. Basilica's journey required more than 2 months.

When the great cannon arrived on 5 April 1453, Mehmet's artillery consisted of 69 pieces. Thirteen of these, including Basilica, were large cannon. The remaining pieces were divided into 14 batteries of four guns each. The artillery was then divided into three main groups. The heavy cannon were to bombard the walls, and the lighter cannon batteries were to keep the defenders from making any repairs. The remainder of the batteries were to fire just over the walls into any personnel who might be there and prevent their reinforcing the weak points; these batteries used the first true case shot, the forerunner of cannister—hollow balls filled with stone and metal fragments that would scatter when the balls exploded on impact. When all was ready on 12 April, Sultan Mehmet gave the order and thus began the first great organized bombardment in history.

The roar of the cannon was deafening. The earth trembled and ships at anchor in the Golden Horn tossed on the chains. Due to the huge size of the great guns like Basilica and the logistics involved in their loading and aiming, these could be fired only six to eight times a day. But these guns caused their share of damage. Great cracks appeared in the walls where the cannon had struck. The Byzantines knew it was only a matter of time before the walls, and thus the city, would fall.

As the bombardment continued, Mehmet became impatient. On his tours of the battle area, he noticed that the Byzantine fleet was still at anchor in the Golden Horn. He ordered his commanders to fire on the fleet with their cannon. They explained that this was impossible because the walls of Galata prevented a clear shot. The author Kritovoulos relates that the Sultan then explained the need for a new type of cannon that would fire indirect plunging



fire. This cannon would be positioned and aimed according to mathematical laws and would fire its shot at great heights. Mehmet drew a rough sketch of such a cannon, explained the mathematical theory involved to his gunners, and ordered that work begin on the project immediately.

When the cannon was ready, an officer was positioned on a nearby hill so that he could see the ships at anchor in the Golden Horn and relay corrections to the firing battery by means of hand signals. When the order to fire was given, the projectile flew quickly from the newly cast "elbow gun" and reached great heights. This first shot was a near miss. The forward observer relayed his corrections and the second round struck a vessel amidships, sinking it immediately. Thus the first planned use of indirect high-angle fire brought a new use of artillery to the battlefield.

The great bombardment of Constantinople, which had begun on 12 April 1453, lasted for 47 days. Many sections of the city walls had been reduced to dust, but the great breakthrough into the city occurred at Topkapi (Turkish for "artillery gate"). Constantinople had fallen to the Turks, and Mehmet's conquest was due in great part to his organized use of artillery.

Among his innovations in the use of artillery were the first use of case shot, the first great organized bombardment, and the first use of precision high-angle fire. Urban had kept his word to cast a cannon large enough to reduce the walls of Constantinople to rubble, but it was Sultan Mehmet the Conquerer who first dreamed of the great power of artillery and then made the dream come true. A new concept of war was given the world. As Fairfax Downey wrote, quoting Oman: "The capture of Consantinople by Mehmet II was probably the first event of supreme importance whose result was determined by the power of artillery."

CPT Burt A. VanderClute II, a 1967 graduate of Rutgers University, attended OCS and received his commission at Fort Sill. He graduated from the Field Artillery Officers' Advanced Course in October 1973. Captain VanderClute studied Turkish at the Defense Language Institute, Monterey, California, and served two tours in Turkey and one in Germany. He is currently serving as aide-de-camp to the US Permanent Military Deputy, Central Treaty Organization, Ankara, Turkey.

continued from page 23

company's commanding officers was obtained. In 1791, the Artillery Company petitioned the General Assembly of the State of Rhode Island and Providence Planations concerning the legality of the charter after the United States separated from England. The General Assembly, during a time of ill feeling toward the British, saw fit to ratify the Royal Charter "as read."

For the 201st to claim continuous service, it must have been chartered under the authority of the King of England (through the General Assembly) and must not have fought against the British in the Revolutionary War or in the War of 1812.

We are interested in finding out which claim is correct.

Your obedient servant,

Martin J. Dwyer
1st Lieutenant
Artillery Company of Newport
R.I.M.

The Reply

Dear Lieutenant Dwyer:

This is in reply to your request for historical information concerning the relative age of various Army units.

One of the primary functions of this office is the determination of lineages and honors of units in the Regular Army, Army Reserves, and Army National Guard, but we make no special attempt to determine the relative age of these various organizations. However, the oldest Regular Army unit (1st Battalion, 5th Field Artillery) dates back to March 1776, and the oldest Army National Guard units (the 182d Infantry and 101st Engineer Battalion in Massachusetts) were initially organized on 7 October 1636.

Concerning your questions, the Department of the Army does not consider the Declaration of Independence, or the physical taking up of arms against England in either the War of American Independence or the War of 1812, to have abrogated the lineages of any unit or to have in any way interrupted the historical continuity. In this respect, there is little difference between the policies of the US and British Armies. In both cases, a specific act expressly severing connection of lineage is required. Even in the case of mutiny, there is no record of such an act. Thus, the US Army recognizes, in its unit histories, service in the Army of the Confederate States of America during the Civil War, and two elements of the Puerto Rico Army National Guard trace their lineages to militia units established in 1763 while the island was under Spanish rule.

I am sure that the Artillery Company of Newport serves the community and the country in a very useful manner, and its lineage is a long and honorable one. But, since it is not an organized unit in one of the three components of the Army—the Regular Army, the Army Reserve, or the Army National Guard, the company's history is beyond our purview.

However, if the criteria for determination of official Army lineage and honors were applied in this case, the 1st Battalion, 201st Field Artillery, would be the older of the two units.

We appreciate your interest in oldtime Army units and trust that the above answers your questions.

Walter L. McMahon
Colonel, Infantry
Chief, Historical Services Division
Office of the Chief of Military History

Downhill?

I would like to conclude my remarks by sharing with you a personal incident in my life. In 1953, while serving here at Fort Sill as a second lieutenant, I volunteered to go on a certain sensitive mission as an "observer." Within a few hours, I was on a military aircraft winging my way to Nevada. By noon the following day, I found myself in a trench in the middle of Frenchman Flats, Nevada. While a colonel briefed, a young soldier passed among us pinning on dosimeters. Lucky me! Now I find out that I am designated a "test troop" and they are going to pop an airburst atomic bomb over my head with my body a lot closer to ground zero than I found comfortable. Needless to say, they got my attention! Well, somewhere in this story, there is a moral for you, and its simply this: Get involved!!! The worst that can happen to you is that someone may drop an atomic bomb on your head. After that, everything is downhill.

The preceding remarks are from an address delivered 8 February 1974 to FAOBC Class 5-74 by COL Harvey D. Williams, Commander, 75th Field Artillery Group.

the field artillery in Alaska

by
CPT Jack L. Hall

Tired of sun, sand, and balmy breezes? Looking for something new? Something to challenge your abilities? If so, then become an arctic artilleryman. Join the arctic artillery in Alaska, the Land of the Midnight Sun. You can exercise individuality as the climate tests your ingenuity and resourcefulness. Throw away your air conditioner and preconceived notions about peacetime training. You will train in an area filled with breathtaking scenery and opportunity for travel.

Training in the arctic artillery is demanding, thorough, and strenuous. It begins, of necessity, with the individual. The objective of the training is to learn to survive. You must be intimately familiar with the extremes of the arctic environment. Summer brings moderate temperatures, moisture, insects, and terrain that becomes a quagmire as winter releases its icy grip. The spectors of winter are unrelenting freezing cold, mountains of snow, chilling winds, and the reward of certain death for poor or ineffective plans. You can learn to cope with this environment from appropriate field manuals, after-action reports, lessons learned, and personal experience.

Arctic training is geared around the axiom "experience is the best teacher." Before beginning unit winter training, you will learn to use your personal equipment and develop confidence in your own abilities. Individual training begins with cold weather indoctrination. Snow and cold add realism to the training. The warmth from your personal clothing, the fire you've lighted, or the shelter you've erected makes it meaningful. You develop habits and reflex actions that will keep you and your associates from receiving cold weather injuries, such as frostbite or snow blindness. As experience and respect for the environment increase, you will be phased into unit activities, operations, and training. While delving into detailed plans and functions of the unit, you will soon realize that complete faith in yourself and your leaders is imperative.

The abilities of a leader are challenged beyond comparison in the Arctic. Leaders must understand the exacting nature of their duties. Numerous tasks must be performed regardless of the temperature. Vehicles should be cycled frequently to insure that engine lubricants

"Routine practice operations become difficult, time consuming, and, frequently, hazardous in the Arctic."

do not become so cold soaked the engine will not start. Vehicle batteries must be kept charged to prevent freezing. Howitzers must be clean, lubricated, and free of moisture. Tents must be free of snow and ice accumulations to avoid collapse. Personal clothing must be cleaned, dried, and repaired. Minute, seemingly insignificant details become of momentous importance in extreme cold weather and thus thorough preparation is essential. Safety is an urgent consideration when making preparations. A fire will destroy a tent quickly if a fire extinguisher is not readily available. Cold-soaked metal will remove several layers of skin if touched with the bare hand. Rapid dehydration and loss of skin occurs if gasoline is spilled on exposed flesh. Leaders must provide active supervision to all facets of an operation. Proper planning and supervision are essential. Particular attention must be given to movement plans. Artillery movement in Alaska is restricted by weather and terrain. Off-the-road mobility is hampered by marshy areas in the summer and deep snow in the winter. Mountains, swift rivers, and thick vegetation are natural obstacles that impede ground vehicular movement. The tundra, during summer operations, will support only light vehicles. Traversing this type of terrain is difficult and leaves permanent trails. Existing trails and roads are few and usually in poor condition. Special problems are presented by deep winter snows. Wheeled vehicles get stuck easily. A cleared trail is preferred but is often unavailable. Engineer support may be required to occupy position areas in winter and is usually required to position area improvement.

Effective movement is limited to airmobility due to the vastness of the area to be covered and the trafficability of the terrain. However, aircraft availability and the extremes in weather conditions do not make helicopters a panacea. Firing batteries are airlifted by Air Force aircraft into remote regions of Alaska and moved to firing positions by helicopters. Firing batteries are lifted complete and prepared to survive without support for 15 to 30 days. Frequent exercises insure that all personnel have the experience gained from confidence in the equipment and the individual's ability to withstand the rigors of the environment.

Winter airmobile operations require special safety precautions. Working near helicopters can be extremely hazardous. Wind chill factors of –100° Fahrenheit occur in the rotor wash. Flesh will freeze in 30 seconds under these conditions. Static discharges from a CH-54 helicopter are severe enough under normal conditions but will arc as much as 5 feet at –48° Fahrenheit ambient temperature.

The extremely short-to-nonexistant winter days in high latitudes pose another unique requirement. Night occupation becomes the rule rather than the exception. Though the night airmobile move presents difficulties, it has tactical value and is effective. Special techniques and equipment are required as well as training, confidence, proficiency, and implicit trust between air and ground crews. Emergency airfield markers are used in the pickup zone and the landing zone. Loads are identified by using color-coded panels or the flashing or steady option of lights. Strobe lights, flashlights, and lighted batons are used for arm and hand signals, emergency signals, and directions. These are augmented with radio transmissions; however, use of the radio is limited because of the intense concentration required of the pilot. Severely restricted visibility, the possibility of vertigo, and generally poor flying conditions make teamwork and understanding of signals mandatory.

Carefully planned and executed movements are important to any successful operation. Mobility is a cardinal principal of arctic warfare, yet ground mobility is restricted and airmobility has limitations. The success or failure of your operation depends upon detailed reconnaissance and a judicious choice of transportation modes. Remember, distance can be as difficult to overcome as any enemy.

Employment of artillery in the Arctic requires imagination, flexibility, detailed planning, and effective standing operating procedures. Small-unit operations are emphasized with command being decentralized. Commanders must be resourceful in utilizing initiative. Forceful personal leadership is necessary to accomplish the mission. Units operating in this environment must be proficient in airmobile and groundmobile tactics and techniques. Under arctic winter conditions, time becomes a major factor. The time required for all operations must be doubled or tripled due to cold, snow depth, bulky clothing, and reduced personnel efficiency caused by prolonged exposure to cold.

Although Alaska is one-third the size of the continental United States, it has only 4,000 miles of roads. This obviously limits groundmobile employment of artillery.

During the summer, most of the low ground becomes unfit for artillery emplacement. Areas adjacent to roads are either soft and will not support a howitzer or the terrain is too steep for position areas in mountain locations. Tundra and muskeg are unsuitable for position areas during summer. Tundra is deep moss underlain by glacial clay or permafrost. Water cannot penetrate the subsurface areas and thus produces a spongy upper layer. Howitzers will sink deep enough in tundra to prevent firing. Muskeg is moss and grass in a layer 6 inches to 3 feet thick underlain by quicksand or soft peat. Weapons emplaced on muskeg sink deep into the vegetation. Firing the weapons will cause them to break through the surface and sink to the permafrost layer.

Position areas are usually located on hilltops or ridges composed of gravel or bedrock. The ridges and hilltops provide good positions, with soil instability during firing being the only problem encountered. Significant piece displacement is experienced unless trail logs are used. Riverbeds and sandbars also provide suitable position areas. Caution must be exercised while occupying these areas because flash floods are common during late summer and fall.

"Firing batteries are lifted complete and prepared to survive without support for 15 to 30 days."

Employment, movement, leadership, and training are all general areas that will present unusual problems. There are other peculiarities not normally encountered in other climates. One of these is that personnel will dehydrate quickly unless they consume plenty of water and obtain ample nourishment. Personal hygiene can also be a problem and must be emphasized. Combat-effective units keep their personnel warm, hydrated, and in good physical condition.

Howitzers and associated equipment present other problems. Prior to operating a howitzer in extreme cold, all old grease (GAA) on howitzer parts must be removed and replaced with clean GAA. Neglecting this point can cause the firing jack on the 155-mm howitzer M114A1 and the traversing and elevating mechanisms of all howitzers to operate improperly. Experience has shown that a recoil system, properly charged for summer operations, will not hold a tube in battery during winter. Therefore, recoil oil must be replenished in extreme cold to keep the tube in battery and allow proper recoil during firing. Excess oil is drained as the recoil mechanism warms with operation. Breachblocks must be free of oil and moisture to prevent freezing. A light coat of diesel fuel provides adequate lubrication for moving parts and prevents rust. Steel items, such as breachblocks, will accumulate frost when brought into a warm area. Therefore, they must be allowed to warm to room temperature and all moisture must be wiped off before returning them to the cold. Water normally used to swab the M114A1 after each round freezes immediately. Swabbing can be done effectively with a 60-percent solution of antifreeze. This mixture does not freeze at cold temperatures usually encountered. Digging spade pits in frozen ground is extremely difficult. It requires at least 1 hour and all the energy of the crew to make spade pits of appropriate depth for one howitzer.

Collimators and aiming stakes are hard to emplace in winter. Deep snow or frozen ground prevents normal emplacement of aiming stakes. Aiming stakes can be supported by a rangepole tripod or similar device. Collimators have limitations that inhibit their use. Emplacement on frozen ground is poor. Firing will cause the device to move unless it is sandbagged. Lenses have a tendency to frost if the collimator is not properly purged with nitrogen. Batteries used to power the light source freeze within an hour in arctic temperatures. When the light is not being used, the batteries should be taken into a warm tent. This will extend battery life significantly.

Short daylight hours present an observer with peculiar situations during winter. Landmarks are obscured and depth perception is reduced by deep snow. Muskeg and snow dampen the effect of ground bursts and make adjustments more difficult. Heavy reliance is placed on dead reckoning, polar plots, and resection from orienting rounds for direction and target location. Qualified, competent forward observers are definite assets.

Fire direction procedures are standard during summer. Cold weather effects on powder temperature, air density, etc., require special consideration. Large range corrections and initial round inaccuracies are pronounced at –40° Fahrenheit and below. The FADAC must be operated as the manual prescribes for cold weather. It must be grounded to avoid malfunctions from static electricity caused by dry air and cold temperatures.

The primary consideration in the operation of the FADAC is the support equipment. Breakage and cracking of the power cables occur if they are not warm when unrolled or coupled. Generators use synthetic oil and often require warmups with a 50,000-BTU heater to start. Temperatures in excess of –100° Fahrenheit occur in the throat of the carburetor. An alcohol/fuel mixture is used to prevent carburetor freezeup. Snow built up

around the generators retains warm air from the generator's operation and reduces icing.

Meteorology and radar sections require twice as long to set up because of cold equipment and the need for personnel to take frequent warmup breaks. Metro balloons take 25 to 45 minutes longer to inflate. Forcing the balloon over the inflation nozzle or inflating it too rapidly will cause the balloon to rupture. Cables and connectors require heating before coupling, and computers require warmup for efficient operation.

Survey operations are hindered by cold weather and distances to be covered. Batteries are commonly located 10 to 15 miles apart, and airmobile operations usually cover 80 to 100 miles. Survey control points are frequently 25 to 30 miles from firing sites. Triangulation or the use of distance-measuring equipment is the best means of providing survey control over these distances. Movement of survey parties is, of necessity, done by helicopter. Night survey techniques and starshots are commonly used.

Routine practice operations become difficult, time consuming, and, frequently, hazardous in the Arctic. A wealth of information on northern operations has been complied, with various aspects of arctic warfare being described. You may not be able to find an answer to every situation, but you can accumulate a substantial background. Armed with this information and personal experience, you should be able to make the necessary decisions with confidence and self-assurance.

You probably feel by now that the Arctic is characterized by loneliness, discomfort, and insurmountable difficulties. This is a common misconception of most personnel on their first assignment to Alaska. The northern environment is a dynamic force that is demanding of the individual soldier. The climate doesn't allow a margin for error. Protecting personnel must take the same priority as preparing to fire. The denial of adequate shelter can cause casualties as certainly as can firepower. The human element is all important, and leadership of the highest caliber is required. Yet the environment can be used to your advantage by understanding and recognizing the effects of cold weather. Disregarding or underestimating the environment will lead to failure. Specialized equipment and knowledge from experience is essential.

Alaska is a potential battlefield. The area to be protected is large, making independent operations and isolation almost a certainty. The forces given this responsibility must have confidence in their abilities and their equipment to complete the task. The training is designed to provide the needed confidence and the opportunity to gain experience and to overcome the natural fear of the elements. The challenge is real. Will you accept it?

CPT Jack L. Hall graduated from the University of Nebraska and received his commission through ROTC in 1966. He has served in Vietnam and is a graduate of the Field Artillery Officers Advanced Course. Currently serving with the 1st Bn, 37th FA, Fort Richardson, Alaska, Captain Hall's next tour will be an ROTC assignment at North Dakota State University.

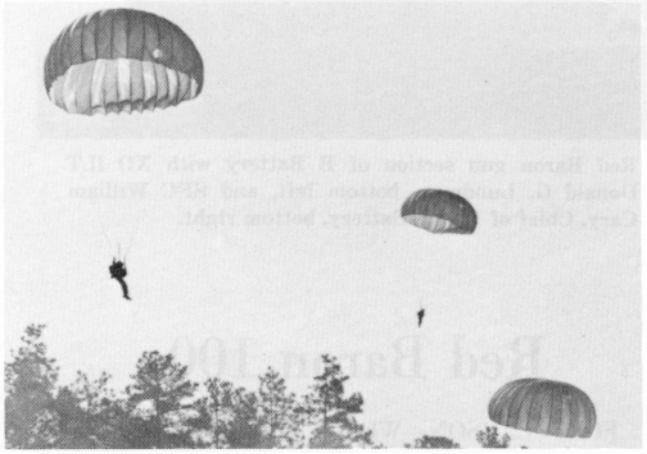
RIGHT BY PIECE

Competition

FORT BRAGG—Many of the targets in the Coleman impact area at Fort Bragg were relocated recently by the men of the 2d Battalion (Airborne), 321st Field Artillery. The targets were relocated the hard way—by means of direct fire competition. The competition consisted of selected section chiefs (two from each battery) and their crews attacking five targets with only five rounds per section.

SSG Michael L. Hargett's section from Battery A came out the winner by obtaining four hits in an adjusted time of 61 seconds, including emplacement time. This score, combined with the score of SGT Thomas R. Chadwick's section, made Battery A the high-scoring unit in the competition.

PFC John T. Harris and SP4 William E. Battle, 2d Bn (Abn), 321st FA, load a 105-mm howitzer during the recent direct fire competition at Fort Bragg.



Jumping FO's

FORT BRAGG—Campbell's Crossroads was not intended for use as a drop zone. It was recently used as such, however, by the 2d Battalion (Airborne), 321st Field Artillery, during an adventure training exercise for the battalion forward observer (FO) teams. The intelligence-gathering duties of the FO were emphasized in the briefing for the exercise.

Designed to give the FO's experience in jumping into small drop zones, the exercise began with an airborne assault from a UH-1H helicopter with T-10 parachutes.

After the jump, the group separated and the men set out to perform individual team missions. The missions were designed to provide the FO's with experience in the identification and selection of enemy avenues of approach, land navigation and reconnaissance, the selection of defensive targets and fire planning, and escape and evasion techniques.

The teams also performed missions not normally performed by FO's at Fort Bragg, such as the selection of sites for Air Force low-altitude parachute extraction system (LAPES) or airlanding operations and the selection of battery positions for airmobile exercises.

Each FO walked about 20 miles during the exercise while carrying the normal complement of rations, radios, and other gear. It was noted that most team members found places to sit during the exercise debriefing by the battalion S2.

Red Baron gun section of B Battery with XO ILT Donald G. Lundman, bottom left, and SFC William Cary, Chief of Firing Battery, bottom right.

Red Baron 100

FORT CARSON—When a Red Baron of the 1st Battalion, 29th Field Artillery, talks about adventure training, he means the Red Baron 100. What is it? Read on.

As Vietnam gradually geared down and Army leaders turned their attention to the more conventional situation in Europe, it became apparent that many new soldiers, unfamiliar with modern mechanized warfare, needed reorientation and retraining. It obviously would be difficult to get the jungle warfare syndrome out of people, but it had to be done. This basic idea was recognized by COL Dave Hughes (now retired) and implemented for artillery by a former commander of the Red Barons, LTC Jerry Monteith.

The concept of the "100" is conventional warfare in a nuclear environment. It places great emphasis on the ability of junior leaders to operate independently and forces them to use a myriad of skills and to make more important decisions than they would normally make. During the exercise, the battery is dispersed by nuclear attack and some personnel are forced to travel approximately 100 miles in teams. During the trip, the teams encounter and solve problems in logistics, survival, survey, map reading, gunnery, and tactics. Too much for junior NCO's? Not so. They welcome the challenge and take pride in their accomplishments.

Enemy air has the advantage, so the teams travel at night. During the journey over difficult terrain, the teams must arrive at various checkpoints at specified times. If they miss the ration point, they go hungry. If they miss the ammo supply point, they can't fire the gunnery portion and thus blow the test. Light and noise discipline are paramount. Passwords are the keys to entry into the checkpoints, and by successful entry into one point, a team gains information for the next.

Each team consists of seven men: a gun section chief, a gunner, a driver, a cannoneer, an FDC computer and chart operator, and a jeep driver. Two vehicles are used—a howitzer and a jeep with trailer. Equipment other than OEM consists of an aiming circle, a compass, a VRC-46 mounted in the jeep, three maps of the area, and a plotting set.

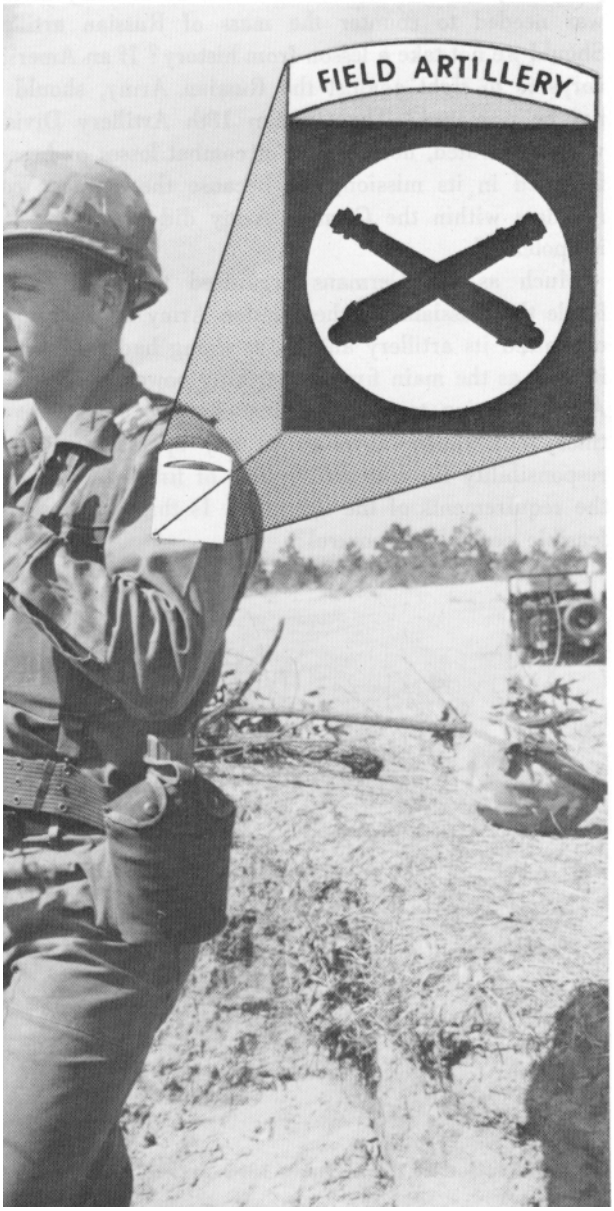
The exercise scenario calls for each team to follow a separate route and hit different checkpoints. All the routes are approximately 100 miles long, and the checkpoints are rations pickup, POL resupply, ammunition supply, maintenance, and one direct and one indirect firing point (the latter involving a nuclear fire mission computation). The number and nature of points may vary, depending on training objectives. Three teams—one from each battery—compete, but this number also may vary. (During the next exercise, the Red Barons plan to test firing platoons.) Prior to initiation, the competing teams are briefed on the overall situation and their equipment is checked. No food is allowed other than the rations picked up along the route. Release is timed to get the teams to their first positions after dark. From then on, all teams pick up their instructions at checkpoints and proceed to the next. The order of arrival at points is not important, since all teams are tested equally and range coordination can dictate firing point opening and closing.

A large number of umpires and support personnel are required to score, run checkpoints, coordinate gunnery, and man the flash base. Umpires follow each section during participation. The test is difficult for the umpires, but it is good training for them as well. Coordination is a nightmare. Aggressors, appropriately dressed, man the unfriendly terrain in which the teams maneuver while Aggressor aircraft fly overhead. Getting wiped out by the "dudes with triangles" is an ever-present hazard—many teams do. A radio relay is established in the best location to furnish umpires and teams effective communications. Safety officers are on hand at checkpoints where live firing takes place. A forward observer is also present to adjust the indirect fire missions (more than one observer may be used, depending on unit strength). Medics, of course, are a must.

Does the exercise build esprit and confidence? Unquestionably. The teams that finish are tired, hungry, and elated. Not all finish successfully. The completion rate is 60 percent in the battalion and is not likely to go higher.

Does the test improve the unit? Of course.

A Field Artillery Division



by
MAJ Robert E. Klein

On order of General of Division Ottenbacher, the 1st Fusilier Artillery Division launches a nuclear preparation to destroy enemy defensive positions. The massed guns of the division's three artillery brigades destroy the frontline positions of the enemy and open a gaping hole for the 39th Combined Arms Army's penetration. (FM 30-103, Aggressor Order of Battle Book)

With the advent of tactical nuclear weapons, the commander is presented with a new situation—a situation in which maneuver will support fire. "It is by fire and not by shock that battles are decided today." This statement, made by Napoleon, the greatest of all artillerymen, almost 200 years ago, remains a reality today. If maneuver is to support fire, who, then, will command?

Will today's military organizations be able to adjust to this situation? Will these organizations be able to respond when the destructiveness of modern firepower and the mobility of combatants place a high premium on responsiveness and flexibility?

Both the German and Russian Armies met this challenge by organizing their artillery into divisions. When flexibility was desired within the maneuver units of the US Army, the ROAD concept was developed to allow for any desired mix of manuever units. Artillery in the US Army today must answer all of the above challenges. This article will examine a new organization for the artillery that will meet such challenges—the artillery division.

The US Army's current reorganization of the echelons above division (EAD) level provides an excellent opportunity for an examination of change within artillery organizations assigned to these higher echelons.

"Both the German and Russian Armies met this challenge by organizing their artillery into divisions."

This article will consider the organization, employment, and tactics of the artillery divisions of the German and Russian Armies to provide a frame by which an examination of the US Army artillery division will be analyzed. The article also will explore areas in which a divisional organization would alleviate existing deficiencies, to include command and control, attachments/detachments, fire support coordination, administration (e.g., automatic data processing, military justice), and logistical support.

In the discussion of this division, a US Army corps of three maneuver divisions will be assumed. This corps will have one organic artillery division, which will be organized with a fixed base (as are all maneuver divisions) and a flexible number of fire support battalions. With such an organization, the artillery division would be capable of supporting any corps organization by assigning the proper mix of fire support battalions to each group (brigade) headquarters. Specific organizational features of this division are not the subject of this article and will be discussed only when necessary to explain how the division would improve current operational procedures.

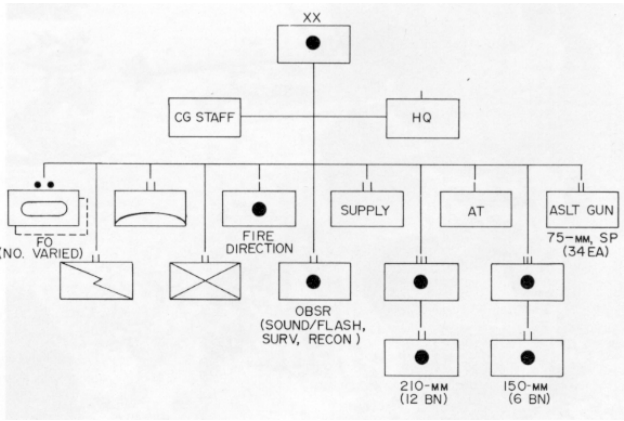
GERMAN AND RUSSIAN ARTILLERY DIVISIONS

Whenever large land armies are organized, the fire support battalion is one of the most numerous of all units. Today's US Army has more fire support battalions than infantry/mechanized infantry battalions. However, seldom are these fire support battalions organized to provide the utmost in command and control. These battalions are used to support maneuver or reserve divisions, or they are parcelled out or kept under the control of the corps commander or even the theater army commander. This organization seems to flaunt the first fundamental of field artillery organization for combat—maximum feasible centralized control. Instead of emphasizing the second adjective, "feasible," let us place emphasis on the first, "maximum," as is done in FM 6-20, Field Artillery Tactics and Operations:

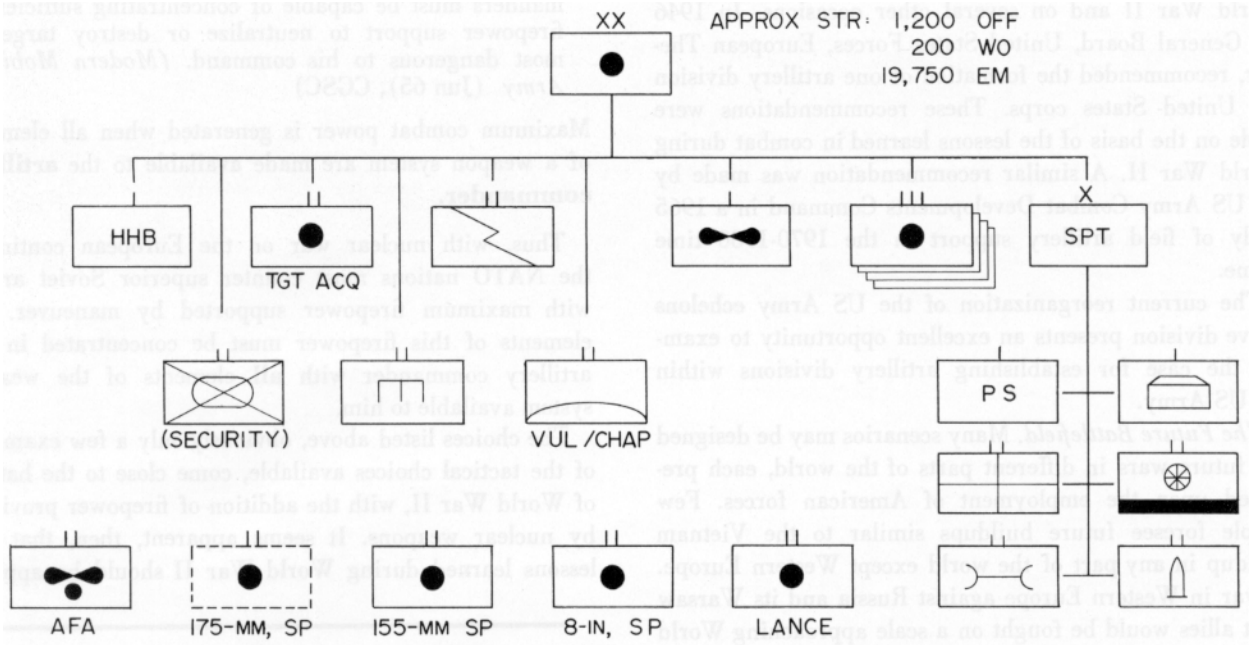
> Field Artillery is most effective when control is centralized at the highest level consistent with its fire support capabilities and the requirements of the overall mission. Centralized control of field artillery permits flexibility in employment and aids in massing of fires.

In 1943, to support operations on the Russian front, the German Army organized the 18th Artillery Division. Prior to this time, German artillery had been organized much the same as is the current US Army artillery. However, in artillery duels fought with the massed Russian artillery, the Germans found that their artillery must be capable of exercising a multiplicity of missions. It is this same Russia that today is considered our principal threat, and Russian artillery is even more powerful now than it was in World War II. Battle experience proved to the Germans that an artillery division was needed to counter the mass of Russian artillery. Should we not take a lesson from history? If an American corps is to fight against the Russian Army, should we not be prepared? The German 18th Artillery Division was deactivated, not because of combat losses or because it failed in its mission, but because the artillery commanders within the German Army did not utilize it to its potential.

Much as the Germans organized their artillery to battle the Russians, so the Russian Army had previously organized its artillery and by so doing had consolidated its role as the main fire and striking power of the Soviet Army. Russian tactical doctrine charges the highest artillery commander involved in any operation with the responsibility for a unified system of fire that will fulfill the requirements of the operation. Is this not maximum feasible centralized control?



Organization of the German 18th Artillery Division.



Organization of an artillery division (approximately 20 FA battalions).

At this point the following quotes from FM 30-102, Aggressor Order of Battle Book, might serve to reemphasize the need of maneuver to support fire:

> Artillery theory employs the concept of fire strike, which is a severe and intense bombardment by all artillery weapons to defeat the enemy without the use of ground troops.
>
> Artillery fires are laid down with such weight, volume, and accuracy that the artillery fire itself is an offensive.
>
> One artillery division is usually allocated . . . to provide conventional and nuclear fire support to armies making the main effort in the advance or to assist in the defense of a critical coordinating area . . . . The division is capable of coordinating all its subordinate units when needed to support one sector of operations.

These quotations show the importance placed on artillery command and control by the Aggressor. Napoleon once said: "We could wipe out the enemy by an immense superiority in artillery." The Russians have set out to do just that. But, again, does the US Army not have the same potential with its tactical nuclear weapons and significant number of fire support battalions?

Before leaving the Soviet artillery, it might be well to point out two obvious differences between United States/German artillery doctrine and Soviet artillery doctrine. First, Soviet self-propelled artillery (assault guns) are primarily employed as direct fire weapons that move with tank formations for attack of enemy pillboxes and bunkers; Soviet antitank guns are also assigned to the artillery. Second, much Soviet artillery is attached for combat operations; however, as previously noted, the senior artillery commander is charged with the employment of all attached artillery.

These two examples of the employment of artillery divisions in the German and Russian Armies highlight several areas, especially command and control, that will be investigated as an artillery division is placed in the framework of the US Army corps.

A US ARMY ARTILLERY DIVISION

As has been shown, the organization of artillery into divisions is not something new to the armies of the world, and artillery divisions do currently exist within the force structure of the Soviet Army. The United States has never formed an artillery division, probably because the size of the peacetime American Army prior to the Korean war was too small to support such an organization. It is the recommendations resulting from war's lessons learned that suggest the formation of such a division. Today, however, with three active heavy corps and the current number of field artillery battalions, size is no longer a constraint.

Recommendations for the formation of an artillery division were made in after-action reports at the close of

World War II and on several other occasions. In 1946 the General Board, United States Forces, European Theater, recommended the formation of one artillery division per United States corps. These recommendations were made on the basis of the lessons learned in combat during World War II. A similar recommendation was made by the US Army Combat Developments Command in a 1965 study of field artillery support in the 1970-1980 time frame.

The current reorganization of the US Army echelons above division presents an excellent opportunity to examine the case for establishing artillery divisions within the US Army.

The Future Battlefield. Many scenarios may be designed for future wars in different parts of the world, each predicted upon the employment of American forces. Few people foresee future buildups similar to the Vietnam buildup in any part of the world except Western Europe. A war in Western Europe against Russia and its Warsaw Pact allies would be fought on a scale approaching World War II and, in all probability, nuclear weapons would be employed.

As H. B. Malmgren pointed out in an article entitled "A Forward-Pause Defense for Europe" (*Orbis*, Fall, 1964), "[If NATO is to remain a viable force to deter attack in Western Europe, then] a forward defense designed to yield no territory is essential." Many types of defense have been proposed, but if no territory is to be yielded, then NATO is limited to few choices. The most logical choice is a tactical nuclear defense. This defense implies that NATO (i.e., the United States) will use nuclear weapons first. A second choice, called the "forward pause," is based on a static defense along the German border with a highly mobile reserve. Each case envisions the employment of tactical nuclear weapons as the principle means of stopping the Soviet offensive. The artillery and air forces of NATO thus become the systems within the NATO force structure which, by fire strikes, will defeat the enemy and permit our tactical forces to maneuver and gain the offensive. As stated by LTC Fowle in an article published in *The Journal of the Royal Artillery:*

> [After nuclear strikes,] any future war in Europe will take the form of an armored battle between opposing tank forces supported by self-propelled guns and infantry in armored personnel carriers . . . probing weak spots in our defenses and . . . exploiting them by use of shock tactics.

Combat power thus will be brought to bear through firepower and maneuver—

> employed in the combination best suited to the type of warfare in which the force is engaged. . . . Commanders must be capable of concentrating sufficient firepower support to neutralize or destroy targets most dangerous to his command. *(Modern Mobile Army* (Jun 65), CGSC)

Maximum combat power is generated when all elements of a weapon system are made available to the **artillery commander.**

Thus, with nuclear war on the European continent, the NATO nations must counter superior Soviet armor with maximum firepower supported by maneuver. All elements of this firepower must be concentrated in the artillery commander with **all** elements of the weapon system available to him.

The choices listed above, obviously only a few examples of the tactical choices available, come close to the battles of World War II, with the addition of firepower provided by nuclear weapons. It seems apparent, then, that the lessons learned during World War II should be applied to today's situation in as many ways as possible. And one of the lessons learned was the need for an artillery division for each corps. Why did the European after-action reports recommend such an organization? What other factors can be added to today's tactical situation that will bear on the problem?

> Napoleon once said: "We could wipe out the enemy by an immense superiority in artillery."

Command and Control. The mission assigned to the corps artillery headquarters by TOE 6-501H is to provide *tactical control* and *administrative supervision* of assigned and attached units. TOE 8-401H for the headquarters and headquarters battery, field artillery group, assigns the same missions to the group. The corps artillery supervises but does not support assigned and attached units. In and of itself, this unit must be supported by personnel service, finance, and medical personnel.

What is to be the size of the artillery assigned to the corps? Artillery-75, a 1968 study by the US Army Combat Developments Command, called for approximately 20 fire support battalions (SP 155-mm howitzer, SP 203-mm howitzer, aerial field artillery, and Lance) and four subordinate control headquarters (field artillery groups). On the basis of tables of organization associated with this study, approximately 14,000 officers, warrant officers, and enlisted men would be assigned to these fire support battalions. The span of command and control for an organization

of this size is an obvious problem, especially when the corps artillery commander does not have the administrative tools necessary to influence his own organization.

Other control problems discovered during World War II include those caused by shifts among units with different SOP's, commanders not cognizant of the capabilities and limitations of their subordinate units due to frequent shifts of these units, and the retention of inefficient battalion commanders for a considerable period of time because of frequent shifts in command.

Additional command and control problems will be experienced on a high-intensity nuclear battlefield, such as the extended distance necessary for adequate dispersion, the high priority given to attacks of command posts, and the effects of nuclear weapons on electrical equipment (caused by electromagnetic pulse).

An artillery division would alleviate many of these problems; SOP's would be standardized, commanders would know their subordinates, and extended distances could be handled as they are by the current maneuver divisions. In addition, attacks on command posts could be offset by two factors: (1) A division would have main, forward (jump), alternate, and rear command posts, each of which could serve if needed. (2) The artillery headquarters could serve as the alternate fire support element if the corps tactical operations center (CTOC) were attacked.

Tactics. The current tactical doctrine for the employment of field artillery need not be altered by the introduction of the artillery division. The tactical missions of direct support, general support, reinforcing, and general support-reinforcing can and should be performed in the same manner as current doctrine dictates. The most significant tactical change is the heightened ability for the centralized control of fire units that the artillery division will provide the corps commander.

TACFIRE. Problems of control of fire support units over the extended distances necessitated by a nuclear battlefield, problems associated with allocations and assignments of nuclear weapons, and the need for greater centralized control of fire support to counter expected maneuver superiority of Soviet forces might appear to conflict, but a division headquarters would centralize fire control up to the highest levels so as to obtain maximum flexibility. The system to be employed by future artillery headquarters will make maximum use of TACFIRE. The objective of TACFIRE is to increase the effectiveness of fire support by providing faster response, better use of target information, quicker fire planning, and ease of determining fire capabilities of units. TACFIRE, to be most effective, must tie in the entire fire support system of the corps. Uniting the corps artillery headquarters (artillery division) and the maneuver division artillery units in an interconnecting net will allow the commander both maximum flexibility and maximum control. Having an artillery division in addition to the CTOC will heighten the flexibility of the system in the face of enemy attacks on headquarters. The artillery division becomes the perfect instrument through which such data as ammunition status, target intelligence, meteorological data, and fire unit status can be incorporated into the command system of the corps.

Communications. Evidence exists that current methods of artillery communication at higher echelons are not satisfactory and that these requirements must be met with "sole user" fire control circuits within proper systems. To provide this type of communications support, the artillery headquarters must be augmented with at least a signal company. Thus the addition of such essential support elements to a sustained combat role will add to the responsibilities of the artillery headquarters at corps level.

Administration. The corps artillery, by TOE mission, has administrative supervisory responsibility for its attached units, yet it does not command the resources necessary to really fulfill this responsibility. In World War II, administrative problems had a deleterious effect on the morale of the separate artillery battalions, and administrative problems arose in the areas of mail delivery, loss of promotions, inadequate replacements, few decorations and awards, and fewer passes and furloughs for these units. Many of these same problems continue to plague corps artillery battalions. Problems were encountered in Vietnam in the areas of pay records, R&R, and promotions because these areas were administered by field artillery group headquarters that were neither equipped nor manned for such operations. Another major area of concern is the handling of court-martials. So long as the senior artillery officer is only a brigadier general, he does not possess general court-martial authority for the 14,000 men under his command. This authority is retained at the higher command level.

Each of these problems can be solved by the formation of an artillery division that will provide the artillery commander with the necessary support units, the personnel services, and the finance companies of a division support command (DISCOM). Having such units under the control of the artillery commander will preclude the field artilleryman from feeling like a "bastard child," a common feeling among non-divisional artillerymen today.

Logistics. The areas of maintenance and supply proved to be large stumbling blocks for the non-divisional artillery battalions of World War II. The shifting of units caused delays in repairs and the filling of requisitions, and it became imperative that the artillery group headquarters assist the battalions with these problems. These

> "The available supply rate for a . . . battalion fighting in Europe is currently forecast to exceed 150 metric tons a day . . . ."

headquarters were not organized to provide the necessary support. Today's mobile field artillery battalion, which has more vehicles, significantly more ammunition, and greatly increased sophistication in fire direction, survey, and communications, has a multiplicity of supply and maintenance problems never dreamed of by the World War II battalion commander.

The increase in supply requirements can be vividly demonstrated by comparing conventional ammunition supplies. During the Korean conflict, an 8-inch howitzer battalion consumed 35 metric tons of ammunition a day. The available supply rate for a similar battalion fighting in Europe is currently forecast to exceed 150 metric tons a day—more than four times the amount consumed during the Korean war. In addition to this, consideration must be given to the nuclear fires of the same battalion. Anyone who has supervised a nuclear resupply on a field exercise knows the time and effort required for such an operation.

Medical and engineer support for non-divisional artillery battalions takes on added significance when considering operations under nuclear conditions. If the support is poor, what recourse does the artillery commander have under the current organization? He does not have command over all the elements of the fire support system, command that in today's operations can be equated to time, time that will not be there in a nuclear situation. The most feasible solution to these logistics problems is to provide the artillery of the corps with full-time maintenance, supply, ammunition, medical, and, possibly, engineer support (or a DISCOM).

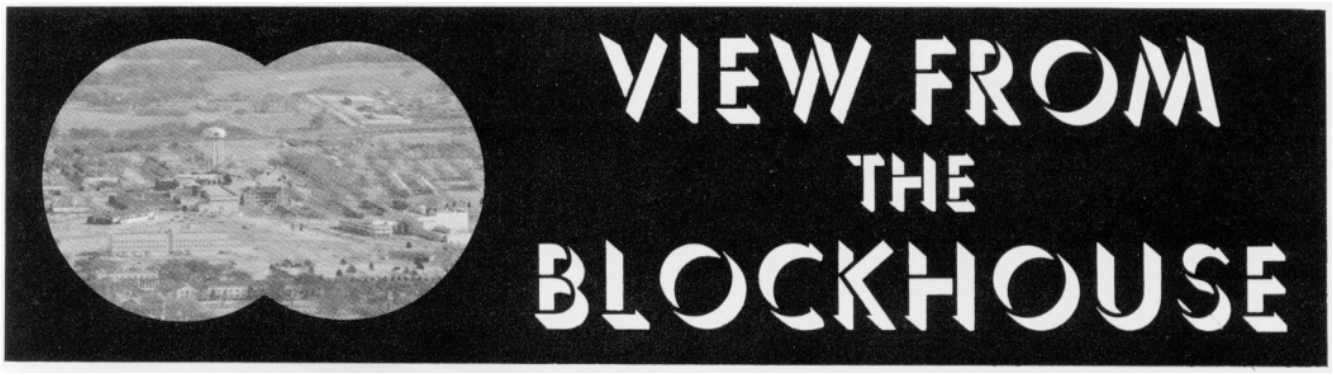
CONCLUSIONS

If the artillery headquarters of the corps is to comprise 14,000 officers and enlisted men and must be permanently augmented by signal, personnel service, and finance companies and maintenance, supply, ammunition, and medical organizations (or a DISCOM), then the recommendation of the General Board, United States Forces, European Theater, for formation of a unit "called the corps artillery division and containing organically the services and other units necessary to sustain itself administratively in the same manner as any other division" should be put into effect for the United States Army of the 1970's. This division, using the field artillery group as the major subordinate tactical headquarters, could then tailor its fire support battalions, as today's divisions tailor their brigades, to provide maximum combat power at the decisive place while maintining the inherent flexibility of the tailoring concept. This division would give the artillery commander all the needed forces that would enable him to exert maximum combat power by providing him the command and control facilities and the administrative and logistic base so necessary to today's sophisticated forces.

This article has shown that the lessons learned by American artillerymen during World War II, as they fought on the same grounds on which future military campaigns may well be fought, favored the establishment of such a division. The German Army, in an attempt to apply its experience, organized an artillery division on the Russian front during World War II. It is this same Russia that poses the greatest threat to the American Army today. This threat can be adequately met only by employment of nuclear weapons to stop the superior Soviet troop concentrations. Once the Soviet offensive power has been degraded, then NATO forces can begin to maneuver around the supporting nuclear fire.

It therefore seems to be in the best interests of the United States to organize an artillery division to take advantages of these past lessons and present strategies. The heightened readiness and greater espirit this division would provide the artillery of the corps would greatly enhance the corps commander's ability to use firepower as a key ingredient in preventing or halting the potential Soviet thrust into Western Europe.

MAJ Robert E. Klein is a 1960 graduate of the United States Military Academy and a graduate of the Field Artillery Officer Basic and Advanced Courses. He has served in field artillery assignments as a battery commander in Germany and on both artillery group and corps artillery staffs. Major Klein recived his MA in geography from Syracuse University in 1967 and served as an assistant professor of geography at the USMA. His last tour in Vietnam was as a member of the J3 staff at MACV headquarters. He is currently a student at the US Army Command and General Staff College.



Failure Rate

The US Army Field Artillery School is experiencing a relatively high student failure rate in the 13E portion of the Field Artillery Cannon Basic (FACB) NCOES Course, In almost every case, the failing student had been granted a waiver of the prerequisite MOS test score of 100 and is completely unqualified in MOS 13E when he arrives for the course.

Interviews with these failing students reveal that most have no experience or training in fire direction, and many state that they had been advised in their units that the course would teach them all about the MOS. This is not the purpose of the course! The gunnery subcourse is basically designed to prepare the students to perform as chief computers. Basic procedures are reviewed, but at a very accelerated pace, and an individual with a poor background, a low MOS skill level, and/or no previous knowledge of the subject will quickly fall behind the other students.

Individuals who have MOS 13E but have not attended 13E AIT and/or performed fire direction duties recently either should be trained in basic fire direction procedures by their units or should complete appropriate Army-Wide Training Support Department (AWTSD) subcourses before they are selected for the FACB course. Subcourses FA 308, Fire Direction I, Fundamentals; FA 309, Fire Direction II, Corrections; and FA 405, The Forward Observer, are recommended.

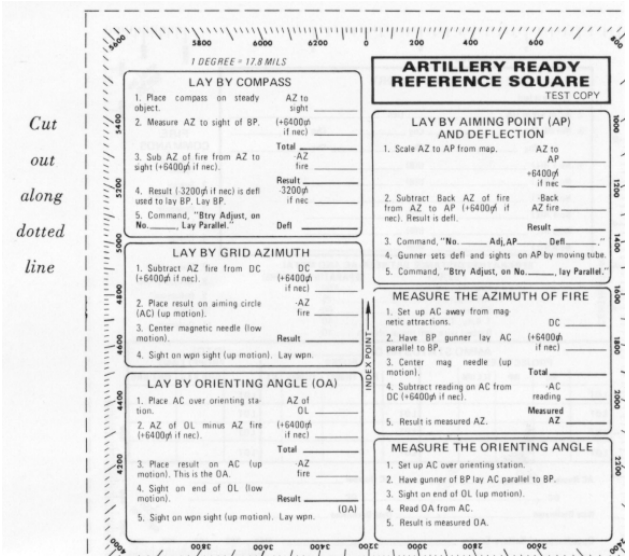
Adherence to the course prerequisities will preclude placing students in a course for which they are not prepared and will also insure that the best qualified individuals receive the training they need to increase their promotion potential and to prepare themselves for positions of greater responsibility.

Artillery Ready Reference Square

How many of you Redlegs recall scratching around for a piece of paper on which you could calculate the data required to lay your battery by orienting angle? Or trying to prepare an XO's report on a soggy piece of paper in the rain? Well, a solution is at hand. The Firing Battery Branch, Materiel and Maintenance Department, Field Artillery School, is presently evaluating the artillery ready reference square (fig 1 and 2), a device developed by SFC James T. Hilyer, formerly assigned to the Firing Battery Branch and now with the Combat Arms Training Board, Fort Benning, Georgia.

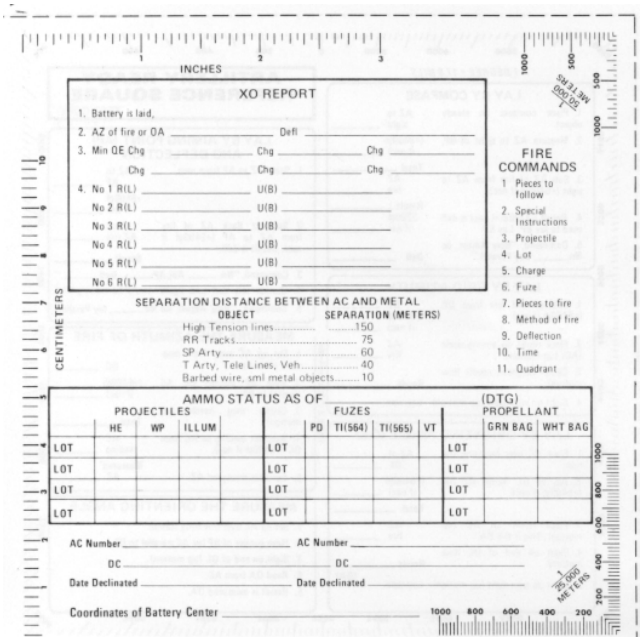
The flexible, pocket-size (5″ × 5″) plastic square contains handy information for the XO and provides space to record data calculated for battery laying, the XO's report, ammunition status, fire commands, and separation distance. Notations pencilled on the square will not rub or wash off but can be completely erased. Notations can be made on the square even when it is wet.

The square is being evaluated by selected units in CONUS and USAREUR and by students in residence at the Field Artillery School. This handy item will be fielded following successful evaluation.



M110E2 Testing

The reorganization of the Army in March 1973 has provided new guidance and directions to the Field Artillery School. This change gives the School the responsibility and opportunity to actively participate in operational testing of new field artillery systems. Operational testing is accomplished in steps to provide for continual evaluation throughout the development phase of a system.



A current on-going test at Fort Sill is the operational testing and evaluation of the 8-inch howitzer M110E2 weapon system, to include 18 product improvements.

Initial tests conducted 11-14 February consisted of firing inert projectiles and fuzes with standard M1 and M2 propelling charges. Situations created by the test managers required that the unit supporting the test (Btry C, 1st Bn, 30th FA) respond to fire missions and movement orders normally experienced by a heavy artillery battery assigned a general support or general support-reinforcing mission. This environment provided an opportunity to evaluate the weapon system during march order, road march, emplacement, and firing and to observe crew performance.

A future test to be conducted in May or June will consist of firing the HE round and PD fuze with experimental propelling charges 8 and 9.

Operational testing by the School is being conducted concurrently with developmental testing by the Field Artillery Board. The data derived will be consolidated and analyzed for independent developmental and operational evaluation of the M110E2.

ADJUSTMENT

With the ever-present emphasis on maximum use of time and resources and the austere fiscal program under which the Army functions, the review of current doctrine and procedures is a continuing process. One area of interest at the Field Artillery School has been expenditure of ammunition for the training of forward observers. Present procedures call for two weapons to fire in the adjustment phase of an area fire mission. The question was whether, in the adjustment phase, one weapon, as opposed to two, could meet the training requirements of forward observers. Since no statistical data were available, the decision was made to conduct an experiment to establish a data base. The Office of the Deputy Assistant Commandant for Combat and Training Development (DACCTD) was selected to conduct the experiment.

The experiment was conducted with two observation posts and two firing points. Two 105-mm howitzers were used along with six observers (second lieutenants), an FDC, and a flash base consisting of three OP's. All missions were fired on the East Range of Fort Sill. By utilizing various combinations of observation posts and firing points, the experimenters were able to vary the angle T from 0 to 2,620 mils.

Firing was conducted on each of seven surveyed targets, and data were compiled for the one- and two-gun adjustments on fire-for-effect accuracy (impact and HOB), observer mission time, crew mission time, and ammunition expenditure. Each round in fire for effect for each mission was flashed, and all distances were computed to the nearest meter. The data were programmed and reduced through computer analysis.

The test was conducted under conditions providing the observer maximum visibility. An increase in times and ammunition expenditures would be expected under conditions of reduced visibility.

Conduct of the test required that each target be attacked with varying combinations of observers, angles T, and types of adjustment (one gun versus two guns).

A total of 40 missions was fired, and the following analysis is based on 26 selected missions. The testing officer, MAJ John Nilsson, Test and Evaluation Division, DACCTD, selectively deleted 14 missions from analysis due to gross errors either in observer spottings or in firing battery.

As expected, in fire for effect, the HOB accuracy for the time missions was greater with the two-gun adjustment than with the one-gun adjustment. The average HOB for two guns was 10 meters as opposed to 31 meters for the one-gun adjustment. Apparently, spotting the mean HOB of two bursts provided more accurate corrections and a more effective HOB. The ground miss distances (fuze time and PD) were relatively equal for both methods. The average miss distance for the one-gun adjustment was 46 meters, while for the two-gun adjustment it was 51 meters.

The two areas observed for timeliness of response were the forward observers and the weapon crew. The observer's reaction time was measured from the burst(s) to the announced corrections. The difference between the observer's response time for the one-gun adjustment and that for the two-gun adjustment was minimal; average times for announced corrections were 9.7 seconds for the one-gun

adjustments and 9.6 seconds for the two-gun adjustments.

Weapon crew response time reflected a marked difference between the one-gun adjustment and the two-gun adjustment. Recorded time was from announced QUADRANT to reported READY. The report of READY of the slowest weapon was recorded for a two-gun adjustment. An average increase in response time of more than 6 seconds per volley was noted between the one-gun and two-gun adjustments (16.6 seconds as opposed to 22.9 seconds). The average mission response times of the gun crews for the one-gun time and PD missions were 194 and 71 seconds, respectively; for the two-gun time and PD missions, the average times were 258 and 94 seconds, respectively.

A major advantage of the one-gun adjustment was, as expected, in ammunition savings. Although a greater number of volleys were required with one gun, the total expenditure of the one-gun adjustment was slightly more than half that of the two-gun adjustment. Of the 26 missions analyzed, 80 rounds were used in the one-gun adjustment and 152 rounds were used in the two-gun adjustment.

The following conclusions are derived from the analysis of the sample missions:

- There is no significant difference in accuracy between the one-gun and two-gun adjustments.
- A more effective HOB can be obtained with the two-gun adjustment.
- Observer response time does not vary appreciably between the two methods.
- Crew response time is greater with two guns in adjustment.
- There is a significant savings in ammunition with the one-gun adjustment.

From the above conclusions it can be seen that if time and/or ammunition are the commander's constraints, consideration could certainly be given to the one-gun adjustment.

By the same token, if there are no restrictions on time and ammunition, and if crew training is one of the objectives, commanders may wish to utilize the two-gun adjustment.

Current procedures call for two guns in adjustment, but the field artillery commander must consider improvements whether in combat or in a training environment. Ammunition availability, the status of training of forward observers, and the time available to accomplish the mission may all be influencing factors.

It is believed that these test results will enable local commanders to determine their own tradeoffs.

continued from page 4

letters to the editor

Transporting an external load of howitzers during daylight hours provides a distinct signature of the operation underway. "Hanging Six" during a night move only adds to the risk of "putting all your eggs in one basket," not to mention the complication of rigging under blackout conditions. A large cargo helicopter operating in a combat zone is vulnerable enough while flying nap of the earth without an external load, much less with six howitzers.

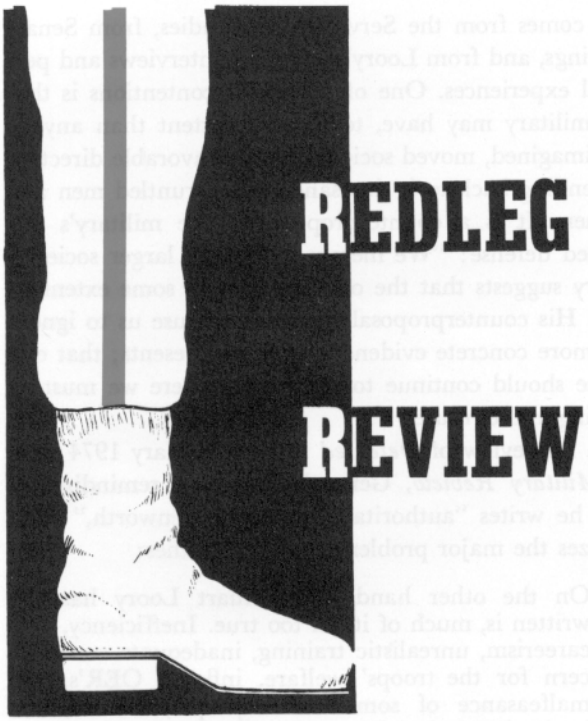
When three Super C's are employed for a battery lift, several combinations can be used to preclude loss of the effectiveness of the battery in the event one helicopter is lost. For a daylight move, internal loading of the howitzers can be done expeditiously by using a pintle on the front of a battery ¼-ton vehicle. With two howitzers to each CH-47, the FDC is split so that all of its capability is not in one aircraft. The personnel are placed on all three helicopters, and the vehicles and ammunition are moved externally to preclude the signature effect of moving the howitzers externally.

Whenever possible, battery moves are made under cover of darkness and the howitzers are lifted externally. With a Super C, it is desirable to have an internal load of troops and equipment and an external load of two howitzers and ammunition. Such moves under blackout conditions and with radio silence can be done routinely with training and prior coordination.

The quickest method of rigging two howitzers for a simultaneous move is to place them side by side, place two pieces of 2″ × 4″ wood between the howitzers at the box trails, and tie the trails together by using general-purpose aircraft tie-down straps. Connect slings of both howitzers to one "doughnut," and the two are ready for hookup.

Using these procedures, you can have independent firing elements in each helicopter, move the battery quickly, and be more ready to provide rapid and continuous fire support at the pickup zone and loading zone.

William H. Schneider
LTC, FA
Cdr, 1st Bn, 77th FA



THE WAR OF 1812, by John K. Mahan, University of Florida Press, Gainesville, Florida, 1972, 476 pages, $12.50.

The War of 1812, like the war with Mexico, was not popular in the sense of wholehearted national support. This fact may explain its comparative neglect by historians and confirm the publisher's assertion that this book is "the first in-depth study (of the war) in 80 years." Though inglorious in part, the War of 1812 reaffirmed our independence, made General Andy Jackson President, and gave us "The Star-Spangled Banner."

The book contains 70 references to artillery, exclusive of naval gunnery. While these are welcome, in view of the sparse treatment by many military historians of the part played by the guns, Redleg readers will not be entirely satisfied. But then, are we ever?

Only two American artillery regiments, with ranks half filled, were available when the war began. Colonel (later General) Winfield Scott commanded the Second, which saw good service in the Niagara theater. In 1813, at the siege of Fort Meigs, US guns were so short of ammunition that a reward of a gill of whiskey was offered for the retrieval of each solid shot embedded in the parapets by British cannon. One hundred of these rounds were collected and fired back at the enemy in the successful defense of the fort.

The gallant action by Commodore Barney's landborne naval guns at Bladensburg is scanted, as is the first-rate gunnery of Major Armistead's batteries in the defense of Fort McHenry. The latter, at least, was appreciated by Francis Scott Key, an artilleryman, who wrote "our flag was still there" while, as a prisoner, he viewed the battle from aboard a British ship. However, Professor Mahan gives due credit to the vital role of American cannoneers in the post-treaty Battle of New Orleans.

No mention is made of Captain George Peter's battery, our first horse artillery unit, which was organized in 1808 and saw effective action in 1812. Yet this book provides a wealth of detail, framed in a background of the social history of the times.

Mahan, professor of history at the University of Florida, was formerly a civilian military historian in the Office of the Chief of Military History.

LTC (Ret) Fairfax Downey, FA, a regular contributor to the Journal, is the author of more than 40 books including Sound of the Guns, The Guns at Gettysburg, and Cannonade.

DEFEATED: INSIDE AMERICA'S MILITARY MACHINE, by Stuart H. Loory, Random House, New York, 1973, 405 pages, $10.00.

During the last 5 years, much has been written about the military and its proper role in society. At the height of the controversy over this Nations involvement in Vietnam, almost every major periodical in the country carried articles lambasting the military and warning society of an incipient threat—the threat that a vengeful military poses to a society that has rejected it. Most that was written was bizarre, concerned more with the rhetoric of failure than with creative reform. Those readers seduced by the rhetoric demanded little from the writers except shared intellectual premises. Fact, the basis for reasoned argument, seemed less important than a commonly perceived truth. The articles and books were aimed at those who shared the writers' perceptions, not at those in the military who were the objects of the writers' criticism.

Many of these writers were "new journalists"—novelists supporting their artistic habit as journalists. What they wrote was difficult for many in the military to understand, because the message was conveyed through the use of novelistic techniques. An understanding of plot, characterization, tone, imagery, and form were necessary prerequisites for understanding the message. Few of those who read the longer works, such as Ward Just's *Military Men,* had a feel for the novelistic pulse of the new journalism. They were annoyed by the stereotyped characters and the selected events that were offered up as evidence, but they failed to see the way that evidence

was arranged to create thematic and artistic unity. That frustrating failure caused many to turn away bitter from what could have provided the impetus for soul searching and subsequent change.

In the aftermath of the Vietnam controversy, another book has been written. It carries many of the same themes as the earlier works, but the technique is different. Some bright graduate student writing on the new journalists could stretch a point and include Stuart Loory on the basis of *Defeated: Inside America's Military Machine,* but his inclusion would represent the kind of niggling intellectualism that blights the end product of too much research. Loory's book is at once more clear and less interesting than a "new journalist's" work. It is an extended argumentative essay that conforms to a classic argumentative pattern: Tell 'em what you're gonna say (introduction), say it (body), tell 'em what you said (conclusion). Loory's book is for a general audience, not a coterie of intellectual dilettantes, and it should be read by all who regard themselves as professional soldiers.

Loory's thesis is clear from the beginning: "The American military machine today is not qualified to protect the nation's vital interests . . . . The American military machine is defeated." It is a pleasing thesis for neither a military professional nor the society he serves. Loory is too bright to believe that it is entirely true but too concerned to ignore the strong evidence that he amasses which suggests otherwise. He has been cited already by military reviewers for failing to present all of the evidence, for creating a flawed picture of the Army. In a sense, that is true, but what is more seriously wrong with the book is that Loory on occasion draws inaccurate conclusions from the evidence that he does present. Even these conclusions, however, offer food for thought and deserve consideration.

The finest section of Loory's book is entitled "A Generation of Exploited Men." It is a penetrating analysis of the effect of social forces on the military and the countereffect of the military on society during the late 1960's and early 1970's. If the analysis is flawed somewhat, that is really beside the point. Loory documents in very clear terms how the Services developed policies and programs to deal with hair, enlisted housing, drugs, and racial conflicts during the period. In the same section he examines training, the "Yobo Culture" in Korea, the club scandals, and military justice. The examination reflects Loory's belief that the Services exploited the soldier—not intentionally, but by simply not always knowing what they were doing, by having double standards, and by not acting decisively when they did know exactly what they were doing. The evidence in this section comes from the Services' own studies, from Senate hearings, and from Loory's extensive interviews and personal experiences. One of his major contentions is that the military may have, to a larger extent than anyone has imagined, moved society in an unfavorable direction by sending back to it thousands of disgruntled men and women. It is a counterproposal to the military's oft-quoted defense: "We merely reflect the larger society." Loory suggests that the opposite may to some extent be true. His counterproposal should not cause us to ignore the more concrete evidence which he presents; that evidence should continue to remind us where we must be moving in the future.

In his review of *Defeated* in the February 1974 issue of *Military Review,* General Cushman, reminding us that he writes "authoritatively for Leavenworth," summarizes the major problems Loory identifies:

> On the other hand what Stuart Loory has written is, much of it, all too true. Inefficiency, careerism, unrealistic training, inadequate concern for the troops' welfare, inflated OER's, malfeasance of some senior people, lack of institutional insight, and so on—these are known deficiencies, some more wide-spread than others, some hopefully over and done with, some still with us . . . .

General Cushman and Stuart Loory utter similar appeals to those of us in uniform. Both urge a positive response. Loory's is an urgent plea for honesty and courage—a willingness to sacrifice career and position for what we believe is right. Response to that challenge will be easier if staff and command relationships encourage subordinates to express their clearest convictions. Honesty cannot be confused with lack of tact or disloyalty when in fact it signals the highest form of dedication and concern. Whether or not we are defeated may eventually be measured by how open our system is to honest criticism. The challenge that must be met is worthy of all who regard themselves as professionals.

MAJ Pat C. Hoy II, Directorate of Personnel and Community Activities, USAFACFS

OR IN WORLD WAR 2: OPERATIONAL RESEARCH AGAINST THE U BOAT, by C. H. Waddington, History of Science Series, Paul Elek, Ltd., 54-58 Caledonian Road, London, 1973, 253 pages, $15.95.

This book serves as a comprehensive example of the values and related problems in the application of operations research (OR) principles to a complex combat operation. It is largely devoted to a presentation of the

principles without a detailed treatment of the mathematics or statistics involved. It is not necessary to be scientifically trained or oriented to comprehend and appreciate the concepts presented. In fact, most of the quantitative support of the material is in terms of a frequency (number) or a percentage. I would not recommend it as the primary textbook for an OR course, but I would recommend it for a "required" or "highly recommended" reading list for students in the OR field or for military personnel in training for staff positions within high-level decision-making command groups. The book demonstrates that the application of OR may vary from the simple collection of data to the full analytic treatment of a combat operation. In any case, the analysis must include all or most of the pertinent information; therefore, it is essential that good communication exist between the decision maker and the OR specialist. The theme seems to be *the necessity of forming a team* to insure that the proper tools are applied to the real operational problems in order to better understand and more effectively manage an operation. Overall, it is an interesting account of actual US aircraft-submarine operations and the advantages realized from applying scientific methods to the related decision-making processes. It should, therefore, stimulate a desire to apply such principles to other major combat areas of particular interest to the reader.

Leroy Loveless, GS-13, Office of the Deputy Assistant Commandant for Combat and Training Development, USAFAS.

DICTIONARY OF WEAPONS AND MILITARY TERMS, by John Quick, McGraw-Hill, New York, 1973, 515 pages, $25.00

If you are a military history buff, a serious writer, or a current or former member of the military who sometimes indulges in military history, the *Dictionary of Weapons and Military Terms* is one of those works that the serious student will want as a part of his personal library and the occasional reader should find interesting.

The reference includes thousands of entries and more than 1,200 pictures and provides an excellent source of information on weapons and weapon systems used throughout history. Of particular interest are the related code words, military jargon, technical terminology, fighting names given to many of our weapons, planes, and ships, and general historical terms. This permits one to find a reference to "Gooney Bird," for example, which refers one to "C-47," which in turn refers one to "Skytrain" for a description and a picture.

Many military personnel know a weapon or vehicle by its common model number but do not remember its full technical nomenclature. The dictionary solves that problem by including an entire section that lists military designations under "M," "MK," and "XM." For example, listed under "M3A1" are a personnel carrier, two different cartridges, a propelling charge, and a submachinegun. This welcome addition provides a somewhat different approach from that of most reference books.

For many of the items referenced, the author indicates the general and, in some instances, the specific time frame that a particular weapon, plane, ship, or slang expression was in use. If this had been done in all instances, it would have made the dictionary one of the most valuable reference works available today.

The foreword by LTG (Ret) James M. Gavin is the only part of the book that seems to belong elsewhere. The foreword deals with Gavin's philosophy on the use of national power. He concludes that mere possession of high-explosive weapons is no longer a valid measure of a nation's strength, and, indeed, these may cause rather than solve many of our problems. He even quotes Clausewitz's theory of war and politics and then proceeds to interpret Clausewitz's theory as saying, in effect, that weapons equal solutions. It is not the intent here to comment on General Gavin's interpretation of our national policy but merely to indicate that it seems out of place in a reference book. It is not difficult, however, to understand why his comments are included, since he and the dictionary's author are both on the staff of the Arthur D. Little Company.

The book will also be of general interest to the individual who is interested in light reading. Although it is primarly a dictionary, when browsing through it one can obtain interesting information written in a readable manner. While it is not the ultimate research and reference work, it is one of the better ones to use in conjunction with others.

LTC Robert T. Fischer, Office of the Deputy Assistant Commandant for Training and Education, USAFAS.

UPDATE

Senior Field Artillery Commanders

BG Willard W. Scott, Jr.
V Corps Artillery

COL Peter J. Hino
25th Division Artillery

COL Charles C. Sperow
559th Artillery Group

LTC Jerry W. Sutton
1st FA Aviation Battalion

LTC William D. Gess, Jr.
2d Cannon Battalion,
FA School Brigade

LTC Robert H. Allison
2d Battalion, 10th Artillery

LTC Guy J. Palmieri
3d Battalion, 6th Artillery

LTC Bobby H. Freeman
13th Aviation Battalion

A Case for a General

by
LTC Keith Painter

FIRE MISSION! GRID 763492. SUSPECT VC! ONE GUN, 40 ROUNDS HE, ASAP!

Does this fire request sound familiar to you Vietnam vets? Did your blood rise when you weren't allowed to mass fires but were directed to ping away at one suspect grid? The above mission amounts to the obliteration of all living things, including every blade of grass, at that location, merely because we pounded away at it for 60 minutes with one gun. Charlie must have delighted in this tactic as he skirted the area to attack at a different point. Preposterous? Not at all; in fact, missions of this type were all too common. Not only was the wrong tactic used, but valuable ammunition was wasted, not to mention the needless wear on the weapon. Why wasn't something done? Why didn't we mass the fires of the four 8-inch howitzers that were within range for, say, two volleys, and then follow up with more fires if this was warranted? The reason given was that this was not what the Infantry had requested. My! What happened to the influence of the fire support coordinator? Who, indeed, was protecting the interest of the maneuver commander in fire support matters?

The situation above calls to mind the initial artillery briefing we received upon our arrival in Vietnam. Artistically portrayed on the situation map were the range circles of the artillery within the area of responsibility. At first glance it appeared that artillery was, in the classical sense, available everywhere. Only later did it come to mind that perhaps senior commanders considered those range circles too sacred. Didn't they realize that in the huge area within the range circle of the 175-mm gun, only two weapons were available for fires? And how about the 105-mm howitzer platoon located at that isolated Special Forces camp? Did we provide adequate fires there? The range circles indicated that we did. Indeed, on many occasions the enemy body count also indicated that we did. But what improvements could have been made?

Another situation comes to mind. In at least one division, the division artillery commander had no control over, and often no voice in, the fire support provided by the Air Force. The first inkling he received that such support was imminent was when the request for clearance came in. This caused the fire planners to react rather than properly coordinate the fires. Often, even the fires of Army gunships were not coordinated and thus were needlessly delayed or were used only after all artillery fires were lifted.

The examples cited above are not all inclusive nor are they intended to belittle the mission so gallantly accomplished by Redlegs in Vietnam. Rather, they are intended to refresh your memory and encourage you to ask, "How can we improve?" Certainly, artillerymen, no matter how successful, should not rest on their laurels when improvements can be made.

Many explanations are available to explain shortcomings in our support in Vietnam: economy of force was often required, personnel were new and untried, and tactics were different in many ways from those previously experienced or taught. Air mobility became a paramount factor, and aerial artillery was given its combat test. Many factors were new and innovations were required. However, the mission of the artillery did not change. The inherent and doctrinal responsibilities did not change. Why, then, was the artillery and other fire support, as outstanding as it was, not as good as it might have been? In the opinion of the author, a major factor was that the division artillery commander did not, by position or rank, possess sufficient authority to properly influence the action. The solution is to restore the division artillery commander to his historic rank of brigadier general.

Let us review the recent history of the division artillery. Artillerymen who date back to the "brown shoe" Army will recall the "triangular" division of World War II and Korea. This configuration, in effect until 1957, consisted of three infantry regiments, each supported by a direct support 105-mm howitzer battalion and a 155-mm howitzer battalion that provided reinforcing and general support fires. Their mission was doctrinally the same as it is today—to support the ground-gaining arms. The division artillery commander, a brigadier general, was, as is his present day counterpart, the fire support coordinator of the division.

The situation was dramatically changed with the introduction of tactical nuclear weapons and the doctrine developed to employ them. An outgrowth of this development was the introduction of the "pentomic" divisions—ROCID for infantry and ROCAD for armor. These divisions were "lean and mean," and this philosophy extended into the organization of the division artillery. Only two artillery battalions were authorized on the TOE. One battalion was the traditional direct support 105-mm howitzer battalion. The other, which had a nuclear delivery capability, provided reinforcing and general support fires. The division artillery commander, a brigadier general, was required to shoulder the burden of nuclear fire planning and its related functions. This marked the real beginning of the complexities of fire support as we know it today.

Our current division structure, the ROAD division, is designed to provide maximum flexibility in a nuclear or nonnuclear environment and includes the ability to tailor the organization on a task basis to best utilize the forces available. This organization includes three maneuver brigade headquarters, each with the capability to exercise command and control over two to five manuever battalions. Logistic support is provided by the division support command with attachments and other appropriate relationships established to provide for proper logistical support. The need for increased fire support was recognized with the forming of an expanded six-battalion division artillery with an increased nuclear capability. A dichotomy surfaced, however, with the downgrading of the division artillery commander to the rank of colonel. Why, some ask, was this done? We could dwell on the tradeoffs that undoubtedly took place, the parochial and political plays that may have surfaced, and the objections voiced by the artillery community. All that really isn't important, as it is past history. What is important is that it was wrong; Vietnam gave us some combat evidence that it was wrong. It is now time to initiate a change.

Fire support today is a complex package of conventional artillery, nuclear fires, toxic chemicals, organic air defense weapons, and, when available, a multitude of aerial and naval fires. The sheer volume of this firepower makes control difficult at best, and the situation is complicated even more by the diversity of effort. In today's environment, the G3 and his staff often control all air-delivered fire support. The use of the air defense artillery battalion in a ground support role may or may not be coordinated with division artillery. Lack of centralized control allows parochial interests to creep in, to the detriment of the whole. When these factors are added to the requirement to control the fires of corps units in support of the division and the necessity, as practiced in Vietnam, of clearing fires and appropriate air space for aircraft and artillery, the task is overwhelming.

The clearing of fires and space through the division is a subject worthy of further comment. Our practice in Vietnam was to establish air clearance centers on a geographical basis, primarily to route aircraft around areas subject to the fires of the moment. While these centers did, for the most part, accomplish the mission, unnecessary delays of both fires and flights were frequently experienced. The situation could have been greatly improved had the air coordination mission rested with the division artillery, which not only is the prime user of low-altitude airspace but also is inherently more aware of the current airspace utilization than any other agency. Again, however, the direction, influence, and authority of a general officer would be required to properly accomplish this task.

One may agree in concept with what has been written here and yet argue that an additional general officer space in the division cannot be considered in today's environment of a shrinking force and in light of congressional criticism of a topheavy Army. This probably is true; however, the current general officer structure in the division might be improved by establishing the positions of deputy division commander and division artillery commander in lieu of maintaining the current system of two assistant division commanders. There is some evidence to support this revised structure. For example, it has been stated that the principal value in having a general officer responsible for the logistical support of the division lies in his ability to deal on a day-to-day basis with general officers in the various support commands. Could not a deputy commanding general perform this valuable function? Further, does a division G3 require the supervision of a chief of staff *and* a brigadier general in his dealings with the division commander? There is no question that the mission of the Field Artillery is to support the ground-gaining arms; there is a question as to whether the division artillery is properly organized to accomplish this mission. The purpose of this article is to generate some discussion on the subject. It is time to take a hard look at the situation. If organizational change is required to better support our comrades, then let's get on with it.

LTC Keith Painter holds an MBA from Utah State University and is a graduate of the Command and General Staff College. His assignments include USAEUER, Thailand, Vietnam, USARPAC, and Office of the Comptroller of the Army. He is currently assigned to the Field Artillery Branch, Military Personnel Center, DA.

from our allies

105-mm LIGHT GUN

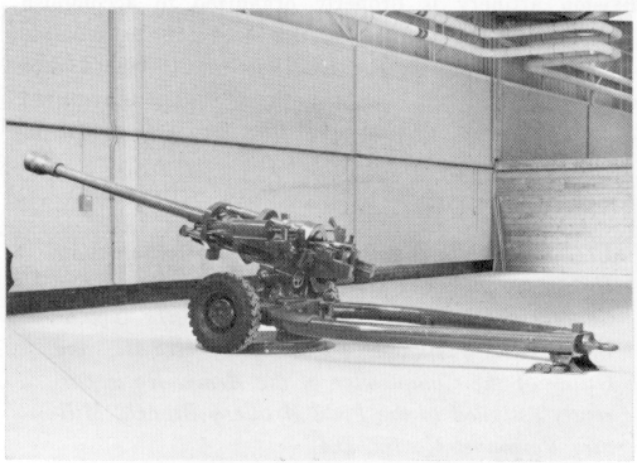
by
LTC R. D. Upton
British Liaison Officer, USAFAS

The 105-mm light gun has been designed to replace the L5 105-mm pack howitzer and will be coming into service with airborne, airportable, and commando units of the British Army within the next 2 years.

The gun is light and mobile and provides a good weight of fire. It is helicopter-transportable, either complete or in two easily broken-down loads. It has two towing positions—a folded position for towing over long distances and rough terrains and an unfolded position for short moves.

Its superior performance has been achieved by means of a very advanced design using the latest materials and production techniques. The barrel is a lightweight monobloc forging swage, autofrettaged to improve the strength and coupled to a conventional hydropneumatic buffer and recuperator system of lightweight design. The breech has a sliding block fitted with electrical firing through a hand generator. The carriage is made of hollow components formed by welding together explosive formed sections of special steel. Once fabricated, each component goes through a heat treatment cycle to develop the high strength-to-weight ratio required to keep the overall weight below that previously considered feasible.

Its characteristics are:	
Range	17,000 meters
Rate of fire	Maximum 6; sustained, 3
Shell available	35-lb HE, HESH, smoke BE, illum
Weight	3,950 pounds
Traverse limits on platform	6,400 mils
Charges	1, 2, 3, 4, 4½, 5, S
Detachment	6 men
Time into action from folded	2 minutes
Time into action from unfolded	1 minute



Changes in muzzle velocity will be much less of a problem with the imperceptible wear figures achieved by using higher yield material. Hopefully, the fact that the steel is rust resistant will make the life of the detachment easier.

The gun has rear trunnions and horizontal balancing springs so that it can be elevated to 70° for high-angle fire in mountainous country. The sights are of the usual type, but the scales are illuminated by nuclear sources for nightwork. There is no shield, to save weight, and the wheels have fully independent torsion-bar suspension to give a quite remarkable ride over rough country. The limit is the speed of the vehicle and the bumping that the driver can survive.

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