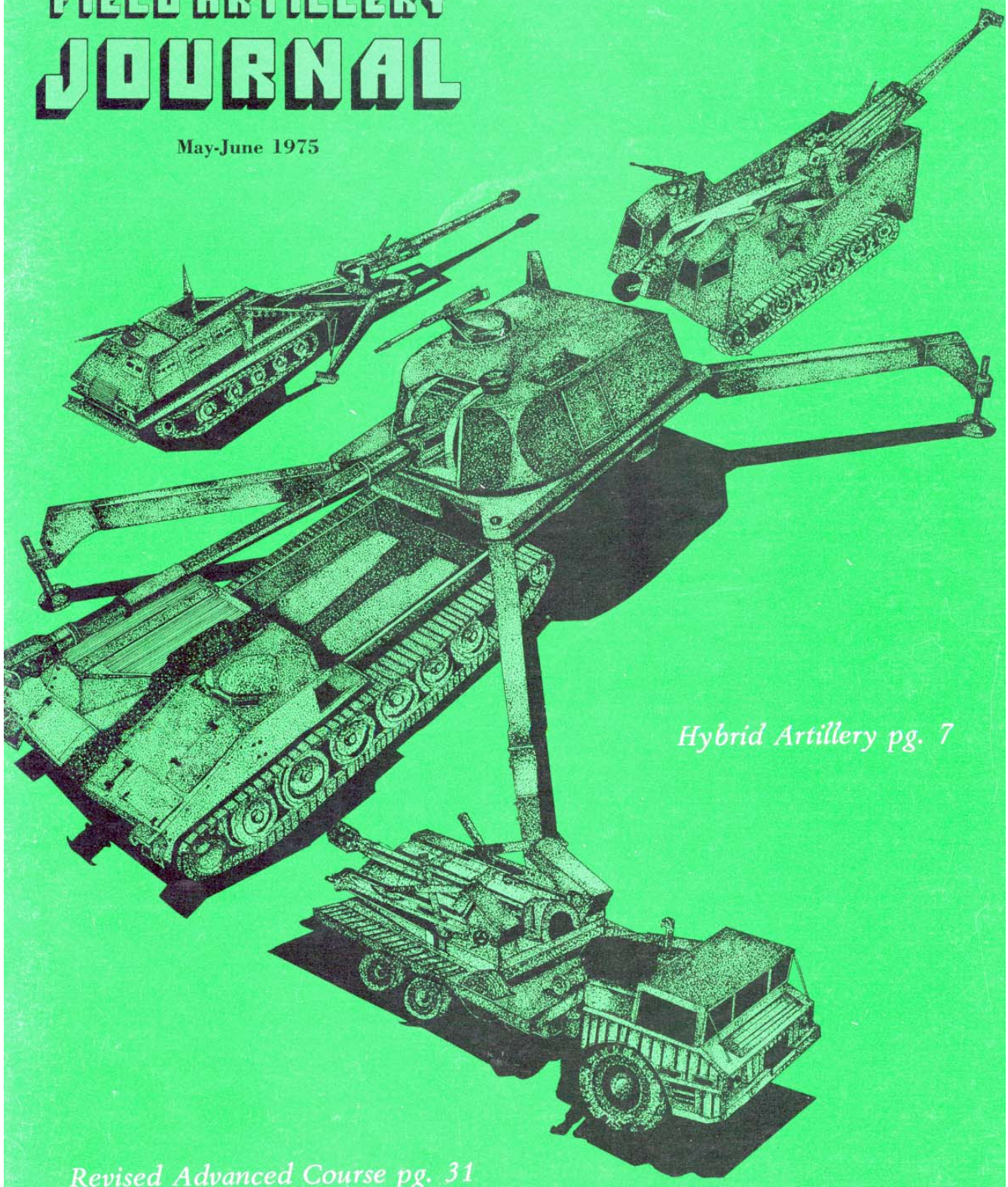
FIELD ARTILLERY JOURNAL

May-June 1975



FIELD ARTILLERY JOURNAL

Volume 43 **May-June 1975** **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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All articles and information submitted are subject to edit by the **Journal** staff; footnotes and bibliographies will be deleted from text due to limitations of space.

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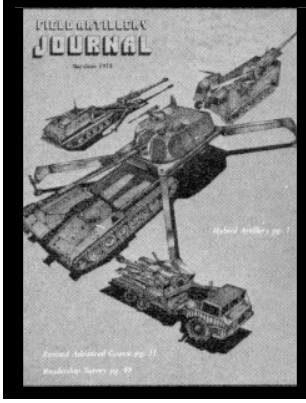
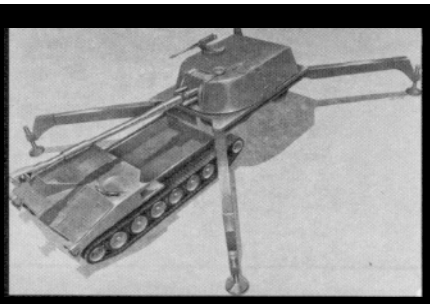


This month's cover was rendered by SP4 Linda Hensley, an illustrator assigned to the Army-Wide Training Support Department, USAFAS, from material supplied by Rock Island Arsenal.

Articles

Features



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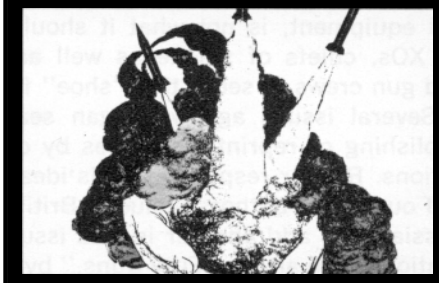

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a word from the editor

The range of articles in this issue is representative of an extremely wide sheaf. While this may not be desirable from the standpoint of the gunnery problem, we believe you will find it acceptable as readers—perhaps even enjoyable.

Before we get to this month's articles I would like to say a word or two about our upcoming issues. A good deal of emphasis is being placed within the Training and Doctrine Command on effective training. We know from the letters and articles we receive that the idea of conducting effective training also receives a high priority throughout the Field Artillery. We plan to highlight this subject in our future issues and we encourage you to take the time necessary to inform us of any particularly meaningful, realistic and effective training that your unit or organization conducts. Good training ideas are timeless and readers need not limit themselves to those currently being conducted.

The Commandant of USAFAS, MG David E. Ott, has brought one aspect of training effectiveness into focus in his "Forward Observations" column. As a result of a recent report it was determined that the precision and accuracy within the firing battery, particularly in the alignment of on-carriage fire control equipment, is not what it should be. We invite all XOs, chiefs of smoke as well as section chiefs and gun crews to see if this "shoe" fits.

Several issues ago we began searching for and publishing or reprinting articles by officers of other nations. Reader response to this idea has been good and our list of authors includes British, German and Russian. We add another in this issue with the publication of the article "Fifty Guns," by LTG A. I. Akram of the Pakistan Army. The article is reprinted from the **Pakistan Army Journal** with our thanks to that publication.

We might add that we also receive requests from foreign military periodicals to reprint **Journal** articles. Recent requests have come from the Pakistanis, Australians and the Mexican Army for their fine publication **Insignia** (see picture).

Our cover article for this issue is a discussion by Mr. R. L. Wrenn of Rock Island Arsenal of an on-going study to combine, compare and evaluate the best characteristics of towed and self-propelled weapons, referred to as "hybrid artillery."

From the National Guard we have an excellent opinion piece on recruiting and retention priorities. The author, CPT Dan Wilkins, is in the Virginia National Guard.

Of special interest to those officers scheduled to attend the Advanced Course beginning in October will be the information in "View From the Blockhouse" on a major revision of the course prepared by CPT Rodney McCormick of the Office of the Director of Instruction.

Missileers will want to make a point to read MAJ Richard Stroud's article on the Field Artillery Missile Systems Evaluation Group (FAMSEG), a unique organization stationed at Fort Sill.

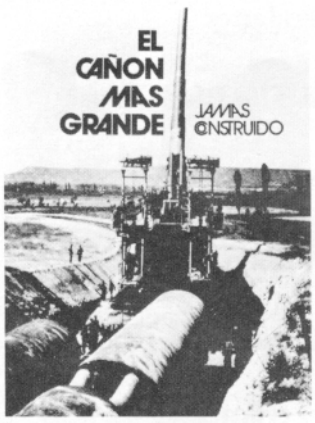
LTC Alexander Jennette of the Department of Doctrine has provided an excellent two-part essay on artillery support in World War I taken from a paper written at Fort Leavenworth.

An alternative to the age-old battery promotion board is the subject of CPT Joseph Halloran's article, "Earned Rank." Although the program is an ambitious one, it represents, in our opinion, an outstanding example of what the cadre of a battery can do to enhance the training and professionalism of a unit.

Fire support of an air assault division is the subject of MAJ Richard Arnold's article and it provides ***Journal*** *readers with the first close look at post*-Vietnam airmobile artillery.

We should, perhaps, invite your attention to one other feature in this issue. Mr. Gillett Griswold, the Curator of the Field Artillery Museum and driving force behind the newly created Field Artillery Historical Association, has outlined the purpose and aims of the organization in "Right by Piece." Redlegs the world over can be justly proud of their museum and the Historical Association which supports it.

Enjoy your **Journal!**



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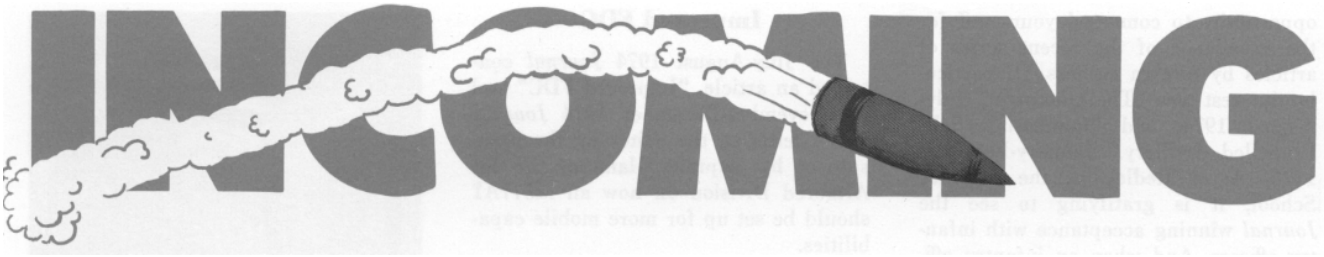
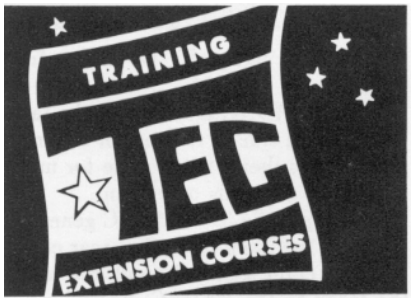




I have read the *Field Artillery Journal* with interest and with enthusiasm. It is a great way to keep in touch with the School — especially for those of us in the Reserve Components.

I am the commander of Headquarters Battery, 1st Battalion, 178th FA, in Greer, SC, which is the DS battalion for the 218th Infantry Brigade (MECH) of Newberry, SC. Last year our brigade was removed from the 30th Infantry Division and set up as a separate brigade. As you might imagine, our status changed and our strength was increased with a new met section added, a survey section was increased and the number of people who are not MOS qualified are now "filling" slots. I am very concerned to see that my people are qualified and trained as soon as possible to insure our readiness. At its best, the training in a Reserve Component unit is somewhat more difficult than the active counterpart due to the shorter training cycle alone and the fact that we have our people only two full weeks per year and 12 weekends per year.

To make this request short and to the point I was very impressed and excited by the article "TEC Is Here" [January-February 1975]. This system I feel offers real potential for my "weekend warriors." Could you tell me how my unit could set up a TEC program? I feel it could greatly enhance our technical training programs. I am eager to learn how to go about it, any info or help you could give, I would appreciate. If you could initially make any responses to me directly I would appreciate it. I do not wish to upset any of the normal command channels.

William Sterling Anderson
CPT, FA, USAR
Greer, SC

As you may already know, your unit was scheduled to receive TEC in May of this year. The hardware (Beseler Cue/See) will be shipped to the Atlanta Depot, ARR IV. The initial distribution of completed software will be shipped from Tobyhanna Army Depot direct to your battalion. Additional TEC software will be mailed to your unit as the service schools complete individual TEC lessons. The TEC Division, Army-Wide Training Support Department, USAFAS, has forwarded three separate TEC documents that should assist you in setting up the TEC program: an aid to the commander entitled, "About TEC;" accumulated experience relative to the management and use of the TEC system called, "Learning Centers for TEC;" and a brief background in the "Learning Center Concept." In addition, the Combat Arms Training Board implementation team will present a user orientation to your unit when you receive TEC.—Ed.

Howitzer Section Test

I certainly enjoy reading the *Field Artillery Journal*, and often review past issues. Of particular interest to me was an article titled "Back to Basics — Howitzer Section Test," in the July-August 1974 issue. We are considering a new approach to howitzer section training and the article stimulated an interest in possibly adapting this excellent program to provide a firmer foundation for our unit readiness posture.

Would it be possible to secure from you more detailed material about this program, and if you don't have such material on hand, could you tell me where to acquire it? Such material would be most helpful toward developing our program for howitzer training.

Richard S. Schneider
LTC, FA, NJARNG
Commander, 3d Bn, 112th FA
Morristown, NJ

The S3 of the 82d Airborne Division Artillery has assured us that the howitzer section test is still very much a part of their training program. In fact, the shoot-off between the best section of each battalion was scheduled for late April. The test includes both direct and indirect firing and information concerning the training may be obtained by writing the 82d Airborne Division Artillery, ATTN: S3, Fort Bragg, NC 28307.—Ed.

That Artilleryman's Tie

Not only have there been letters to the *Journal* ["Incoming," January-February 1975] concerning the dark blue color of the artilleryman's tie, but I have also received telephone calls and personal notes. As you stated in your answer to a letter earlier, the blue was chosen to go with the artilleryman's blazer. With many different shades of red in our blazers, we felt it would be difficult to come up with a red tie that would look good; however, many people wish to wear the artilleryman's tie with other civilian attire and would like to have a red version. We decided to see how well sales were going with the blue tie before venturing into another color.

I'm happy to report that the original quantity of blue ties were sold very quickly, and we have now initiated action to get a red tie, probably a wine color with the yellow cannons on it, for those who would like to wear a red artilleryman's tie.

DAVID E. OTT
Major General, USA
Commandant, USAFAS

Foreign Articles and Monograph

As a sometimes contributor and an avid reader, I would like to take this

opportunity to commend your staff for the excellence of the recent series of articles by foreign authors. Of particular interest was "The Offensive," July-August 1974, and "Combating Self-Propelled Artillery," January-February 1975. As a Redleg at the Infantry School, it is gratifying to see the *Journal* winning acceptance with infantry officers. And when an infantry officer "burns" a copy of "The Offensive" for his own files, then you know you've hit the mark with that article.

Too often we forget that we can learn from others — whether they be potential friends or foes. Reading and studying foreign articles can give us an insight into tactics, techniques, equipment capabilities and, perhaps most important, the thinking of foreign tacticians. Please continue the good work in keeping us informed of what's going on in the foreign military scene.

On a different subject, I found Part I of the "FA Monograph" [January-February 1975] most interesting. Serving only in TOE units in RVN, it gave me an insight into what our Redleg advisors were up against.

Again — keep up the good work and keep the *Journal* rolling.

John E. Sarantakes
MAJ, FA
Doctrine & Training Developments
USAIS, Fort Benning, GA

Commanders Update

In reference to your list of senior artillery commanders, in recent publications of the *Journal* you have failed to list all of them. I am sure that this is a mere oversight and will be corrected in future publications.

The commanders omitted all command the National Guard or Reserve units. Since these units are a definite part of the national defense scheme, it is only fitting that they be given recognition.

I'll start your list with the name of our commander: LTC William R. Brown.

Joseph H. Zang
CPT, FA, MDARNG
2d Bn, 110th FA
Pikesville, MD

We, of course, do not mean to slight our Reserve component commanders. Guard and Reserve commanders greatly outnumber their active duty counterparts and the limitations of space prohibit their individual listings.—Ed.

Improved FDC

The July-August 1974 *Journal* contained an article, "Improved FDC" and the November-December 1974 *Journal* had a letter to the editor on the same subject by Captain Glann of the 1st Armored Division on how an M577A1 should be set up for more mobile capabilities.

After having completed this year's ORTT as chief of the battalion FDC for the 3d Battalion, 18th Field Artillery, I can tell you about the modifications I made to our M577A1s during the summer and which were later proven successful during the ORTT.

In our battalion FDC we normally set up the extension tent because we tend to spend more time in one place than the batteries. For a battery FDC, the extension is not necessary. Given the need, I can run the battalion FDC completely from inside the track. Granted, it's a tight fit but it can be done.

My modifications are:

1. All forms, pencils, sticks and books are contained in a box mounted next to the radios on the shelf on the left side of the track. Plotting equipment is also contained in a divided section of this box.

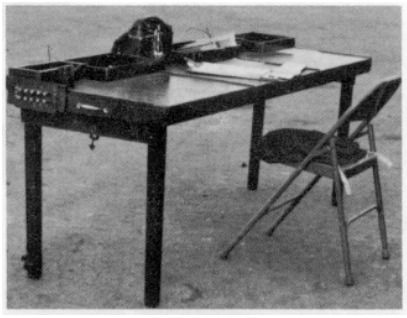
2. A second box next to the first contains all the extra things such as batteries, headphones, mikes, etc.

3. Directly below this we have a threeman computer table that can be set up outside or left inside. It has boxes for three TA-312 field phones and sections for books and forms for all three battery computers. This table is not necessary for battery operations but saves a lot of time in battalion use. Captain Singray of one of our sister units designed the table (see picture).

4. We store the plotting chest and two GR-39s next to the fuel tank on the ledge behind the driver.

5. We have two firing charts. One, the standard type with a field table permanently attached to it, is stored on the ceiling of the track. The second one is a 6400 mil round plywood chart which folds against the wall on the right side of the track.

6. We placed a situation/altitude map on the wall (behind the 6400 mil chart) for work inside the track and we have a larger one that is hinged and has room for other data, such as ammo count, XO's report and current GFT settings, which is stored under the computer table. It is used for working in the extension and hangs by two clips from the frame.



7. Our FADAC is bolted to the table on the right side to the rear of the track and it stays there. It is secure for movement over all kinds of terrain.

8. We put the 3kw FADAC generator on top of the track in the left rear corner with the cable going through the top of the track to the FADAC. Everything is semi-permanent in that the generator can be removed and changed in a matter of minutes if need be.

We set up a 292 antenna only when necessary. The Canadian telescoping antenna is a good idea, I would use it all the time if I could find one. A 292 makes for better reception, but it just takes too much time to erect.

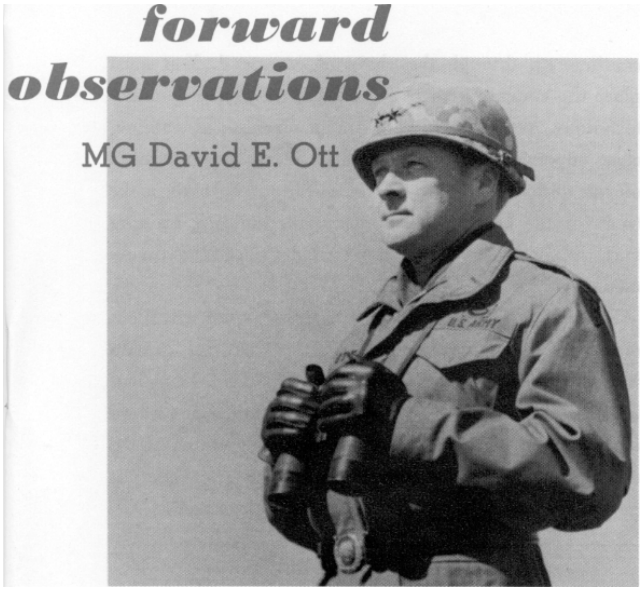
All of those modifications were made to save time which is necessary in today's mobile Army. Battalion operations can be set up and ready to fire in two or three minutes and a battery can be ready immediately. In fact, except for the FADAC (which shouldn't be run for fear of damage to the memory), you can work missions while you're moving down the road, and the FADAC is operational the moment you stop.

John W. Sutton
SP5, Chief Bn FDC
3d Bn, 18th FA

This letter is in reference to the July-August 1974 *Journal* article on "Improved FDC" and on Captain Glann's letter about the same article in the November-December 1974 *Journal*.

Captain Glann and I were in the same battalion (2d Battalion, 78th Field Artillery) in Germany and I fully agree with his comment. However, Captain Glann should have mentioned a modification made by my FDO to my battery's M577A1. LT John R. Gingrich made such an improvement in the interior of the vehicle so that we could set up and shoot without even opening the back door.

(Continued on page 6)



As we move to increase the accuracy of our firing data through improved equipment, revised procedures and increased technological sophistication, we must continue to address the accuracy of the human application of that data on the guns. This requires effective cannoneer training in the units. At the Field Artillery School, we are analyzing training effectiveness. As a part of our cost effective total training concept, our OBC students now rely on cannoneer trainees to put rounds on the target. The motivation of cannoneers to apply their newly acquired skills accurately and responsively is increased by this approach and we think you will find your newly assigned cannoneers reflect this.

These men are, however, heavily reliant on further unit training to master their skills. Our new TEC lessons for the 13B and the new Skill Qualification Test to be implemented in support of EPMS, will further assist you in the future in being able to provide skill mastery in your unit. While we look to the future, we must also stress increased responsiveness to the maneuver forces we support today. The future improvements in the accuracy of our firing data provided by new radars, computers, improved cannon materiel and modern battlefield procedures can only be meaningful if our time-honored sense of urgency and accuracy applies that data within acceptable standards on the guns, now. Too often unit administrative and TPI requirements are precluding opportunities for cannoneers to maintain and improve proficiency through meaningful section training. Too often supervised practice is not regularly conducted, resulting in a "forgetting curve" of degraded skill. Too often, unfortunately, we as field artillerymen, assume that section chiefs are thoroughly checking technical and procedural accuracy continuously during training.

Results obtained from HELBAT IV tests (see May-June 1974 *FA Journal*) indicated to me that firing battery errors continue to degrade fire for effect accuracy. As a result, last July it was directed that an evaluation of firing data and procedures be conducted in a number of units to determine the frequency and magnitude of howitzer section errors affecting accurate delivery of fires. Particular areas of interest to my evaluators were the setting of firing data on the weapon, verification of boresighting, lay of the battery for indirect fire and accomplishment of the Basic Periodic Test/Fire Control Alignment Test. The "Firing Battery Accuracy Assessment" report resulting from this evaluation is available on request. In my review of the data from the 90 Active Army and National Guard howitzer sections evaluated, I noted that 70 percent of the units had errors up to 9.90 mils. The errors were attributable to some very basic and correctable problems. These included errors in setting firing data, leveling vials, attaining proper sight picture, improper alignment of on-carriage fire control equipment and, finally, inadequacies in technical knowledge or checking by supervisors. This indicates an unfortunate lack of professionalism and precision among howitzer section crews which can, if unchecked, negate our progress in improving the accuracy and timeliness of firing data and erode the ground gaining arms' confidence in our ability to support them.

My experience, and that of other field artillerymen over the years, indicates that the chief of section is the key to improvement of firing battery accuracy. He needs to understand the purpose and procedures of the Basic Periodic Test/Fire Control Alignment Test. He must verify the accuracy of the test when it is conducted. He should train his men on fire control procedures when conducting the test. When the battery is laid for indirect fire he should reciprocally lay with other howitzers to verify accuracy. He must check for proper positioning and distance of aiming posts and collimator from the panoramic telescope. He must insure that all motions are made from left to right, that data is applied from the lower to the higher number and that the proper sight

picture is applied. He should level trunions whenever possible or establish proper tracking of vertical cross hair and tube through reference lines. He should eliminate parallax by using parallax shields on the eyepiece or an entrance window cover. He must check the last motion during adjustment for boresight and doublecheck by repeating the complete alignment procedure. He should observe the application of firing data on the weapon and check the direction of the last motion. Finally, he must make physical checks of vials for leveling and sight picture for displacement. I indicated in previous "Forward Observations" that your role in training your trainers is increasing. This must begin with the section chief; he must insure that his cannoneers are capable of performing their duties to acceptable standards, and continue up through the chain of command. You must place the emphasis where it belongs: on proper gunnery technique. You can do this through meaningful training, close supervision and continuous checks. I solicit each of you to do so. Make time for training. Above all, make time for the kind of disciplined, skill building training that will provide lethal effect on the target in a timely manner.

Future articles in the *Field Artillery Journal* will focus on training effectiveness, especially on what you can do with today's equipment to improve individual, team and unit proficiencies. Our Field Artillery System relies, above all, on the competence of field artillerymen. Join me in the effort to insure that the competence of your cannoneers is not overlooked in our goal to make the system work.

(Continued from page 4)

I suggest that you contact the present commander of B Battery, 2d Battalion, 78th Field Artillery, and ask for pictures of the M557 which Lieutenant Gingrich modified during my period of command.

Arthur D. Miller
CPT, FA
HQ, 1st Battalion, 143d FA
Richmond, CA

Thanks. We'll write the unit.—Ed.

Trade

The *Field Artillery Journal* is an extremely worthwhile vehicle for transmitting interesting and informative articles on field artillery and is especially well received by the men of Howitzer Battery, 3d Squadron, 11th Armored Cavalry Regiment, in Bad Hersfeld, Germany. I forward copies to my squadron commander. However, the other armor officers and noncommissioned officers of the squadron would greatly benefit from the opportunity to regularly read what interests the artillerymen. Would you kindly initiate a subscription of six copies of the *Journal* to: Commander, 3d Squadron, 11th ACR, APO New York 09141.

In peacetime, I can think of no better way to provide direct support to the Cav.

Kenneth A. Martell
CPT, FA
Commander

Agreed. We are, however, limited in our free distribution. We have forwarded your letter to the Field Artillery Historical Association and you should receive subscription blanks from them. Perhaps you can work a trade with the troopers of the 11th ACR for copies of ***Armor*** Magazine.—Ed.

Combat Photo

As always, I enjoyed very much your January-February *Journal*. The *Journal* seems to bring me closer to the field artillery community than before after leaving command of the 3d Battalion, 18th Field Artillery, at Fort Sill just recently for Iran where I am now the field artillery advisor/project monitor to Iranian ground forces.

In your "Incoming" section my boss, Colonel Sullivan (a good infantryman) and myself read the letter about the dramatic photo and both have been moved by the photo somewhere before. If it is possible to reproduce the photo, we would each appreciate copies of the photo to hang in our place of business.

Eddie H. Jones
LTC, FA

Although the *Journal* staff does not have the facilities to fill the numerous requests we have received for this photo, we do have an answer for you. You may request the photo, by serial number (sc 635974), from: US Army Audio Visual Agency, Pentagon, Washington, DC 20310.—Ed.

Basics

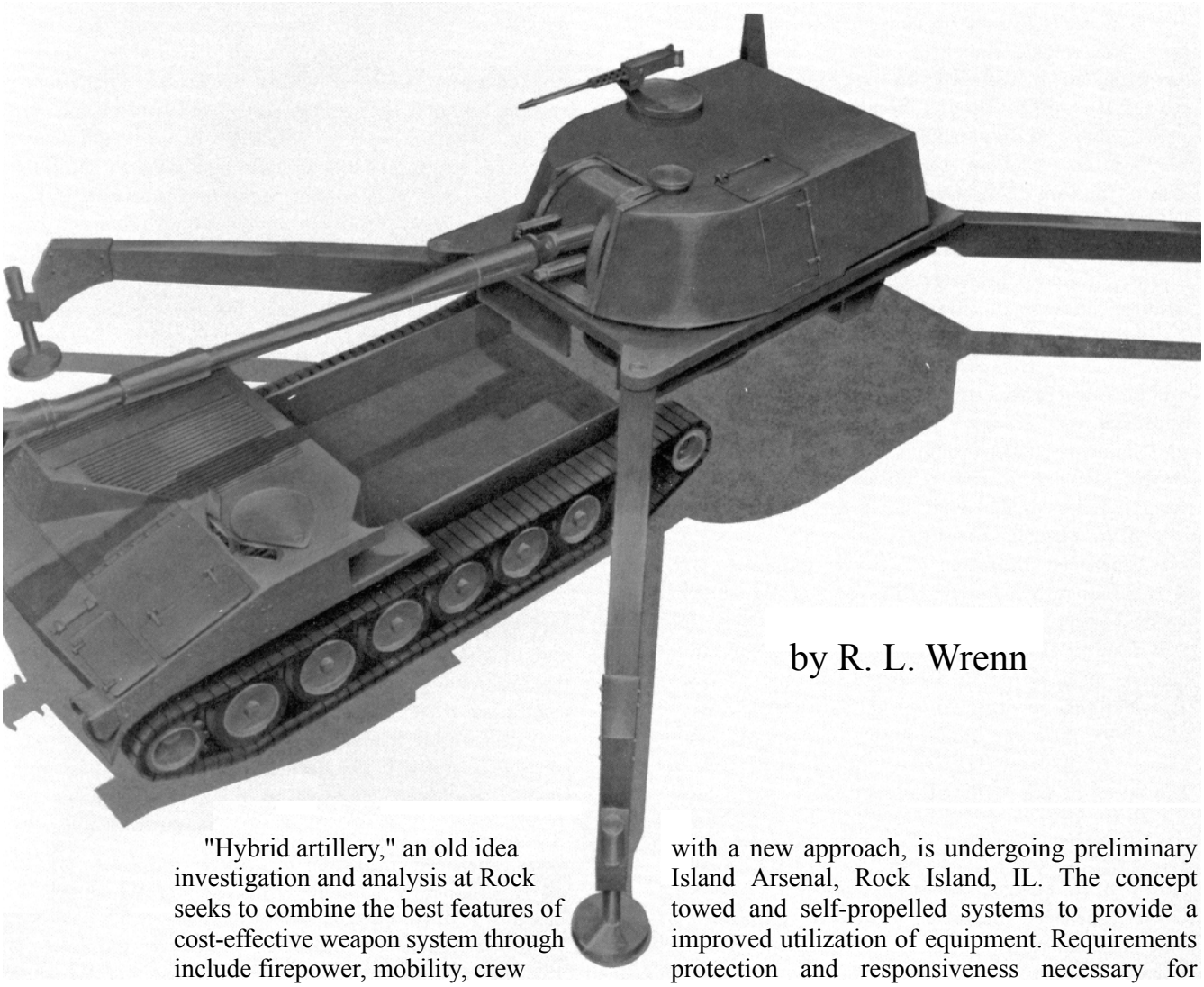
Each issue of the *Field Artillery Journal* impresses me with the technical innovations and advances in our discipline. Before all this new equipment reaches battery level, however, we would like to obtain equipment presently in the inventory. A USAR unit, equipped with the 8-inch SP (M110), we continue to use the M-1 Aiming Circle and are awaiting the arrival of our first FADAC sometime in the future.

While we continue to accomplish our mission with the equipment on hand, certain additional demands are placed on us. Newly-assigned lieutenants must learn to lay the battery with an instrument they never saw at USAFAS and the assistant executive officer must be sharp on gunnery procedures. What it boils down to is simply, don't forget the basics.

In response to Major Koster's letter ["Incoming," January-February 1975 *Journal*] about the establishment of an FSCE within the Headquarters of the 3d ACR, the 11th ACR experienced this in Vietnam in 1968 and 1969 and solved the problem in the same manner. We are glad to hear it is being adopted in other Cav outfits.

David Husing
CPT, FA, USAR
Btry A, 7th Bn, 9th FA
Fort Tilden, NY

HYBRID ARTILLERY



by R. L. Wrenn

"Hybrid artillery," an old idea with a new approach, is undergoing preliminary investigation and analysis at Rock Island Arsenal, Rock Island, IL. The concept seeks to combine the best features of towed and self-propelled systems to provide a cost-effective weapon system through improved utilization of equipment. Requirements include firepower, mobility, crew protection and responsiveness necessary for effectively performing towed and self-propelled type artillery operations.

The hybrid artillery idea surfaced in 1917 with a gun carrier. This system was to lend the support of artillery to tanks, realizing that if the tanks penetrated far into the enemy defenses, they might exceed the support capabilities of field guns which could not be easily transported by horses through trench-infested zones. These artillery carriers transported their guns with wheels removed, but stored on the vehicle for use as needed. Few were built and even fewer used for the intended purpose; although, their employment as supply carriers was important in getting ammunition and fuel to the fighting troops and it saved manpower.

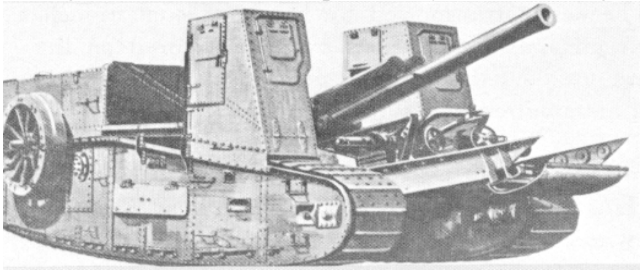
During the latter part of World War II, the Germans developed a hybrid artillery approach. This weapons carrier played no significant role because of its late arrival and, therefore, has remained virtually unknown; but as early as 1942 both the German artillery and infantry voiced a requirement for a simple

and suitable self-propelled mount for the various weapons of the infantry. Weapons were to be able to fire from mounts with 6400 mil traverse, both off and on the vehicle. No significant requirements were placed on their mobility since it was to correspond to the mobility of the infantry. With the weapon dismounted, it was possible to take up concealed firing positions and move the vehicle elsewhere. Loss of the vehicle would not mean loss of the entire weapon system. Weapon sizes ranged from 75 to 210-mm. Some versions had no armor while others were partially armored. Several concepts reached the prototype stage; however, few were fielded due to the loss of the German production capacity after the Allied invasion. Subsequently, the concept of a weapons carrier has attracted little attention.

The Arsenal's investigation and analysis of hybrid artillery addressed criteria not unlike those considered important in these earlier versions. However, a new outlook as to the potential modern battlefield tactical and logistical advantages and disadvantages of the hybrid approach was assessed in light of today's technology and monetary considerations. These criteria, reflecting hybrid artillery mission requirements, formed the basis for the synthesis and analysis of the concepts:

- More reliable cost-effective system.
- Improved utilization of vehicle equipment.
- Adequate ground mobility for support of armored units.
- Rapid dismountable/mountable 155-mm howitzer capable of independent fire operations.
- 155-mm howitzer with XM198 performance.
- Essentially the same crew, ammunition, on-board vehicle equipment (OVE), secondary armament, range and speed as the M109 SP Howitzer.
- Limited crew protection.

Generally, the conceptual designer tends to employ intuitive imagination within the basic criteria guidelines to develop his configurations. Although this approach was used to some extent, it became obvious that for this preliminary analysis, such an approach would be void of firm performance data from which to draw comparisons with existing towed and self-propelled systems. Therefore, a more quantitative approach was employed. A manageable number of concepts were synthesized using existing vehicle and weapon components to obtain as firm a data base as possible for evaluation purposes.



hybrid artillery

In formulating the hybrid configurations, the total weapon system was considered as an integration of three major subsystems—weapon carrier-vehicle chassis, a weapon module and the required materiels handling equipment (MHE). The vehicle chassis subsystem must carry the weapon module and MHE as well as ammunition and crew while providing protection. The weapon module includes the cannon, recoil mechanism and gun mount. Weapon module emplacement or displacement and cargo loading or unloading is facilitated by the MHE subsystem. The goal of the configuration synthesis was to select a near optimum combination of three subsystem modules. There were numerous choices within each subsystem category. As can be visualized, the possible alternatives can soon become completely unmanageable if restrictions are not applied. One such restriction was the establishment of minimum vehicle payload requirements of 25,556 pounds. This figure included 14,800 pounds for the weapon system (XM198/Soft Recoil); 3,416 pounds for 28 rounds of ammunition; MHE 2,000 pounds; crew protection, 2,000 pounds (M109 turret armor); OVE, includes communication equipment, secondary armament, tools, 1,900 pounds; and crew of six, 1,440 pounds.

A large number of vehicles were considered before the M109 chassis, the M110 chassis, the XM598 cargo carrier and the GOER were chosen. These four not only meet the minimum payload criteria but they also have sufficient cost, RAM and mobility data available to permit a more credible analysis. In order to simplify the comparative analysis, it was decided that the XM198 155-mm weapon would be employed as the weapon module for all concepts. Because of its developmental status, the exclusive use of the XM198 provided credible data for the hybrid concept analysis that would not be available with a conceptual weapon, particularly in terms of cost. In addition, the MHE components were selected on a case by case basis that offered the best interfacing possibilities for each concept configuration.

Numerous concepts were synthesized, some of which are shown in Figure 1. Five were selected for further comparative analysis.

A brief description of the analysis methodology employed appears warranted. A criterion function analysis was used. In this method, the important performance criteria are recorded and a simplified mathematical model is employed for comparative analysis.

For example, you could obtain a relative ranking between the M109A1 chassis and the GOER flatbed based on using three criterion variables selected at random: reliability, grade negotiation and trench crossing. In

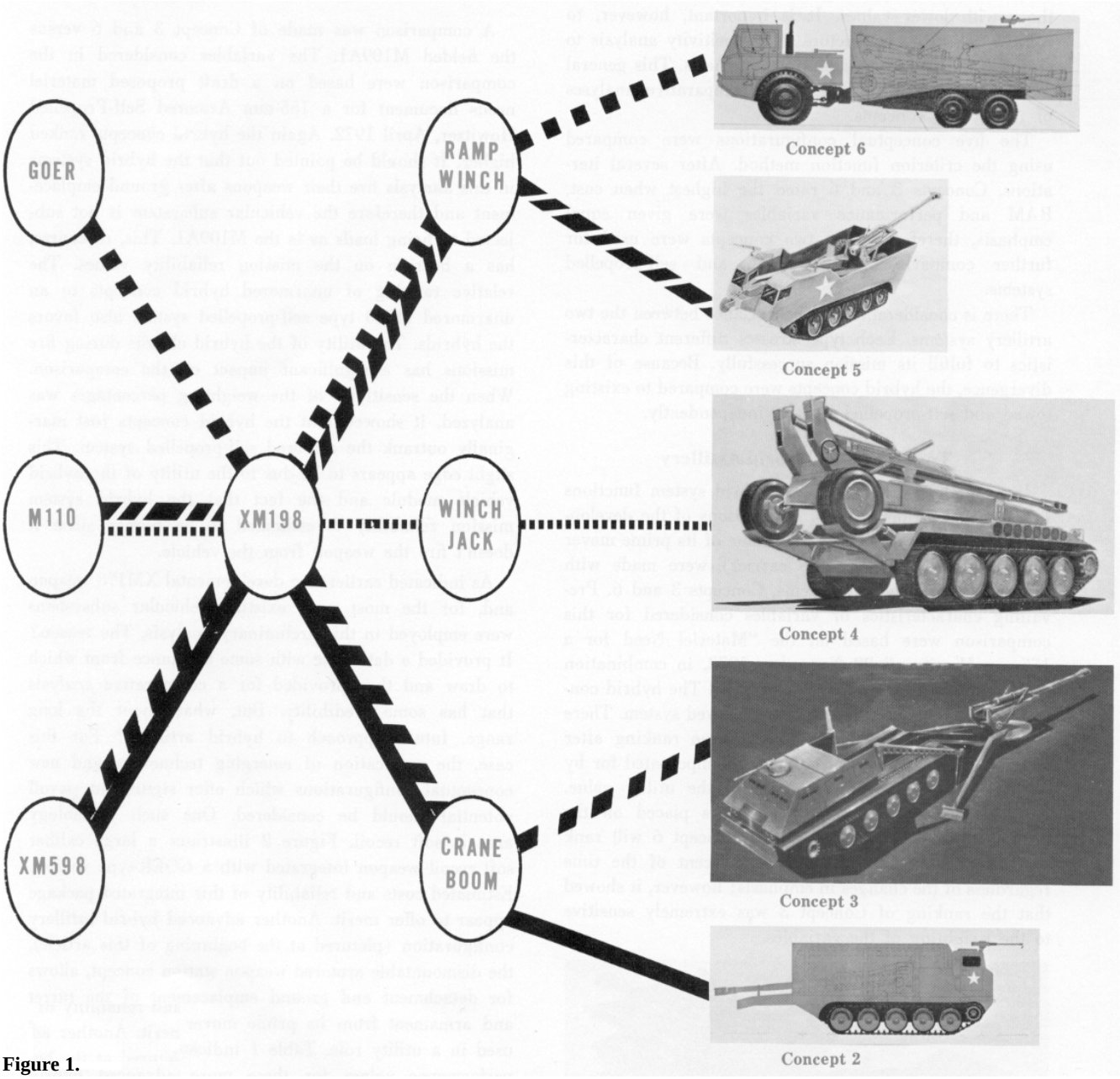


Figure 1.

order to perform this comparison, a relative weighting factor is assigned that indicates the degree of importance for each criterion variable. Next, since the criterion variable values are often given in diverse magnitudes such as mean miles between failure (for reliability), grade negotiation in percent and trench crossing in inches, a scale factor is applied that serves to normalize the numerical differences between these values while acting as a units-conversion agent.

A criterion function equation forms the symbolic mathematical model. Therefore, the criterion function value is the summation of the products of the criterion variable value times its scale factor times its weighting factor. The candidates with the highest criterion function

values indicate they are generally a better choice than those with lower values. It is important, however, to subject the weighting factors to a sensitivity analysis to establish the effect of this applied emphasis. This general method was used throughout the comparative analyses of the hybrid concepts.

The five conceptual configurations were compared using the criterion function method. After several iterations, Concepts 3 and 6 rated the highest when cost, RAM and performance variables were given equal emphasis, therefore, these two concepts were used for further comparisons with towed and self-propelled systems.

There is considerable mission variance between the two artillery systems. Each type stresses different characteristics to fulfill its mission successfully. Because of this divergence, the hybrid concepts were compared to existing towed and self-propelled systems independently.

Towed Versus Hybrid Artillery

In order to see how well the hybrid system functions in the towed artillery arena, comparisons of the developmental XM198 towed weapon and one of its prime mover candidates (the M548 cargo carrier) were made with the two ranking hybrid systems, Concepts 3 and 6. Prevailing characteristics or variables considered for this comparison were based on the "Materiel Need for a 155-mm Howitzer," 22 November 1972, in combination with pertinent hybrid artillery variables. The hybrid concepts ranked higher than the XM198 towed system. There was virtually no change in this relative ranking after deletion of the armor protection was compensated for by decreased costs and improvement in the utility value. A sensitivity analysis of the emphasis placed on the variables considered indicated that Concept 6 will rank higher than the towed system 80 percent of the time regardless of the changes in emphasis; however, it showed that the ranking of Concept 3 was extremely sensitive to the weighting of the variables.

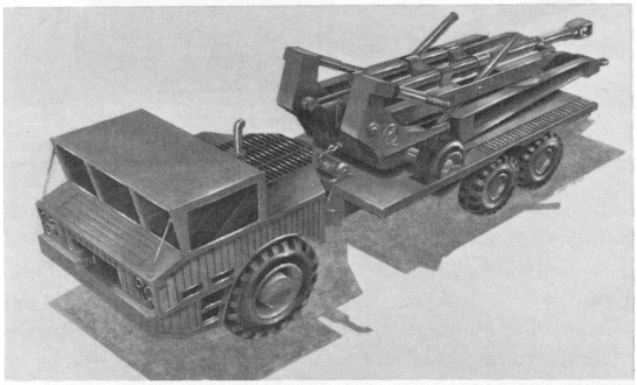


Figure 2.

Self-Propelled Versus Hybrid Artillery

A comparison was made of Concept 3 and 6 versus the fielded M109A1. The variables considered in the comparison were based on a draft proposed materiel needs document for a 155-mm Armored Self-Propelled Howitzer, April 1972. Again the hybrid concepts ranked higher. It should be pointed out that the hybrid systems in this analysis fire their weapons after ground emplacement and therefore the vehicular subsystem is not subjected to firing loads as is the M109A1. This, of course, has a bearing on the mission reliability values. The relative ranking of unarmored hybrid concepts to an unarmored M110 type self-propelled system also favors the hybrids. The utility of the hybrid chassis during fire missions has a significant impact on the comparison. When the sensitivity of the weighting percentages was analyzed, it showed that the hybrid concepts just marginally outrank the armored self-propelled system. This slight edge appears to be due to the utility of the hybrid vehicle module and the fact that the hybrid system mission reliability is estimated to be higher since it doesn't fire the weapon from the vehicle.

As indicated earlier, the developmental XM198 weapon and, for the most part, existing vehicular subsystems were employed in this preliminary analysis. The reason? It provided a data base with some substance from which to draw and thus provided for a comparative analysis that has some credibility. But, what about the long range, future approach to hybrid artillery? For this case, the application of emerging technology and new conceptual configurations which offer significant payoff potential should be considered. One such technology area is soft recoil. Figure 2 illustrates a large caliber soft recoil weapon integrated with a GOER-type vehicle. Estimated costs and reliability of this integrated package appear to offer merit. Another advanced hybrid artillery configuration (pictured at the beginning of this article), the dismountable armored weapon station concept, allows for detachment and ground emplacement of the turret and armament from its prime mover that can then be used in a utility role. Table 1 indicates some estimated performance values for these more advanced hybrid systems. There has been no opportunity to date to fully assess these concepts.

In summary, the idea of a hybrid artillery system comprised of vehicle, weapon and materials handling modules has been investigated, concepts synthesized and preliminary comparative analyses performed.

Some of the general potential advantages of the hybrid artillery over the XM198 with the M548 prime mover

include: a greater ground mobility, faster emplacement time (a marginal improvement), armor protection during movement and a complementary armament capability. In addition, there is an improved materiel handling capability, an increased cargo carrying capability and the crew transport is indigenous to the system. The potential disadvantages are a degraded system air transportability, increased costs, reduced reliability due to the increased vehicle complexity and a potential mobility dependence on a specialized vehicle.

When the hybrid artillery was compared to the M109A1, it had a marginally improved system reliability and ground mobility, an increased ammunition carrying capability and an improved materiels handling and carrying capability. Additionally, there is greater vehicular utilization during firing, a reduced requirement for combat support vehicles and the weapon module is air transportable and can be transferred between vehicles. The potential disadvantages included an increased cost as well as an increased vulnerability during firing. There also is an increased emplacement time, a limited traverse capability and a potentially lower rate of fire.

It is emphasized that these potential advantages and disadvantages are generalizations and certainly not all encompassing; however, they provide some food for thought.

This review concerning a recent preliminary analysis of the concept of hybrid artillery should not be construed as a recommendation for developmental pursuit. It does, however, imply that Rock Island Arsenal is continuing its quest for better, more cost-effective ways of executing the Army's artillery mission.

R. L. Wren is Chief of the Advanced Concepts Division, Artillery and Armored Weapons Systems Directorate, General Thomas J. Rodman Laboratory, Rock Island Arsenal.

Characteristic	Estimated Values for Each Configuration Dismountable Armored Weapon System		
	GOER W/155-mm Soft Recoil Weapon	W/155-mm Conventional (M109A1 type) Weapon	W/155-mm Soft Recoil Weapon
Reliability			
Mean Miles Between Failure (MMBF)	820	450	450
Mean Rounds Between Failure (MRBF)	1400	700	1400
Firepower			
Range (km)	24	24	24
Rate of Fire (Rds/Min)	4	4	5
Traverse (Mils)	800/6400	6400	6400
Emplacement Time (Min-Weapon Mounted/Dismounted)	NA/6.2	2.7/3.83	2.7/3.83
Mobility			
Air Transportability Phase	III	III	III
Soil Mobility Index	92.8	95	95
Max Speed (mph on rough hilly country)	8	12	12
Grade (%)	45	60	60
Trench (in)	60	72	72
Wall (in)	23	21	21
Swimming Speed (mph w/kit)	3	4	4
Crew Protection (No. of Armored Surfaces)			
During Transport	0	6	6
During Firing	0	6	6
Utility Payload (lbs)	30,000	30,000	30,000
System Cost (FY 74 $)	223,000	220,000	220,000
Weapon Module Weight (lbs)	15,000	25,353	28,948
Chassis Weight (curb)	32,200	27,107	27,106
System Combat Weight	51,000	60,161	63,756

Table 1—Advanced Hybrid Artillery Concept Characteristics

In The National Guard

by CPT Daniel B. Wilkins

What does R and R mean to the artilleryman today? As a Vietnam veteran your mind may be flooded with memories of that seven-day rest and recuperation from combat. However, in today's Army R and R stands for recruiting and retention, and it is the lifeline of the volunteer concept not only for the active Army but for the National Guard as well. For the National Guard, the order must be reversed to become retention and recruiting. There is a great deal of argument about this reversal of emphasis because of the possible stagnation of rank-curtailing career opportunities in the NG. An analysis of the composition of the Guard will show why primary emphasis is placed on retention rather than on recruiting.

Membership in the Guard can be broken down into three categories: persons who have reenlisted, persons who have joined after being released from active duty and persons who were recruited. After a person has served his six-year obligation in the Guard, he is naturally more valuable to the organization than when he joined. It is important to retain a competent, qualified person because of his military school training, his on-the-job experience and the development of his leadership ability. By this time this person knows the unit's capability, what is expected of him and what he can expect from others. Even though a Guard unit only trains one weekend a month and two weeks in the summer, the majority

of unit members have worked together for over six years as opposed to regular Army units that have new personnel approximately every 18 months.

The second valuable category is composed of those persons who join after active duty tours. This group brings a multitude of new ideas and experience because of the diverse environments in which they have trained, i.e., Vietnam, Korea, Western Europe and the US.

The third category is composed of new recruits. Such personnel fill in the ranks bringing the unit to full strength. Though limited in experience, their fresh approach and enthusiasm bring new vitality to the unit.

Attractions

What is it about the National Guard that attracts these three groups? Membership gives the individual a chance to serve his community while performing an essential job. In addition, the opportunity to learn a new skill may be a welcomed change from a civilian job. Membership also offers a reasonable income for a part-time job, retirement income at age 60 and low cost insurance.

Retention

Even with these positive points, problems develop which make the retention process difficult. The biggest problem is getting the community to understand the importance of the Guard's work. Often employers penalize their personnel for being in the Guard. Some reduce vacation because of the time missed for summer camp, and others fail to promote Guardsmen for fear that their military responsibilities, such as flood duty or national defense, will hinder their dependability when essential work is needed.

In addition to employer discouragement, family members also lack enthusiasm for the work of the Guard. Many hours are spent in addition to weekend training to continually keep abreast of the changing situations and the time spent with one's family is reduced. Family members, employers and the general public often forget that an active, well-trained unit is necessary for national defense.

Other retention problems arise when the unit fails to provide a sense of challenge and accomplishment for the members. They may feel that valuable time is being wasted in useless formations and boring classroom instruction.

Solutions

Perhaps the direction the Guard needs to take is to shift some of the emphasis now placed on recruiting to seek solutions to these retention problems. The first aspect of this new program is to build the image of the Guard in the community. The public needs to realize the security gained by the community through the Guard, not only in times of violence (i.e., riots), but also during disasters (i.e., floods and tornadoes). Only when the public can identify the Guard as an essential community organization, will employer- and family-type retention problems begin to dissipate. Employers who encourage their personnel to participate in organizations (United Givers Fund, the Jaycees and The Rotary Club), for service as well as business contacts, should be made aware of the potential that exists within the National Guard.

The Individual

Each Guard unit should also attack its own retention problems. Commanders at every level need to be sensitive to the individual soldier, listening to his suggestions for unit improvements, helping him to find the most interesting and challenging job and making sure he understands his role in the unit's mission. An understanding commander can help ease tension between the Guardsman's military and civilian jobs. One way is to have units request more local military schools so that personnel can become qualified and eligible for promotion without having to leave their civilian jobs for long periods of time. A Guard unit should also provide opportunities for social as well as work relationships by sponsoring off-duty parties, sporting events and club activities. Families, employers and community leaders should be included. What better way is there to keep a man in the Guard than having him enjoy his work and companions!

Incentives

Congress, the National Guard Bureau and state legislatures should also work on the retention process. A more extensive incentive program is needed if the volunteer force concept is to survive. A helpful program should include a lower retirement benefit age. Today, a Guardsman may serve 20 years, retire at age 38 and not receive any retirement benefits for 22 years. Active duty military personnel receive their benefits immediately after retirement while Guardsmen must wait until age 60. A lower retirement age would be an incentive especially for sole proprietorships and partnerships such as carpenters and lawyers who do not have retirement programs. Alaska already has such a program which provides $50 a month after 20 years service commencing at age 55. North and South Carolina have a similar program commencing at age 60. Additional benefits needing legislative approval would also strengthen the retention program. Guardsmen have long sought post privileges including the daily use of the commissary, post exchange and medical facilities. Post exchange privileges are already a reality but on a reduced scale of one day of exchange use for each day of inactive duty training performed. Another incentive needed is a reenlistment bonus similar to that recommended

by the special commission of the Massachusetts Legislature: 10 days basic pay for each year of enlistment. Again, Alaska is ahead in offering this benefit. Educational assistance is also needed for the Guardsman and for his family if he should be killed or disabled while on active duty. Eleven states at the present time offer educational assistance. Guardsmen have frequently requested a tax break but some legislatures have never approved it. State income taxes, though payable, are not deducted from Guard checks. An exemption from state tax on Guard income would be a tremendous incentive.

I think smaller incentives granted by states which promote the name of the Guard should include one free set of distinctive license plates as Georgia, Arkansas and Alabama are now offering, and a reduction in the price of state hunting and fishing licenses. Congress and state legislatures have had bills regarding these programs before them for some time. It is up to the National Guard Bureau and local Guard units to encourage the passage of these bills.

Recruiting

Even though I see retention as the primary area needing more effort, active recruiting will always be essential. A unit with a high retention rate automatically has a valuable selling point to the recruit, but more effort than this is necessary. With the elimination of the draft, National Guard units can no longer sit back and wait for people to come to them.

Publicity

Because of the changing times the Guard needs to evaluate its old techniques of recruiting with the possibility of adding some new approaches. Infrequent commercials and a few posters are no longer enough to market the National Guard. For instance, the general public does not know the difference between the National Guard and the Reserves. The name of the Guard must appear before the public and be sold as any other product. Commercials and posters can be supplemented through the use of public service and purchased billboard advertisements, store window displays, newspaper and magazine advertisements, bus and taxi display areas, programs for sporting events, parade representation, shopping accessories like milk cartons and bags, advertisements on race cars and dragsters, bumper decals on all state owned vehicles, unit equipment displays and state and county fair exhibits.

With the name of the organization now familiar to the public, the personal contact recruiting becomes easier. To recruit people with no prior military experience, the most valuable source is the high school. The recruiter should contact the guidance counselor explaining the National Guard program and asking if this type of program is offered as a career option to seniors. With cooperation from the guidance counselor, the recruiter can obtain a date on which he can personally meet with the seniors, he can strategically place posters and literature in the school in order to create interest and he can write each senior regarding the future meeting. During this meeting the recruiter should discuss all the positive points of joining the Guard: military service for the nation, acquiring a skill, money, insurance, retirement benefits, community programs, social aspects and competitive sports programs. He can explain how and when to enlist and make a special effort to speak privately with those who show an interest. Then the recruiter should follow up his meeting through continued communication with interested students and periodic checks with the guidance counselor for new names of students who have inquired about the program. Other areas where information should be available to high school students are post offices, draft boards, shopping malls, state employment commissions, high school newspapers and the local news media.

Another valuable group to recruit are those recently released from active duty. Due to their training and familiarity with military life, this group is a definite asset. Recruiters should obtain from the Army, a list of persons being released from active duty in their geographic location. A list of all GI Bill students would also be helpful in informing prospective candidates of local units and their needs. In this situation dormitories, student centers, school newspapers, classroom halls and fraternity lodges are good information points. Personal contact with the college placement counselors and with students on registration day might offer a lead to interested students. Recruiters should not overlook veteran job fairs, job market conventions and the state employment commission as potential sources for new Guardsmen.

The terms recruiting and retention are mentioned so often in the National Guard that it hardly seems necessary to write anything about them. The job, however, needs constant attention. The majority of the states need or will be needing more Guardsmen. Perhaps it is necessary to rearrange priorities trying harder to retain the most competent Guardsmen by new incentive programs; and filling the gaps with new energetic recruits and veterans by a more active recruiting program. The National Guard should become more creative in reaching and appealing to those people who would make good soldiers for our states and nation.

CPT Daniel B. Wilkins, FA, is the assistant S3 of the 244th Field Artillery Group, Virginia National Guard.

Part III Field Artillery Mobility

In Order To Win

by MG David E. Ott
Commandant, USAFAS

The importance of mobility in insurgency operations cannot be stressed too highly. From experience in past guerrilla actions in Malaya and the Philippines, the conclusion was that at least 10 soldiers were required to counter every enemy soldier. The ratio is high because the enemy had the initiative—he could hit wherever he desired and thus require that friendly forces be ready in sufficient numbers at all locations likely to be contested. Once the enemy had attacked and withdrawn, sizable forces were needed to sweep the countryside if there were to be any hope of finding him. Superior mobility allowed the available friendly units to be more widely deployed and permitted planners to reduce the ratio of friendly to enemy troops. For example, a highly mobile infantry battalion and its supporting battery could complete an operation in one area and in a matter of hours be moved to another area some distance away.

Mobility in Vietnam for ground troops and artillery was provided by ground vehicles, Air Force assault aircraft, watercraft and helicopters. More artillery was moved by road than by any other means. When a landing zone could be conveniently reached by road, it was to a unit's benefit to move in this fashion if operational considerations did not dictate otherwise. The entire unit could be moved in convoy by its own vehicles, whereas movement by helicopter usually required several lifts. Because of weight, all self-propelled artillery was moved in convoy. The Air Force, usually employing C-130 aircraft, supported long-distance moves between improved or unimproved airstrips. Watercraft transported both infantry and artillery in the delta areas where a network of rivers, rivulets and canals favored such movement.

The Vietnam War saw the first large-scale use of helicopters by the US Army to transport troops, artillery and supplies. Helicopters added a new dimension to the battlefield by providing the commander a more responsive and flexible means to concentrate his combat power where it was needed.
Before 1962, the helicopter had been used sparingly, but through the imagination and drive of several key officers, notably Generals James M. Gavin and Hamilton H. Howze, the airmobile concept was developed. They envisioned the deployment of lightly equipped troops by lift helicopters, with fire support to and within the objective area provided by light tube artillery and armed helicopters. What airmobile troops lacked in weight they would compensate for with mobility. They were planned for use against a sophisticated enemy where highly mobile forces have always been needed. Covering force and screening operations, economy-of-force missions, flank and rear area security and securing of key terrain,

CH54 emplacing an 155-mm howitzer.

bridges and installations behind enemy lines were a few of the possible applications. In 1962 the Airmobility Requirement Board (commonly known as the Howze Board) was formed to develop organizational requirements for an airmobile brigade. The efforts of the board resulted in the activation of the 11th Air Assault Division at Fort Benning, GA, which was redesignated the 1st Cavalry Division (Airmobile) in June 1965 and programed for deployment to Vietnam. Though the division was initially configured for use in a sophisticated environment, it proved to be extremely effective in Vietnam against an unsophisticated enemy.

The airmobile division artillery was equipped with 105-mm towed howitzers and UH1B (Huey) helicopters armed with rockets. Howitzers were lifted by the division's own CH47A (Chinook) medium-lift helicopters. The Chinook could carry 33 combat troops and internal cargo up to 78 inches high, 90 inches wide and 366 inches long or external cargo of 6,000 to 8,000 pounds, depending on atmospheric conditions. A 105-mm howitzer battery with a basic load of ammunition could be moved in as few as 11 CH47A sorties. Other maneuver units that followed the 1st Cavalry Division also used Chinooks extensively to move their howitzers; however, with the exception of the 101st Airborne Division, these helicopters were not part of the divisions but were provided by aviation groups supporting the military regions. Every infantry unit in Vietnam was, in fact, if not in name, airmobile infantry and its direct support artillery was airmobile artillery.

The CH54 (Tarhe), nicknamed the Crane for its lifting ability, followed the Chinook to Vietnam. It could lift up to 18,000 pounds either by sling or attachable pod, but sling loads were by far the more common in Vietnam. Of special importance to the field artillery was the Crane's capacity to lift the 155-mm towed howitzer without breaking it down into two separate loads as was required for the CH47 helicopter. This expedited the positioning of medium artillery in areas not accessible by road.

Use of available mobility allowed direct support artillery to follow supported ground forces virtually anywhere. But once field artillery was displaced to a preplanned position to provide supporting fires, it was extremely vulnerable to the enemy who could attack in mass from any direction. Firing batteries had neither the personnel nor the expertise to defend their positions against determined enemy attacks. Accordingly, infantry units provided defensive troops. The position jointly occupied by supporting artillery and defending infantry was referred to as a fire base or fire support base. It was commanded by either an infantryman or an artilleryman, usually whoever was the senior. From its fire base an artillery fire unit could shoot in any direction to its maximum range and would answer calls for fire support from maneuver forces operating under its protective umbrella.

The position for a fire base was selected jointly by the artillery and infantry commanders. The primary concern of the artillery commander was that the position be adequate to support maneuver elements throughout the area of operation. An important consideration was the availability of other artillery within range of the position that, if required, could be called on to provide indirect fire in defense of the fire base. Other important considerations were the type of soil to support the howitzers and how readily the position could be defended and supplied by air. The primary concern of the infantry commander was defense of the position unless he intended to establish his headquarters on the fire base to take advantage of the available security. In that event, he was concerned that the fire base be central to his maneuver forces so they could be effectively controlled. This priority was generally agreeable to the artillery commander who could provide better all-round coverage from such a location.

Because of the manpower drain on maneuver units had they been required to defend all artillery positions, fire bases were constructed almost exclusively for direct support artillery. When such a fire base was established.

B Battery, 1st Battalion, 77th FA, in star formation.

it was usually to support a large operation of at least divisional size or to provide a position when no available one was even marginally acceptable. Division or field force artillery generally chose the best positions for their firing units not in direct support from among defensive positions already established. As a result, such a unit might occupy a fire base with one or more other artillery units or, for that matter, might occupy any other type of defensive position belonging to either American or allied forces. Any commander was happy to have the additional firepower that a battery would bring to his position.

The organization of a fire base was a reflection of the flexibility and ingenuity of the American soldier. Terrain, area available and number and caliber of weapons, plus numerous other variables, made it impossible to standardize procedures for occupying such positions. Still, some generalities can be cited.

The formation of artillery pieces on the ground varied with the terrain and the caliber and number of weapons. In so far as possible, weapons were arranged in a pattern with as much depth as width to eliminate the need for adjusting the pattern of effects on the ground. Six-gun batteries, which included all 105-mm and 155-mm batteries, were emplaced in a star formation, with five guns describing the points of the star and the sixth gun in the center. This configuration provided for an effective pattern of ground bursts and for all-round defense. At night the center piece could effectively fire illumination while the other pieces supported with direct fire. Firing units with only three or four guns arranged their pieces in a triangular or square pattern, if terrain permitted. The diamond formation was most commonly used by composite 8-inch and 175-mm batteries. The 175-mm guns were positioned farthest from the center of the battery, away from the fire direction center (FDC) and administrative elements, thus reducing the effects of blast on personnel, equipment and buildings.

The infantry established a perimeter as tight as feasible around the guns. The desired configuration was a perfect circle, but this was seldom possible because of the varied terrain to be defended. Perimeter defensive positions were dug in and bunkered where possible. To the front, barbed wire was strung and claymore mines and trip flares were emplaced. Infantry soldiers defended the fire base perimeter with their individual rifles and grenade launchers and with crew-served machine guns and recoilless rifles. Mortars were invaluable for fire base defense, not only for their heavy volumes of high-explosive fires but also for close-in illumination during enemy night attacks. A fire base was fortunate if it had air defense weapons on its perimeter. Both the M42A1 "Duster" (a dual 40-mm weapon) and the M55 "quad" .50 caliber provided impressive ground fires, though neither weapon had been designed for that role. These weapons were organic only to nondivisional air defense battalions and were not available in sufficient numbers to provide protection to all fire bases.

The defense responsibilities of the infantry did not end with the establishment of a strong defensive perimeter. Just as important was aggressive and continuous patrolling around the fire base to frustrate enemy attempts to reconnoiter the base and prepare for an atttack. Usually, a single-battery fire base was provided a rifle company to man the perimeter and conduct necessary patrols. This provision was recognized in the organization of infantry battalions in Vietnam, where each battalion was assigned four rifle companies instead of three.

The field artillery on the fire base also contributed to its defense. In fact, the contribution of the artillery was often the deciding factor in staving off a determined attack. Artillery defensive fires included direct fire, countermortar fire and mutually supporting fire.

Direct fire, as its name implies, required line of sight between weapon and target. It involved the use of special antipersonnel munitions and techniques. The XM546 antipersonnel projectile, called the Beehive round, was particularly effective in the direct fire role. The projectile was filled with over 8,000 flechettes (small metal darts). The field artillery direct fire capability was integrated with the infantry defense to cover likely avenues of approach and the most vulnerable areas. It was imperative that the infantry bunkers be built up in the rear so the infantrymen were protected from the effects of

A and C Batteries, 2d Battalion, 77th FA, in LZ BIRD firing Charge 1 at retreating Viet Cong.

the Beehive ammunition. Beehive was fired in combat for the first time on 7 November 1966 by Battery A, 2d Battalion, 320th Field Artillery. A single round killed nine attacking enemy and stopped the attack. The round was employed on many occasions with similar success, perhaps the best known being during the enemy attack on Landing Zone BIRD.

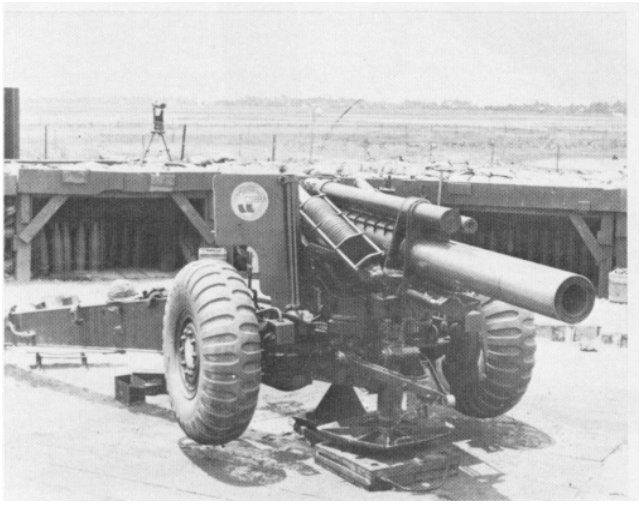
Another effective direct fire technique was "Killer Junior," perfected by LTC Robert Dean, commander of the 1st Battalion, 8th Field Artillery, 25th Infantry Division Artillery. The name "Killer" came from the radio call sign of that battalion. The technique was designed to defend fire bases against enemy ground attack and used mechanical time-fused projectiles set to burst approximately 30 feet off the ground at ranges of 200 to 1,000 meters. Killer Junior applied to light and medium artillery (105-mm and 155-mm), whereas Killer Senior referred to the same system used with the 8-inch howitzer. This technique proved more effective in many instances than direct fire with Beehive ammunition because the enemy could avoid Beehive by lying prone or crawling. Another successful application of the Killer technique was in clearing snipers from around base areas. To speed the delivery of fire, the crew of each weapon used a firing table containing the quadrant, fuze setting and charge appropriate for each range at which direct fire targets could be acquired.

Countermortar (or counterbattery) fires, the second type of artillery defensive fire, were preplanned, unobserved fires that were executed in the event the fire base underwent an enemy rocket or mortar attack, either as part of a ground attack or as a "standoff" attack. A field artillery forward observer (FO) or liaison officer chose likely positions for enemy weapons from a map and from information provided by aerial reconnaissance. Firing data to the positions were computed and a fire plan was prepared and retained in the battery FDC where it could be executed immediately. This procedure might appear to depend to a great extent on luck, but it proved to be quite effective. An experienced artilleryman, knowing the optimum range of enemy weapons, the likely routes into the area and the criteria for good weapons positions, could be very accurate in predicting future locations of enemy weapons.

Mutually supporting fires, the third type of artillery defensive fire, were indirect fires provided by one fire base in support of another. Whenever a new base was established, field artillery FOs and liaison officers contacted responsible personnel on other bases within range and made plans to support one another if attacked. Planning included choosing and prefiring targets close to the defensive perimeter of each fire base. The firing data were retained in the FDCs and used when requested. Immediately available close-in fires were thus assured. Subsequent corrections could be made if necessary.

Time and again the indirect fires from mutually supporting artillery proved to be a principal factor in successfully countering an enemy attack on a fire base. Having mutually supporting bases was considered so important that whenever a battery was required to occupy a position beyond the range of any friendly artillery, every effort was made to readjust other artillery positions to bring them within range. If that was not possible, batteries often split into three-gun platoons and occupied two separate but mutually supporting positions.

The various designs of individual weapon emplacements constructed by batteries on fire bases reflected a great deal of initiative and individuality. The design normally was standardized within a battalion and, in some cases, throughout a division or group. Whatever the design, it provided for all-round protection of weapons



155-mm howitzer position with speedjack and collimator.

and crews from direct fire, readily available overhead cover for the crews and protection of ammunition. Materials used were sandbags, ammunition boxes, powder canisters, pierced-steel planking, heavy timbers and corrugated steel roofing. Steel culverts covered with sandbags were used to provide hastily constructed, yet effective, personnel cover. Standard cyclone fencing placed 20 to 25 feet in front of positions protected howitzers, which, with their high silhouettes, were particularly vulnerable to enemy rocket attack.

The loose soil of coastal areas and the saturated soil of the lowlands during the monsoons made it difficult to prevent the shifting of light and medium howitzers during firing. Logs were used to brace the M101A1 105-mm howitzers. Firing platforms on the M102 105-mm howitzers frequently were staked through pierced-steel or ridged-aluminum planking. The M114A1 155-mm howitzer was particularly prone to shifting. A common field expedient to help stabilize this weapon was 55-gallon drums filled with soil buried vertically and flush with the surface. Logs were often dug in horizontally in a circle around the weapon to brace its trails during firing. One method that proved effective in reducing displacement was devised by the 1st Battalion, 84th Artillery. Old tanks tracks, with the ends linked together, were buried vertically flush with the surface and in a circle. The howitzer was positioned in the center, with its trails against the tracks.

The 6,400-mil environment required that gun sections be thoroughly versed in techniques to allow weapons to be shifted rapidly to a new direction of fire. Two sets of reference points, which normally consisted of two sets of aiming posts or one set of aiming posts and an infinity collimator, provided a visible angular reference in any direction. Azimuth markers or stakes placed around the gun positions provided easy reference and facilitated the frequent shifting of trails from mission to mission. In the case of the 155-mm towed howitzer, shifting trails was a time-consuming, laborious task. Through the initial efforts of LT Nathaniel Foster of the 8th Battalion, 6th Artillery, 1st Infantry Division, a pedestal was developed that eliminated the need for lowering the howitzer off its jack before shifting trails. Modification of Foster's initial platform led to the float jack, which made the weapon more responsive and flexible.

Central to the firing battery was the FDC. This was a small, well-bunkered position. It had the personnel and equipment necessary to receive fire requests from FOs with the supported force and to convert these requests to data that were usable at the guns. FDCs, too, had to follow new techniques in order to respond to calls for fire from all directions. Firing charts had to allow for a 6400-mil range of fire, and much experimentation was done in this area to devise the best system. Generally, an oversized firing chart mounted on a large table proved to be the most effective solution.

The fire base proved its worth in Vietnam. It could be constructed quickly virtually anywhere; it could withstand the most formidable assaults that an unsophisticated enemy could bring against it; and it permitted the field artillery to provide fire support of the same high quality as that provided in past wars.

Artillery Hill base camp at Pleiku.
(Photo courtesy MAJ R. Bolt)

CH47 emplacing an airmobile firing platform. (Photo courtesy CPT N. King)

Base Camp Defense

The base camp was an installation occupied by a headquarters larger than a battalion. Whereas the fire base performed a combat mission, the base camp was large and contained controlling headquarters for combat activities as well as essential combat service support activities. A perimeter of bunkers encircled the base camp, and beyond the bunkers were intricate barriers of barbed wire reinforced with flares and mines. Headquarters and combat service support personnel, augmented where required by infantry, manned the perimeter. Ground forces conducted continuous patrolling around the base camp, usually out as far as the range of the enemy rockets.

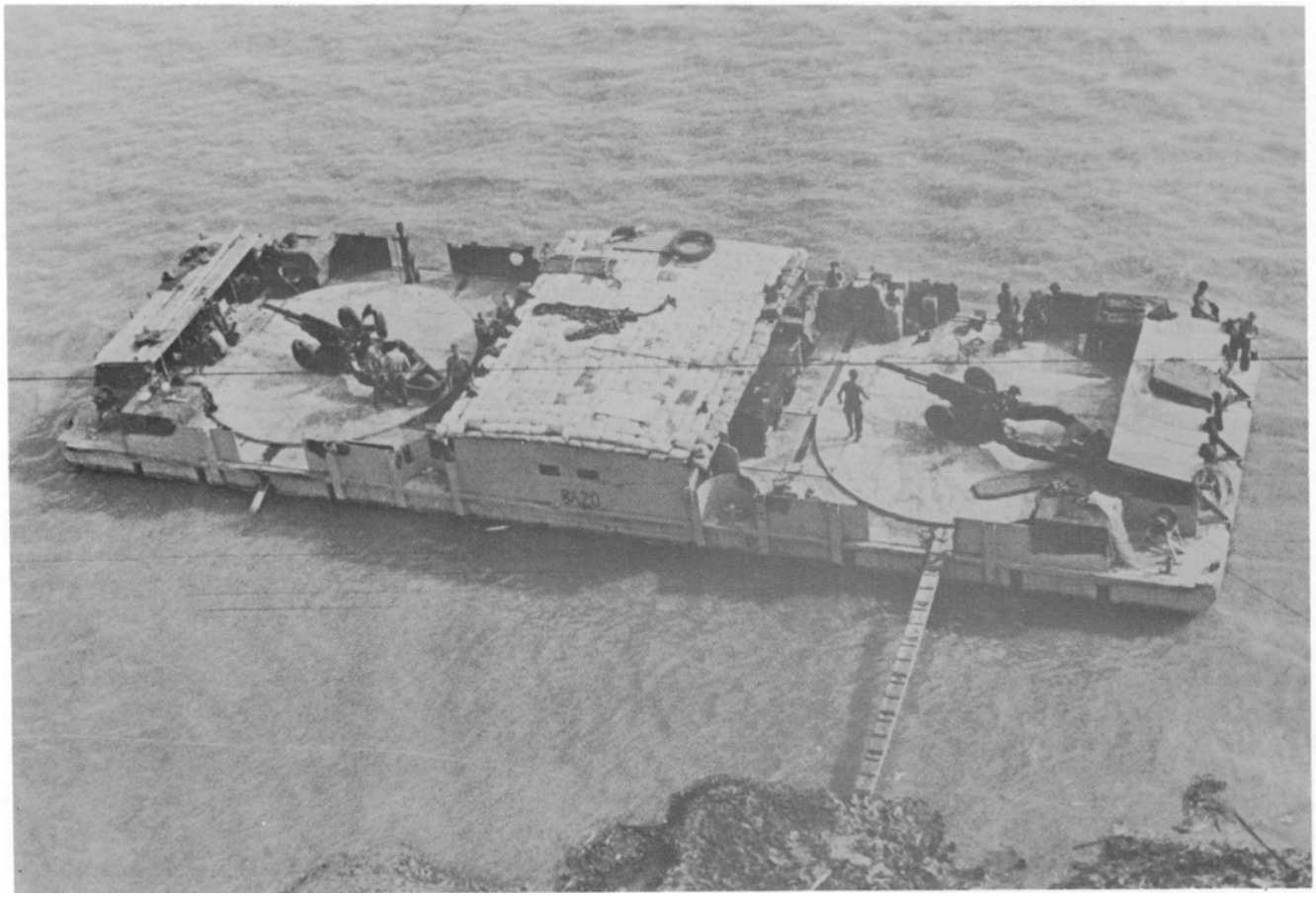
The field artillery also contributed to the defense of a base camp. Cannons fired harassing and interdiction fires on likely enemy routes and positions, answered calls for observed fire from patrols, fired illumination rounds and provided direct fires against enemy ground attacks. The number of cannons required for the defense of base camps varied, a brigade or artillery group base camp might need several batteries.

In addition to cannons, field artillery targeting devices (such as radars and searchlights), when available, were integrated into the defense. The AN/MPQ-4 countermortar radar, organic to DS artillery battalions, and the AN/TPS-25 ground surveillance radar, organic to division artillery, were used in conjunction with shorter range infantry antipersonnel radars for locating targets. These targets were then engaged by cannons or other suitable supporting fires. Searchlights provided either visible or infrared illumination and were oriented for direction on the same angular reference as the artillery weapons. If the enemy were spotted, an azimuth and an estimated distance could be relayed directly to the battery FDC.

The responsibility for defense of a base camp was often assumed by the senior artilleryman occupying the installation. Phu Loi base camp, for example, was occupied by the 23d Artillery Group Headquarters plus other combat support and combat service support activities. No infantry unit was permanently assigned, and on two occasions the group commander was designated as Phu Loi defense commander. Senior ground commanders at times also delegated responsibility for the defense of

their base camps to their senior artillery commanders, as in the 4th Division, first at Camp Enari and later at Camp Radcliff. As installation defense commander, the division artillery commander controlled that area around the base camp within a 14-km radius. He coordinated patrols and reconnaissance activities, coordinated the perimeter defense effort and established the installation defense coordination center in which all efforts concerning reconnaissance, ground defense, reaction to enemy attack, target acquisition and fire support were centralized. Sizable portions of base camp defense

rice paddies. Roads and dry ground are scarce, and hamlets and villages have long since been built on what little dry ground there is. If artillery shared dry ground with a hamlet, the firing unsettled the people whose support the allies were trying so hard to win. Even when field artillery was positioned on dry ground, it was difficult to employ because the high water table made the ground soft. Without a firm firing base, cannons bogged down, were difficult to traverse and required constant checks for accuracy. All this lessened their responsiveness and effectiveness.



Riverine platoon moored to canal bank. (Photo courtesy CPT N. King)

responsibilities were also delegated to the artillery commanders of the 1st Cavalry Division and the 1st Infantry Division. The former was given operational control of a cavalry squadron in Area of Operations CHIEF, encompassing the division base camp at Phuoc Vinh. The latter directed maneuver operations around the Big Red One artillery base camp at Phu Loi.

Riverine Artillery

The terrain of the Mekong Delta was a serious hindrance to fighting forces in Vietnam. The delta is comprised of rivers and canals coupled with swamps and

A fighting force in the delta could not rely on ground vehicles for transportation or supply. Vehicles could seldom move the infantry close to the enemy, they were vulnerable to ambush and the scarcity of dry ground overly cramped and restricted supply operations and the activities of control headquarters and supporting field artillery. Helicopters were used successfully to transport troops and artillery to the area of operations. The airborne platform was developed to solve the soft ground problems. The platform, a 22-foot square, was similar to a low table with large foot pads on four adjustable

legs to distribute its weight. The platform could be lifted by a Chinook and placed rapidly in boggy or inundated areas. A second Chinook brought in an M102 howitzer and ammunition and placed it on the platform. (The howitzer and platform could be lifted together by a CH54 Crane.) The platform provided space for the howitzer, the crew and a limited amount of ammunition and permitted traverse of the howitzer in all directions. If one or more of the legs were mired when the platform was to be moved, the footpad was disconnected and left in place to be recovered separately. A principal disadvantage was that the gun crew was exposed to enemy fire. It was impossible to construct bunkers or overhead cover since the nearest ground was under water, though sandbags positioned around the edge of the platform provided some protection. Another disadvantage was that ammunition resupply and storage was difficult because of limited space on the platform.

Even more significant than the use of helicopters in the delta was the formation of a riverine task force which relied on watercraft to provide transportation, firepower and supply. The task force consisted of the 2d Brigade, 9th Infantry Division, and the US Navy River Assault Flotilla 1.

Field Artillery support for the new riverine task force was initially provided from fixed locations, but the support was less than adequate. Field artillery needed to move and position itself to best support the ground action. This need was satisfied by the 1st Battalion, 7th Artillery, in December 1966 when the battalion first employed the LCM-6 medium size landing craft as a firing platform for howitzers. The LCM could be moved to a desirable position and secured to the riverbank. Internal modification enabled the craft to accommodate the M101A1 howitzer, but it was not wide enough to permit the howitzer trails to be spread fully, limiting the on-carriage traverse. Other shortcomings were that the craft did not afford as stable a firing platform as was desired and excessive time was required to fire.

More successful were floating barges. The concept originated from a conference in the field between CPT John A. Beiler, commander of Battery B, 3d Battalion, 34th Artillery, and MAJ Daniel P. Charlton, the battalion operations officer. Their ideas prompted a series of experiments to determine the most suitable method of artillery employment with the riverine force.

The first experiment used a floating AMMI ponton barge borrowed from the Navy and an M101A1 howitzer. Although the barge served its purpose, it was difficult to move and had a draft too deep for the delta area. The barge selected was constructed of P-1 standard Navy pontons (each seven by five feet) to form a platform 90 feet long by 28 feet, 4 inches wide. Armor plate was installed around its sides for protection. Ammunition storage areas were built on either end and living quarters in the center. This arrangement provided two areas, one on each side of the living quarters, that could be used to position 105-mm howitzers. As the newer M102 weapon became available in Vietnam, it replaced the older M101A1 howitzer. A mount for the M102 was made by welding the baseplate of the howitzer to a plate welded to the barge deck. This mount permitted the howitzer to be traversed rapidly a full 6400 mils.

Three barges and five LCM-8s constituted an average floating riverine battery. Three LCMs were used as push boats, one as the FDC and command post and one as the ammunition resupply vessel. Batteries could move along the rivers and canals throughout the delta region; they frequently moved with the assault force to a point just short of the objective area. All the weapons had a direct fire capability, a definite asset in the event of an ambush. Then the howitzers often responded with Beehive rounds, which usually broke up the ambush in short order.

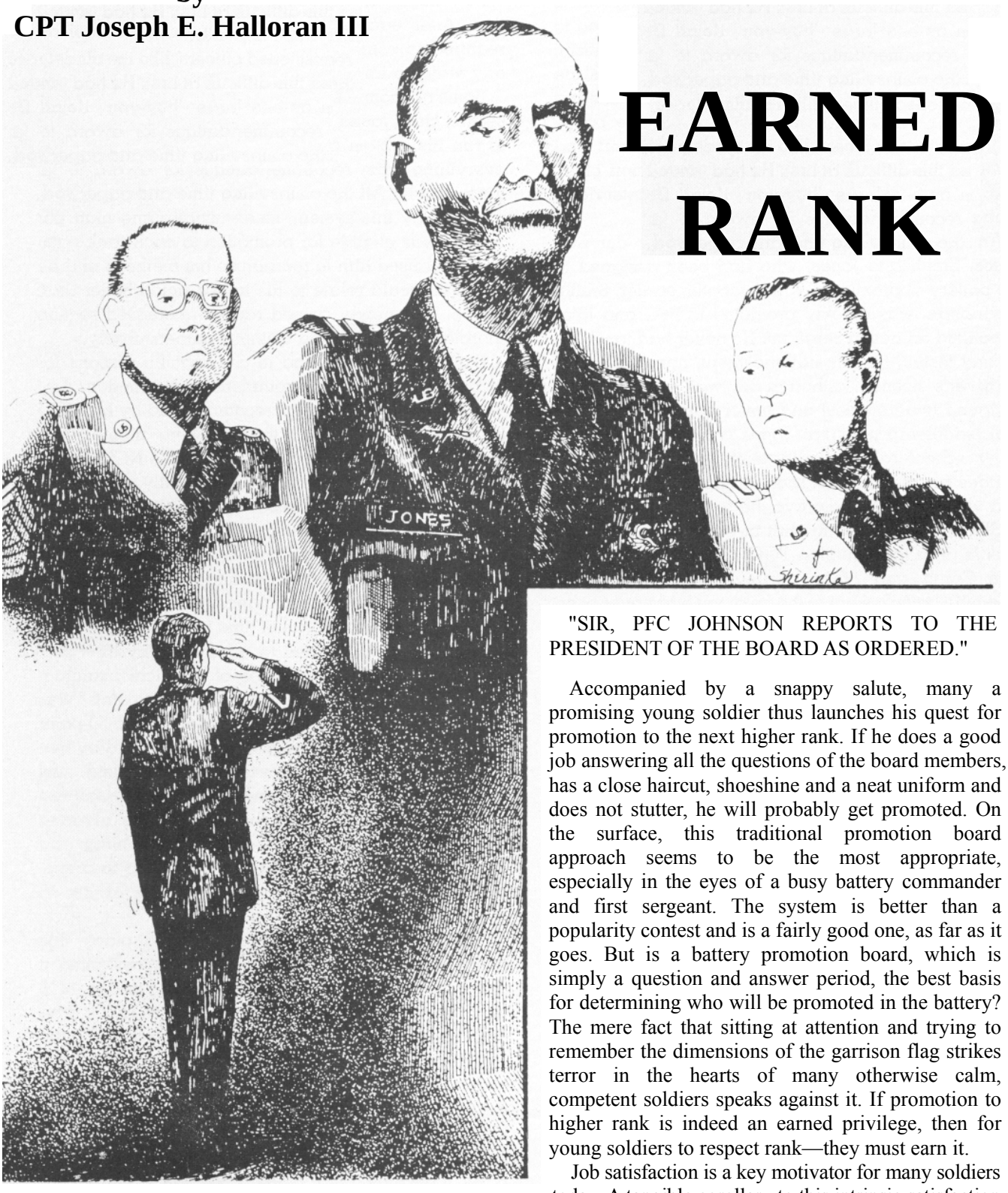
When a location for the battery was selected, the barges were pushed into position along the riverbank. The preferable position was one where the riverbank was clear of heavy vegetation. This facilitated helicopter resupply, which could then be accomplished on the bank as close as possible to the weapons. Clear banks also provided better security for the battery. The barges normally were placed next to the riverbank opposite the primary target area so that the howitzers would fire away from the shoreline in support of the infantry. This served two purposes: weapons could be fired at the lowest angle possible to clear obstructions on the far bank and the helipad was not in the likely direction of fire.

The barge was stabilized with grappling hooks, winches and standoff supports on the bank side. Mooring lines were secured around the winches and reeled in or out to accommodate tide changes so that the barges would not be caught on either the bank or mudflats at low tide. Equipment to provide directional reference for the weapons—including aiming circle, collimator and aiming posts—was emplaced on the banks. Accuracy of fires proved to be comparable to that of ground-mounted howitzers.

Without these new developments in riverine artillery, US maneuver force activities in the delta area would have been seriously curtailed or often would have had to take place out of range of friendly field artillery. Instead, the field artillery was able to provide support when and where it was needed.

by
CPT Joseph E. Halloran III

EARNED RANK



"SIR, PFC JOHNSON REPORTS TO THE PRESIDENT OF THE BOARD AS ORDERED."

Accompanied by a snappy salute, many a promising young soldier thus launches his quest for promotion to the next higher rank. If he does a good job answering all the questions of the board members, has a close haircut, shoeshine and a neat uniform and does not stutter, he will probably get promoted. On the surface, this traditional promotion board approach seems to be the most appropriate, especially in the eyes of a busy battery commander and first sergeant. The system is better than a popularity contest and is a fairly good one, as far as it goes. But is a battery promotion board, which is simply a question and answer period, the best basis for determining who will be promoted in the battery? The mere fact that sitting at attention and trying to remember the dimensions of the garrison flag strikes terror in the hearts of many otherwise calm, competent soldiers speaks against it. If promotion to higher rank is indeed an earned privilege, then for young soldiers to respect rank—they must earn it.

Job satisfaction is a key motivator for many soldiers today. A tangible corollary to this intrinsic satisfaction is promotion as a reward for outstanding job

performance. Unfortunately, today many young soldiers view unit promotions with a jaundiced eye. Since no one has bothered to explain the system to them, many conclude there is no rhyme or reason to the whole process. The probable cause is favoritism, be it subtle or blatant, in the battery. This was the situation one captain found upon assuming command of a headquarters battery. In a nutshell, the policy of the previous commander and first sergeant had been simply: "If you drank with your section chief, you got promoted." Initial commander interviews brought evidence of this system to light.

An example would be two privates (for our purposes, Smith and Jones) who had been assigned to the battery approximately nine months earlier. Smith, a wireman, was quickly promoted to PFC and later appointed an acting sergeant. He never had to undergo any testing for this advancement, never obtained a driver's license (although he was a team chief assigned two vehicles) and never demonstrated any real leadership potential. Jones came to the battery as a school-trained radio teletypewriter operator. Besides maintaining his radio equipment, generators and vehicle which he drove, he regularly pulled the additional duty of night shift in equipment and generators or in the battalion TOC. Jones worked alongside Smith and other communications personnel when the battery went to the field, yet had never been recommended for promotion. It turned out there were two reasons for this apparent inequity. First, Smith was a good friend of the communications sergeant and Jones wasn't. Also, Jones was black.

Consequently, to correct such situations the commander developed a four part promotion program that eventually corrected weaknesses of the promotion board system as well. The basic points of the program were these. Initially, a man eligible for promotion in any given month was rated by his section chief on the Enlisted Evaluation Report. Then the man was given a series of practical examinations relating to his job and basic soldierly skills. The third part of the system was initally a battery promotion board. A practical problem, designed to test leadership potential, was subsequently substituted for the board and worked much better. A physical fitness test was also added when this substitution was made. All parts of the system were worth points, totaling a possible 600. The point cutoff for promotion to PFC was 375. It took 450 points for promotion to specialist four.

Every month the first sergeant published a list of personnel meeting the time in grade and time in service criteria for promotion to E3 and E4. Section chiefs then rated each on an EER, worth a maximum of 100 points. As part of the rating, the NCO had to state whether he recommended the man for promotion. After each was rated, the section chief was required to counsel him and discuss his rating and any ways to improve his performance.

Some noncommissioned officers', like the air defense section chief, found this difficult at first. He had tended to run his section as one large "hey-you" detail for everything from recommendations for award to latrine orderly. All the counselling time and paperwork required by this system, since usually one man per section was eligible for promotion to each rank each month, caused him to reorganize his methods and he found he could relate to his troops much better than before. This newly gained rapport increased section morale and helped the training immeasurably.

Each section chief had to cite specific reasons for recommending or not recommending promotion. Any eligible man who was not recommended by his NCO became ineligible until the following month. This policy simply recognized the fact that the NCOs knew their men best since the NCOs actually supervised details involved in mission accomplishment. The commander then supported each NCO's recommendation. This, in turn, further developed the troops' respect for their section chiefs and made them realize it was their duty performance that earned them eligibility for promotion, not time in service.

All men recommended for promotion by their section chief underwent a series of practical examinations. This part of the system, worth 200 points, was divided into six parts. First, each man 'took a 50 point test relating to the job he performed, followed by five equally weighted tests covering map reading, first aid, his individual weapon, NBC and a compass course. In each instance the soldier was given a specific task, such as properly disassembling and reassembling the M16, to be accomplished in a specific time and was then graded on his ability to accomplish that task.

The battery commander decided to place this emphasis on basic soldierly skills after assigning a class on the disassembly and cleaning of the M16 to a sergeant in the radar section. This NCO, who had five years active service, was more than a little embarrassed when he told the captain he had forgotten how to do it. After recovering from this shock, the commander realized the battery needed training in fundamentals—not to mention some time cleaning rifles. After this training was instituted on a recurring basis, it became a part of the promotion system in the form of tests. The sergeant also improved and became

a good instructor for this training.

The final portion of the practical examination was the test of the man's job proficiency. It was the first sergeant's idea that this be a test of the job the man was actually performing since it may not even be remotely related to his primary MOS. To the battery, it was more important to determine if a man was skilled in his actual duty assignment than in an MOS he might not have worked in for months. This was also fairer to the man.

The battery clerk, probably the most versatile man in the battery, provided a good example. A cannoneer by MOS, he had been a Redeye gunner for five months when he became eligible for promotion to PFC, so he was tested in that speciality and made it. Due to necessity, he later became the battery clerk; he was the only man in the battery who used more than two fingers on a typewriter. After four months in that job he was eligible for promotion to SP4. This time he took a practical clerical examination, passed and was subsequently promoted to SP4.

When the new promotion policy was first put into effect each man had to appear before a battery promotion board. This board was used to question individuals on leadership techniques. This did not work well since some men simply clammed up in front of the five-man board or chose not to appear before it. For example, one man in the battery was a completely self-taught mechanic who had been promoted to PFC under the old battery system. He was a hard worker who had the uncanny ability to keep vehicles that were virtually in salvage condition running (without any spare parts being available). He had also been the acting battery motor sergeant for three weeks and had done a good job. He became eligible for SP4, was recommended by the battery motor sergeant and successfully passed all the practical examinations. However, when it came time for him to appear before the battery promotion board he failed to show. He simply did not want to do something he felt was unnecessary. The battery commander held a seminar with his battery following this to find out how all the enlisted men felt. Most felt an appearance before a battery promotion board was irrelevant in reaching any decision as to whether or not a man should be promoted to E3 or E4. Since this was the majority view, to include NCOs, the system was modified and circumstances showed it was a change for the better.

Consequently, as has been mentioned, the board was replaced by a practical leadership problem and a physical fitness test, each valued at 100 points. The leadership problem was actually a two-part exercise which took one afternoon to complete. The problems were generally tailored to fit each man's job speciality.

A surveyor, preparing for promotion to SP4, was given a field and garrison problem. He was required to load out his survey party, minus NCOs, and conduct a position area survey in a location five miles from the compound. He had two hours from notification to have this completed. He then had to take his survey party back to the battery area and prepare for an equipment inspection in two areas. This required some leadership on his part and cooperation from the other members of the survey party as well. Personnel trying for promotion to PFC were given tasks that were a little easier. These tests developed personnel quickly and also helped in the process of trying to fill the gaps created by the general lack of noncommissioned officers. The battery gained the additional benefit derived by the improved teamwork resulting in each section.

The physical fitness test was the inclement weather test taken from FM 21-20. This test was used since it adequately measured a man's physical fitness, was quick and easy to conduct and a gymnasium was readily available for the battery's use. If today's Army is really going to be lean and tough, each soldier should have the strength and stamina to perform adequately under pressure. The physical fitness test was the most readily available method for the battery to measure this and added another dimension to the battery policy. The enlisted men learned they had to stay in good shape to earn any advancement in rank. A corollary to this was that the senior battery NCOs and officers also had to be in good physical condition if they expected their men to be tough.

Simple addition shows that these four parts of the battery promotion system add up to only 500 points. The additional 100 points was given to those men who possessed a vehicle operator's permit and successfully completed a short driver's test. Initially mere possession of a license gained the owner the additional 100 points but circumstances caused a change to this policy.

The battalion operation officer's driver was one of those exceptional men who managed to pass the standard driver's test on his first attempt. Because of this he acquired the bonus 100 points and with that scored enough to be promoted to PFC. In an ensuing FTX, he managed to have two accidents in one day. In the second he succeeded in depositing the battery commander on the side of the road without bringing the vehicle to a stop. This caused some

reflection on his commander's part who determined that possession of a driver's license did not necessarily guarantee a man was a good driver. Consequently, the promotion policy was modified so each driver, while granted 50 points for his license, had to earn the rest.

Each man who achieved enough points for promotion to the next rank was usually promoted within one week. Those who failed, approximately half those recommended, were given two options. Their first option was to wait until the following month and, if again recommended by their section chief, go through the promotion system again. Second, if they did not already have a vehicle operator's permit, they could try to obtain one and take the battery's driver's test. If they thus achieved enough points for promotion, they would automatically be promoted with those personnel who were to be promoted the following month, without going through the entire system again. This option was made available since licensed drivers were at a premium in the battalion at that time.

The battery commander and first sergeant had to insure every soldier in the battery knew exactly why this system was being used and what it meant. There were two reasons for this. First, it was a radical change from the previous commander's policy. It was also totally unlike the promotion systems in the other batteries in the battalion. Command information classes and orientations for new personnel continually stressed how the system worked. Repeatedly, it was emphasized that in this system a man earned through his own skill, not friendship or longevity.

Battery noncommissioned officers needed as much education on the merits of the system as the junior enlisted men. They had to be shown that it did not undermine their prestige. The initial step in the system, in fact, reinforced their authority, while demanding an increased responsibility on their part to be fair and capable leaders. These NCOs were also the men who conducted the various parts of the system. It was essential that each part of the test be rehearsed in detail so the test went smoothly.

The policy this battery commander instituted is only one example of how a battery level promotion system can be effectively managed. However, the basic principles used are important to any system. First, the system must be fair and provide an equitable basis for determining who is eligible for promotion and consequently who will be promoted. Second, it must be responsive to the particular type unit involved and may require modification for unusual situations; the key here is flexibility. Third, it must be understood by each and every member of the unit. Fourth, it must adequately contribute to individual job satisfaction, which will ultimately aid unit morale. This, finally, dictates the overriding consideration that our soldiers must be challenged and earn the privilege of rank. This, in turn, will further strengthen professionalism in today's Army.

CPT Joseph E. Halloran III, FA, is attending graduate school at the University of North Carolina, Chapel Hill, NC.

Commanders Update

Colonel Carl E. Vuono
82d Airborne Division Artillery

Colonel Boris Pogoloff
214th Field Artillery Group

LTC Douglas W. McCarty
1st Battalion, 8th Artillery

LTC Robert M. Furney
2d Battalion, 8th Artillery

LTC John E. Hayes
1st Battalion, 12th Artillery

LTC Alan R. Borstorff
1st Battalion, 16th Artillery

LTC Gordon E. Saul
3d Battalion, 16th Artillery

LTC Charles S. Williams
1st Battalion, 17th Artillery

LTC Darel S. Johnson
3d Battalion, 17th Artillery

LTC Hardy L. Griffin
1st Battalion, 19th Artillery

LTC Donald W. Jones
2d Battalion, 19th Artillery

LTC Darryl R. Hawn
1st Battalion, 29th Artillery

LTC Phillip T. Yamaguchi
1st Battalion, 31st Artillery

LTC Larry D. Struck
1st Battalion, 35th Artillery

LTC Edward T. Stokke
1st Battalion, 36th Artillery

LTC Richard M. Bronson
2d Battalion, 37th Artillery

LTC Thomas D. Reese
6th Battalion, 37th Artillery

LTC Frank E. Hines
1st Battalion, 39th Artillery

LTC Randal A. Perkins
2d Battalion, 41st Artillery

LTC Lamar A. Stroud
1st Battalion, 42d Artillery

LTC John K. Solomon
2d Battalion, 42d Artillery

LTC Robert N. Morrison
2d Battalion, 81st Artillery

LTC Wilburt L. Jenkins
1st Battalion, 83d Artillery

LTC Frank J. Klein, Jr.
Specialist Training Battalion
Fort Sill, OK

LTC Gerald D. Gross
Officer Student Battalion
Fort Sill, OK

REDLEG Newsletter

Primary and alternate specialties for majors and promotable captains were designated in March. Primary and alternate specialties for captains with more than seven years Active Federal Commissioned Service as of 30 June and primary specialties for the remaining captains and lieutenant colonels will be designated prior to 1 July 1975. Any FA officer in the above categories (who does not have a mandatory release date prior to 31 December 1976) who has not received a letter informing him of the specialty designation by the end of July 1975 should contact his appropriate specialty manager (FA speciality manager, Majors Division or FA Branch, Combat Arms Company Grade Division).

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Reorganization of MILPERCEN's Officer Personnel Directorate took place mid-May. FA officers are now being managed by FA specialty managers in the Colonels, Lieutenant Colonels or Majors Division or by FA Branch of the Combat Arms Company Grade Division, as appropriate. Warrant officers are being managed by the Warrant Officers Division.

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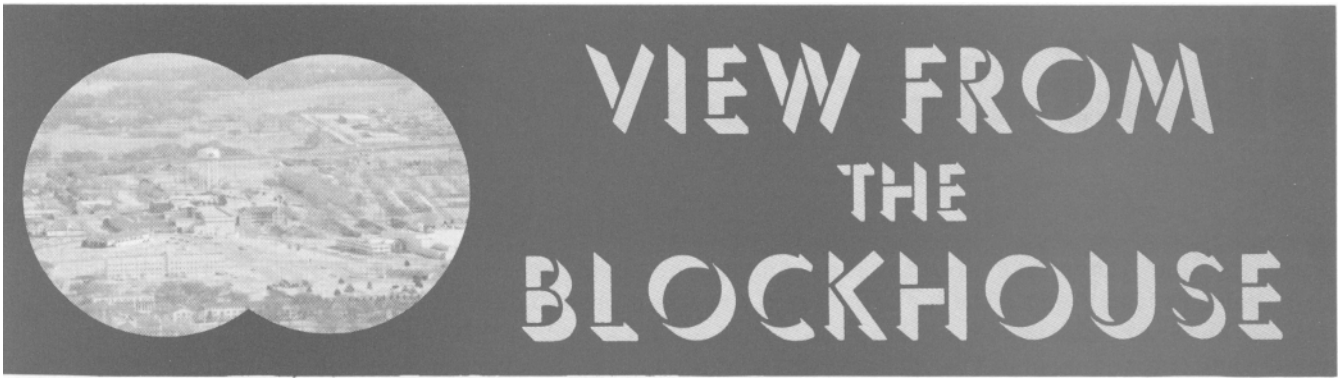
FA managers need your current mailing address! The inaccuracies and delays inherent in the current automated system often result in mail being sent to out-of-date addresses. In addition to the steps outlined in the November-December 1974 FA Journal, FA officers should send change of address cards to their FA specialty managers whenever they change units or mailing addresses. Help!

———————●———————

A Department of the Army Active Duty Board (DAADB) convened in May to identify RA and Reserve officers who must be involuntarily discharged or released from active duty. Each officer career branch in MILPERCEN's Officer Personnel Directorate was assigned a branch quota to submit for consideration by the board. The quota was based on the branch's relative size and relative overstrength in the four year groups 1967 through 1970. FA Branch determined which officers' records were submitted to the board upon demonstrated manner of performance and potential for future service as evidenced by the officer's entire record, without regard to whether or not the officer is RA or Reserve. A total of 2,700 records of commissioned officers were submitted by all career branches to the DAADB. In order to provide maximum time for personal planning, individual officers whose records have been submitted to the board were notified by letter. Following adjournment of the DAADB, the approximately 2,200 officers selected by the board for release/discharge will be notified by letter by late June 1975, and will be released/discharged not later than 90 days after notification. No extensions to this 90-day period will be authorized, but earlier release/discharge will be made upon request by the officer concerned. However, no early releases will be made prior to 1 July 1975. Released/discharged officers who have completed at least five years of continuous active service as commissioned officers, warrant officers or enlisted members are entitled to readjustment pay, which is computed by multiplying years of active service (not to exceed 18) by two months basic pay for the grade in which serving on the date of discharge/release. No officer will be paid a sum greater than two years of his basic pay or $15,000 (whichever is less). RA officers who are discharged will be offered an opportunity to apply for appointment in the US Army Reserve (not on active duty). Reserve officers will retain their commissions upon release from active duty.



Honk If You're Unsafe

Saving legwork, time and a lot of potential grief, the Mitchell Safety Device may be the answer to the safety officer's dream. Credit for ingenuity and imagination is due its inventor, MSG (Ret) Bennett J. Mitchell, former Chief Instructor of Cannon Division Operations, Weapons Department, at the Field Artillery School. The Mitchell Safety Device is a welcome expedient permitting a greater degree of range safety and speed of firing for the M109 and M109A1 self-propelled howitzers. The easily and inexpensively constructed apparatus utilizes the mounting hardware already found on the tracks.

Materiels involved in the safety device include two arcs of plexiglass, two metal pointers, an electric horn, several small "C" clamps and about six feet of 3/8-inch steel rod.

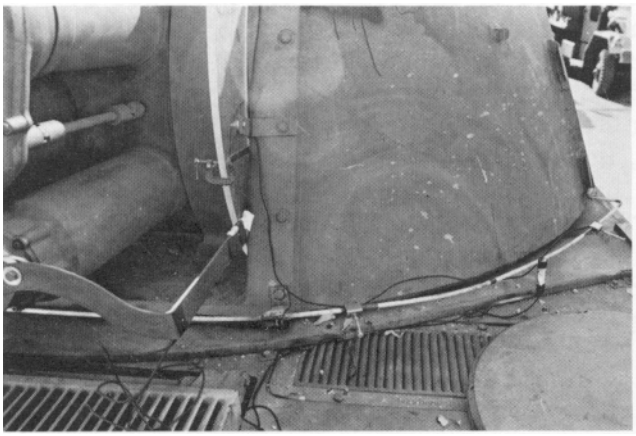
The horn, serving as the systems' audio alarm, sounds when a simple electrical circuit is completed as the gun tube is raised or lowered beyond quadrant elevation limits. The small "C" clamps are adjustable anywhere on the plexiglass edge, preferably by the range safety officer. The clamps are connected by wire to the self-grounding horn, located to the top rear of the vehicle's cab.

In operation, the horn is actuated as the pointer (positive) passes over the clamps (negative) on the plexiglass. The tip of the pointer (made of spring steel) allows the pointer to pass over all clamps, eliminating any possible damage to the hydraulic elevation mechanism.

Using the plexiglass arc on the other side of the tube, strips of wide, contrasting masking tape are placed to visually display minimum and maximum quadrant elevation limits as the pointer on the gun tube is elevated or depressed. A similar arrangement monitors deflection safety limits. The steel rod is attached horizontally to the cab with adjustable contacts connected to the horn. Another section of rod is attached to the deck and connected to the battery. As the cab is traversed beyond safety limits, contact is made and the horn sounds.

With thoughts directed to the improvement of range safety, Master Sergeant Mitchell has turned his creative thoughts toward the larger 175-mm and 8-inch self-propelled vehicles. With a wooden prototype now undergoing successful live fire tests, a copy of the device has been forwarded to the Rock Island Arsenal for evaluation.

View from the front of the howitzer showing the right arc of plexiglass with the pointer and the "C" clamp (placed at minimum elevation).



View from the right side of the howitzer showing the left arc of plexiglass with the pointer and tape placed at maximum and minimum elevations.

Aiming Posts Camouflaged

Often the most carefully planned and executed battery camouflage scheme is ruined by the presence of bright red and white aiming posts. CPT David G. Groves, an instructor in the Field Exercise Division of the Tactics and Combined Arms Department, USAFAS, began experiments some time ago to replace the red and white pattern with more subdued colors. The aiming posts were initially painted by simply alternating two camouflage colors in place of the conventional red and white. Thus, the posts were seen easily by battery gunners but were practically invisible to an "enemy" observer.

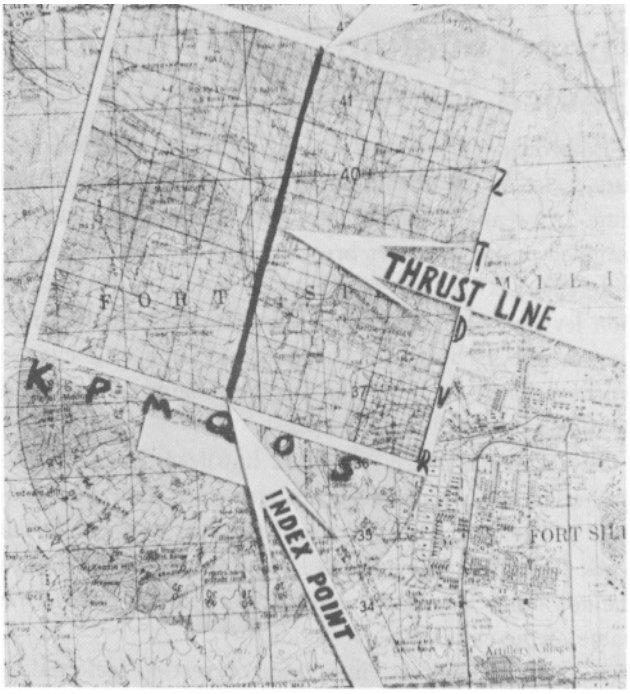
The Field Exercise Division tested Captain Groves' concept during several "Four Day Wars" utilizing one set of posts painted in black and OD, and a second set in sand and forest green. The former proved indistinguishable to even the battery gunners but the sand and forest green pattern verified the captain's idea. Colors were chosen in compliance with the coloration of the local surroundings: darker shades would blend with tree trunks and the like; lighter shades were selected to coordinate with vegetation such as grass.

The concept has been forwarded to Project MASSTER at Fort Hood, TX, for evaluation and improvement. In the meantime, the posts are being used in the training of AIT students in the FA School Brigade, USAFAS.

Camouflaged aiming post (see arrow) compared to red and white aiming post.

Template Expedites Targeting Data

In conjunction with the USAFAS Tactics and Combined Arms Department, the School's Gunnery Department has developed a gridded template for the rapid transmission of targeting information between the forward



FO gridded template.

observer (FO) and fire direction officer (FDO). The template, a piece of gridded plastic (1/50,000), is the mechanism for the gridded thrust line method of passing data when speed is essential and security is limited.

In use, the FO refers to his CEOI thrust line table and labels the grid lines on the template. The FO places the coded template over the planned targets on his map, marks an index and orienting point and draws the thrust line between the two points. The KAL 61 is used to encode the coordinates of the index point and either the coordinates of the orienting point or an azimuth from the index to the orienting point. The FO may select the two points (and thrust line) in any direction, depending on the locations of his preplanned targets. Planned targets are then read from the positioned template and transmitted to the FDC.

As the gridded template is constructed on a scale of 1/50,000, the FDO must prepare a 1/25,000 duplicate of the gridded portion of the template for his firing chart. A five-inch by six-inch section of a transparent plastic firing chart is cut with an edge remaining to record the template code. A five-inch by six-inch 1/25,000 meter grid square section of target grid (DA Form 4176) is cut out and pieced together with transparent tape on the piece of section of the plastic firing chart. The FDC template is oriented according to the FO's coded message.

Prototype models of the template have been sent to the Combat Arms Training Board with a request to produce 5,000 copies for worldwide test and distribution. Procedures for use of the FDC template are included in the Draft Training Circular 6-40-1. FO template procedures are found in Draft TC 6-20-2.

Tube Leveling Device Developed

Embedded corrections, also known as correction factors, exist on all current field artillery weapons. At the time of weapon manufacture the correction factor is stamped on the howitzer breech, representing the angular difference between the tube bore centerline and the elevation leveling plates on the breech. The embedded correction is not a constant value, however, and will change whenever the tube, breech or recoil mechanism is adjusted or replaced.

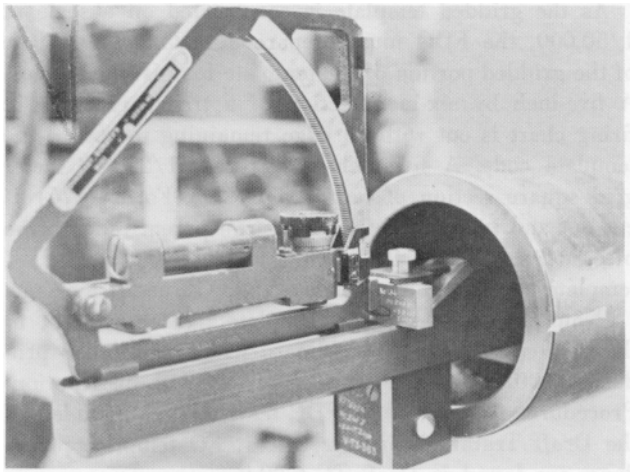
For example, nearly all M102 howitzers in the inventory have experienced such changes since their introduction into service. The direct support units performing the work lack the equipment to level the tube and measure the new correction factor and therefore do not change the value of the embedded correction.

In order to eliminate inaccurate correction factors during the basic periodic test, or whenever it is necessary to level the tube, cannon engineers of the Weapons Department, USAFAS, have developed a device called the tube leveling fixture. The device is rugged and can be used with all calibers of current artillery except the M114A1 155-mm howitzer (embedded corrections do not apply to this system).

The fixture is inserted into the mouth of the tube and attached by an on-off switch-type magnet when the cross level vial is horizontally flush with the tube. The M1A1 gunner's quadrant is placed on the groove provided on the end of the fixture and leveled by the elevation hand wheel. This accomplished, the quadrant is placed on the breech elevation plates and leveled by its own adjustment knob for a precise determination of the correction value.

USAFAS has recommended that one tube leveling fixture be issued to each field artillery battery and one per direct support unit. The device is to be manufactured by Watervliet Arsenal, Watervliet, NY, and distributed in late 1975.

Tube leveling fixture inserted in M102.

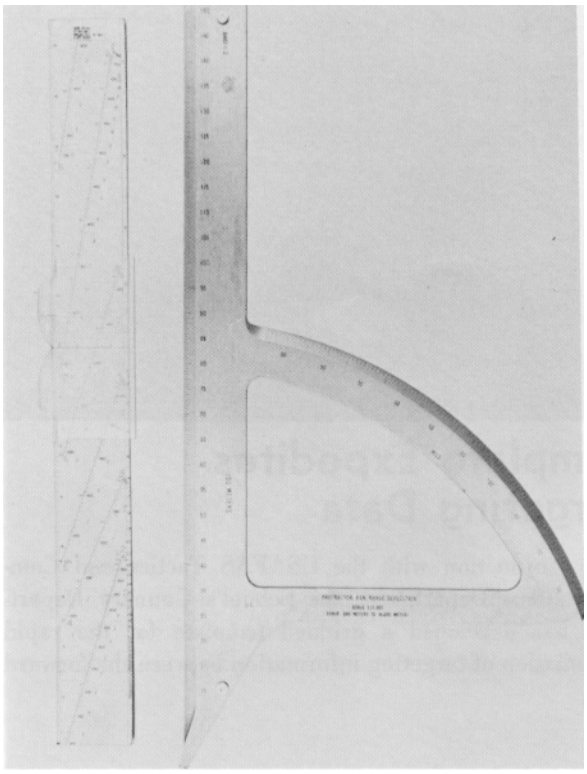


GFT Fan Increases Response

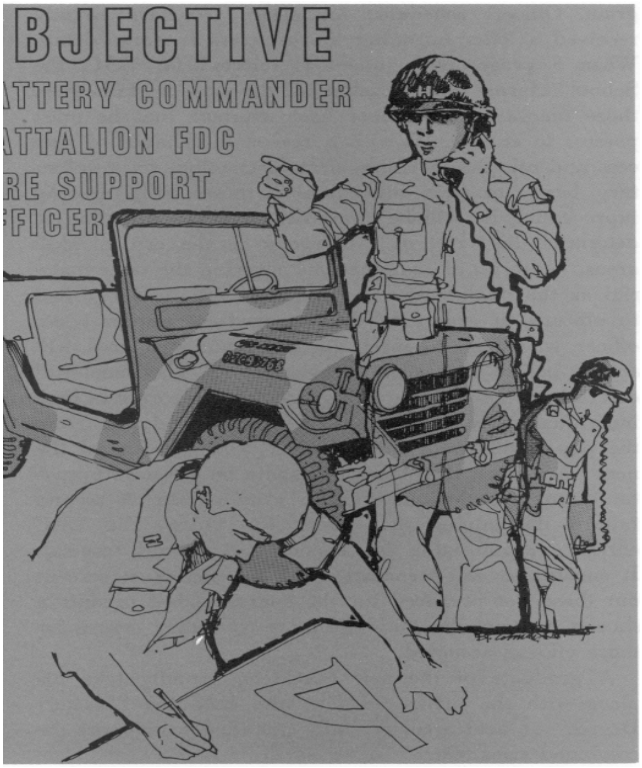
On the modern battlefield, one of the most critical periods of time may be between the call for fire and the impact of the first rounds. The Gunnery Department, USAFAS, is working to narrow that time period with production of a single, all-charge graphical plate designed to fit on currently issued aluminum range defection protractors (RDP). Responsiveness tests have proven that procedures using the graphical firing table (GFT) fan produce first round fire data faster than RDP/GFT procedures and normally faster than FADAC depending on time of flight.

The new graphical plate is designed to eliminate the time normally required for the computer to determine firing data. Charge, fuze setting, deflection and elevation are announced by the chart operator as rapidly as he can adjust the cursor to the target. The computer need only relay the chart operator's information to the guns, adding average site to elevation for quadrant elevation.

The GFT fan adapter package for the RDP includes two mounting/securing screws, the graphical plate and instructions for use. Complete adapter packages have been distributed to all active M102 and 155 SP units.



GFT fan for RDP.



New OAC Teaches FA As A System

Officers selected to attend the Field Artillery Officer Advanced Course (FAOAC) class 1-76 have been deluged by rumors. "The course will be 39 weeks long." "No, 36 weeks." ". . . 32 weeks." "The reporting date has been changed." "No, it will stay the same."

To set the record straight, FAOAC class 1-76, which reports 29 October 1975, will be 26 weeks long and will inaugurate an entirely new, redesigned course teaching field artillery as a system, emphasizing the interaction of field artillery and the ground-gaining arms on the modern battlefield of a mid-intensity war.

The new OAC must support the objectives of the Officer Personnel Management System (OPMS), provide professionally trained manpower to the 16-division force and apply lessons learned about the modern battlefield. It must also provide a challenging and rewarding learning experience for the student.

The entire Army officer educational system is being revamped to support OPMS. The basic premise of military education under OPMS is that each stage of formal education will prepare the student officer for his next duty assignment. The Field Artillery School, in its efforts to advance this concept, has narrowed the scope of OAC and established precise objectives designed to train the student to command a battery; operate a battalion fire direction center; and serve as fire support officer to maneuver battalions and brigades. This concept is clearly a departure from the "whole man" concept and the "enrichment" type of curriculum. Under OPMS, these needs will be filled primarily through self-study, civilian schooling, CGSC and the Army War College. This concept also de-emphasizes extensive preparation for higher level staff positions and the duties associated with these positions will be taught in detail at CGSC.

Fielding three new divisions in an Army of decreasing size required a comprehensive evaluation of all "people" programs, at all levels. One TRADOC solution was to clear the personnel pipeline by shortening professional development courses, thus reducing resident training time and returning the student to a productive, mission-oriented assignment as quickly as possible. To meet this challenge, the School reduced its OAC to 26 weeks by instituting a demanding entrance qualification examination and developing a compact, fast-paced program of instruction that will effectively satisfy OPMS-established objectives.

The Mideast War of October 1973 was a "sand-table war" for the tacticians and planners of nations not directly involved in the war. It provided an excellent opportunity to analyze the equipment and tactics employed in that war and to develop doctrine and concepts for fighting future mid-intensity conflicts. Existing US doctrine is being reviewed and much is being rewritten as has been indicated in recent issues of the *Journal* and in recently published FA training circulars. The School has tailored OAC to insure that the graduates will be well-versed in modern battlefield doctrine and techniques and will be fully capable of applying their knowledge to live situations.

In his opening remarks at the Field Artillery System Review, October 1974, MG David E. Ott, Commandant, USAFAS, stated: ". . . in short, the Field Artillery is a system, and must be treated as one." The new OAC will teach Field Artillery as a complete system, not as disjointed elements or separate parts as it has been taught in the past. The four major technical functions of field artillery (move, shoot, communicate and acquire targets) will be emphasized, as will close cooperation, coordination and interaction between field artillery and ground-gaining arms. In this way, the student will be continually conscious

of the techniques employed by the Field Artillery System to facilitate the accomplishment of the field artillery mission.

The new OAC is structured in two phases: phase I, a 22-week hard core phase devoted primarily to technical proficiency, and phase II, a four-week applicatory phase during which the student will apply the knowledge gained in phase I. The first phase will teach the "nuts and bolts" of the system, the fundamental knowledge that field artillerymen must have before they can operate the system. Parochial subjects will be taught by the individual departments, but system subjects will be taught by interdepartmental instruction. Phase II will give the students opportunities to operate the system. It is oriented toward the students' practical application of their professional skills in a variety of realistic mid-intensity situations. Phase II also will include reinforcement training, seminars with selected military leaders and student evaluation. Graduates will have a clear understanding of the field artillery system and the interaction that must exist between the field artillery and the maneuver elements.

As the Army shrinks in size, more discriminators are needed to separate the marginal performer from his contemporaries. A more demanding and challenging OAC will provide not only additional discriminators but will prove much more rewarding to those FA officers who view OAC as the ideal opportunity to put the final polish on their technical and professional skills. The cornerstone of the process that makes OAC more demanding and challenging is the qualification examination program. Officers scheduled for class 1-76 have already received a letter outlining the program in some detail. When a prospective student is selected for OAC, the School informs him, by letter, of the various skills (i.e., those taught in the officer basic course) that he must possess to enter OAC with a reasonable chance of success and offers him nonresident instruction, on a voluntary basis, to help him develop these skills. During inprocessing he will be administered an examination to determine his level of proficiency in the critical skill areas. (A series of examinations covering the same material as the qualification examination will be forwarded to officers on orders to OAC upon their request.) An officer who fails to meet the minimum standards will appear before an academic review panel. The panel will determine whether extenuating circumstances exist in each individual case. An unfavorable recommendation from the panel will result in deferment from OAC until the next class, when the officer will again be given an opportunity to take the qualification examination. A second failure disqualifies the officer for OAC. The OAC entrance examination is beneficial in several respects. It encourages self-preparation for the course, it screens out those not prepared for the course and it permits a shorter, more challenging and more rewarding course for those officers accepted.

A graduate of the new OAC can proudly take his place with the privileged few who hold the "Masters Degree" of field artillery, fully qualified to support the combined arms team.

"How To" Tapes Prepared By Gunnery Department

Command of the intricate tasks in field artillery hinges on the mastery of numerous building block skills. High density courses in schools and meager training time in units do not allow the luxury of repetitious reinforcement necessary to long-term retention. Elapsed time between training and application tends to muddle the subtasks involved in a complex skill.

The Gunnery Department of the Field Artillery School is attempting to alleviate the problem by making available to resident students the means for review or reinforcement of just that part of fire direction and observed fire tasks they need. Dubbed the "How To" series by the department, it consists of short, meaty educational television (ETV) tapes (differing from the usual concept of ETV) that the individual can view as he wishes.

To determine the subject matter of the How To tapes, major tasks in fire direction and observed fire procedures were considered in their respective subtasks. Study of the results of subcourse exams and comment by individual instructors pinpointed the most common areas of difficulty encountered by students.

When the subject matter had been determined, instructors were asked to write scripts, each one demonstrating one aspect of a procedure. The instructors also presented the instruction on the tapes (52 in all), which were produced by Fort Sill Army Training Aids Service Office ETV Branch at the rate of one per day. The tapes vary in audio time from less than six minutes to 28 minutes. Each tape requires the viewer to follow the instructor step-by-step through a procedure and then provides one or more practical exercises for the viewer to do on his own. He may be given a stated period of time to perform a requirement and may be directed to turn off the machine while he works an exercise. He is continually informed of the correctness of his responses. These are no-nonsense, practical,

"hands-on" programs requiring the use of real world equipment. As the tapes are reviewed and approved by the department, they are dubbed onto one-inch cassettes for use in individualized learning centers.

For example, the vertical control operator may know how to compute site, but is hazy on plotting. He can take "How to Plot Critical Points on a Firing Chart" and bone-up on it. Maybe he needs to review the procedures for determining data for replot. Two tapes are available to him: "How to Determine Data for Replot (Time)" and "How to Determine Data for Replot (Quick and VT)." There are a number of tapes requiring the student to use the FADAC for review of the procedures for that device—from "How to Prepare FADAC for Action" to "How to Use FADAC to Locate Unknown Points by Intersection." The How To tapes will supplement the TEC lessons in providing a means for selected subject matter review and practical exercise.

Contact your TASO for procedures on obtaining these tapes in your area.

"How To" Tapes Available

Number	Title	Running Time
0362B	How to Determine Met + VE GFT Settings	18:00
0364B	How to Plot Critical Points on a Firing Chart	24:00
0365B	How to Prepare and Use the M17 Plotting Board for Position Corrections	14:00
0366B	How to Construct Azimuth Indices	17:28
0368B	How to Construct Deflection Indices	13:45
0370B	How to Determine Data for Time Replot	17:37
0371B	How to Use the Illuminating GFT	19:21
0373B	How to Determine and Apply Position Corrections	
0374B	How to Determine Data for Quick and VT Replot	23:00
0376B	How to Determine and Apply Position VE	16:00
0377B	How to Determine Firing Data for ICM	22:00
0378B	How to Determine a Total Range Correction	7:00
0379B	How to Orient the Observer for High Burst	10:00
0380B	How to Determine a GFT Setting for High Burst	18:00
0381B	How to Record a Met Message on a Met Data Correction Sheet	21:00
0382B	How to Determine Initial Fire Commands with the GFT Setting	16:38
0383B	How to Determine Chart Data for ICM	15:43
0385B	How to Locate a Target by Grid and Polar Plot	17:50
0386B	How to Determine and Apply Position Fuze Corrections	9:12
0389B	How to Use a GFT	10:56
0391B	How to Construct a Deflection Correction Scale	6:05
0394B	How to Use FADAC to Determine Registration Corrections	17:00
0396B	How to Enter Registration Corrections into FADAC	11:00
0393B	How to Use FADAC to Determine Muzzle Velocity	18:00
0397B	How to Determine Total Fuze Corrections	6:16
0398B	How to use FADAC to Determine Firing Data using Polar Plot, Grid and Shift from a Known Point	28:00(I) 16:00(II)
0400B	How to Enter Known Data in FADAC	14:00
0402B	How to Use FADAC to Locate Unknown Points by Intersection	13:00
0403B	How to Use the Target Grid to Locate a Target and Plot Observer Corrections	17:13
0404B	How to Work Practical Exercises in Site	13:05
0405B	How to Determine Data from the TFT	23:46
0407B	How to Use FADAC to Mass Fires	12:00
0408B	How to Use FADAC to Determine a GFT Setting	10:00
0409B	How to Adjust a Smoke Screen	5:33
0410B	How to Set Up and Prepare FADAC for Action	23:00
0411B	How to Emplace FADAC	6:00
0412B	How to Transfer GFT Settings from Registering to Non-registering Batteries	23:03
0415B	How to Use the M17 Plotting Board for Emergency Missions	22:28
0416B	How to Use FADAC to Determine Rg & Df for Manual Backup	12:00
0418B	How to Determine Subsequent Corrections (Range & Deviation)	17:58
0425B	How to Use FADAC to Determine Observer Orientation Data	9:00
0429B	How to Determine Firing Data for WP	16:56
0430B	How to Determine Firing Data for Smoke	13:57

Air Assault Artillery

by MAJ Richard L. Arnold

"Winged Guns" was the name given to the light, mobile artillery employed by Gustavus Adolphus of Sweden in 1630. In our own Army, the "flying batteries" employed by Winfield Scott during the war with Mexico gained considerable fame for moving with lightning speed and delivering devastating fire at the key place and time. Flying batteries were equipped with light pieces, having a high rate of fire and transported by horses instead of oxen. Today, through the advent of modern technology, true flying batteries support the infantry soldiers of the 101st Airborne Division (Air Assault) at Fort Campbell, KY.

Although the name flying artillery is an old one, today's tactics and techniques are continually being updated, developed and employed by the only Air Assault Division Artillery in the Army.

Air assault operations are characterized by fast moving, ever changing missions and situations. While the air assault force is capable of accomplishing most missions assigned a ground unit, it is best suited for offensive operations which are of short duration. Show of force, reconnaissance and security operations, tactical interdiction and exploitation and over-obstacle operations are ideal missions. To support these varied missions, the air assualt artillery is organized with a headquarters and headquarters battery, an aviation battery, three 105-mm howitzer battalions and the only aerial field artillery (AFA) battalion currently in the Army inventory. All elements of the division artillery must work closely in order to provide support to the air assault infantryman. Each flying battalion conducts an extensive training program to attain and maintain proficiency in the many and varied tasks required of an air assualt artilleryman. This program culminates in a comprehensive operational readiness training test (ORTT), such as "Orbiting Eagle III" held recently, in which elements of the 101st Division Artillery participated. A look over the shoulder of one of the FA battalion commanders during the exercise provides an excellent insight to the evolving tactics of an air assault field artillery battalion.

As he prepares to board the C141 aircraft for his predawn departure, the battalion commander mentally reviews his deployment plan. In the hectic 48 hours since he was alerted for deployment as a part of the 2d Brigade Task Force, one battery has departed and the remainder of the battalion has processed through the departure airfield control group. C141 aircraft have been loaded for their flight to the intermediate staging base in the country of "Cumberland" (actually a Tennessee Air NG base near Smyrna, TN). Upon arrival they will prepare for the combat assault/tactical deployment and maneuver phases of the exercise.

While the brigade planners formulate their tactical plan to accomplish the mission as a part of the corps covering force, the artillery fire planners, working closely with their infantry counterparts, prepare a detailed fire support plan.

Numerous contingencies are planned for in advance. During the execution of the plan frequent changes and short notice operations requiring rapid fire planning and possible repositioning of firing units can be expected. If a surprise contingency occurs, the FO and FSO must rapidly formulate a complete fire plan, with limited information from their infantry commanders, and transmit it to the DS battalion utilizing a quick fire support plan format. Firing units may be required to displace on short notice, with little or no reconnaissance, to positions in previously unsecured areas. At times, the FA must be in place prior to the infantry main assault in order to support deep objectives. These firing positions are initially secured by infantry elements who are picked up shortly after the battery closes in the forward area.

Utilizing maps and aerial photos, the battalion selects possible treeline positions to support the brigade's initial delay line. A well-camouflaged treeline position makes it extremely difficult to find a field artillery battery, even when the general location is known. Overhead and overhanging vegetation is, for the most part, left intact. It can be laced together with cord and arranged in a draw-string affair which will enable the unit to prepare the howitzer for firing with a pull of the string. An inherent restriction of treeline positions is that at least half of the battery perimeter can no longer be covered by direct fire, which increases the vulnerability of the unit to ground attacks from the flanks and the rear. Treelines also preclude 6400-mil firing unless the guns are displaced a short distance forward of the trees for firing to the rear. Since the primary threat to an air assault battery is from the air, the overriding consideration must be camouflage and treeline positions are the best solution.

Within 24 hours after closing at the intermediate staging base, the unit boards C130 aircraft for the tactical deployment into the exercise area (the Fort Campbell reservation). After landing at an unimproved landing strip, the batteries load internally aboard CH47 helicopters and make a daylight move to their initial positions. This is an unusual occurrence since, except in special situations, all moves are made under the cover of darkness.

Air assault artillery moves internally which enables the aircraft to fly nap of the earth (NOE) at increased speeds thus increasing the survivability of aircraft and crew in a mid-intensity environment. Although the time to load the howitzers is longer than for external rigging, with trained artillery and aircraft crews working together the loading time is reduced significantly. Times in the landing zone (LZ) are about the same since with an external load the aircraft still must land to discharge the gun crew.

Night movement increases the element of surprise, provides an excellent means of passive defense and insures that the field artillery can provide continuous support to the infantry. Prior to darkness, the advance party, accompanied by an infantry security force, deploys by UH-1H "Huey" helicopters to set up the LZ. Both the LZ and the pickup zone (PZ) are set up and controlled by the artillery unit. Each battery has sufficient lights to set up a "T" and mark howitzer positions and obstacles. In combat the aircraft would take off, fly and land without on-board lights; however, peace time safety standards require landing lights at low altitude. During a night move, the battery may initially lay in the LZ. The guns are then moved to the treeline and re-laid one at a time. This sequence is reversed prior to extraction from the PZ, and significantly reduces the time the battery is out of action while security is increased during march order. PZ and LZ times for night moves are comparable to times for day moves with the number of sorties and type loads the same.

Upon arrival in the exercise area the battalion tactical operations center (TOC) moves to the initial position. In this case the TOC is located with the brigade TOC to facilitate coordination with the supported unit. At times the TOC may locate with one of the firing batteries. The TOC makes initial contact with the FOs, FSOs, the batteries and assumes control. Upon their arrival in the exercise area the supporting artillery units make contact with the DS battalion. The AFA battalion is in general support of the division; Battery B provides general support reinforcing (GSR) to the DS battalion (a normal relationship). In addition, the 1st Battalion, 39th FA, a corps 155-mm towed battalion attached to the division, has also been given a GSR mission to the DS battalion. XVIII Airborne Corps frequently attaches this battalion to the division. It is trained in airmobile operations and can be lifted by the CH47. Normally, one battery would be GSR to each DS battalion to ease the problems encountered in covering the extended brigade areas of operations (30-50 km). Because the division has a covering force mission and additional artillery support in the form of the three corps artillery battalions, the 155(T) battalion will be supporting during the exercise. (Actually one battery and the control headquarters are on the ground with two batteries played constructively.) The DS battalion is given permission to plan the fires of all seven batteries in support of the brigade's delay in zone.

As the exercise progresses, the infantry sends out platoon and company size patrols to locate the aggressor force. Two of these patrols will be supported by dedicated artillery. A platoon from Battery A is dedicated to one patrol while Battery C is dedicated to a larger and more vulnerable patrol. Battery B in the center and the GSR artillery will provide coverage throughout the brigade's zone. Fires on the suppression targets sent by the FO are immediate and deadly.

Over the next three days, the brigade continues to delay in zone while being pushed back to successive positions. The artillery battalion makes frequent and timely moves. At one point Alpha Battery comes under an infantry and mechanized attack. The battery employs direct fire and, after being reinforced by an infantry air assault, repulses the enemy. Concurrently, the brigade S2 receives a confirmed report on a large enemy POL dump. Cloud cover prevents an air strike and the target is out of range from present positions. The brigade commander, in conjunction

with the FA battalion commander, orders a night artillery raid to destroy the dump.

The artillery raid is a tactic practiced extensively within the air assault division. The basic idea is to swiftly deploy a firing element to engage a lucrative target out of range. The size of the firing element, the number of rounds and the ammunition and fuze combinations are all tailored to the target. In this case, the FA battalion commander decides on a four gun raid with 80 rounds of HE and WP mixed. Battery A will conduct the raid from a firing position behind enemy lines. The required security force could be inserted to clear the area prior to the artillery assault, but with stay-behind elements available, they will be used to set up a flashlight "T" for the advance party and to provide security for the main body. The data is precomputed and, since the fires will be unobserved, zone fire techniques will be utilized. (If available, the fires may be observed by an air observer, a stay-behind element or a long range reconnaissance patrol.) The four Chinooks employed land simultaneously and shut down. The guns are quickly pushed out of the aircraft and laid on the target with the fire order immediately following. At end of mission, the guns are march ordered and winched on board. Each aircraft takes off as soon as its load is tied down. From first touchdown to the last liftoff, 36 minutes elapse. Located by the enemy, the remaining two guns of Battery A made a ground move to a new firing position and the raid element deployed to the new location.

The successful artillery raid and the brigade's delay stalled the enemy attack by the end of the third day. Late that night, the brigade was given a change of mission. They would go on the offensive the next day! The artillery battalion commander and his staff began to prepare for offensive operations scheduled to start the next night. The offensive began with a preparation and two artillery batteries moved well forward to support deep penetrations. The attack was successful and the exercise terminated. The battalion successfully completed a most challenging ORTT spanning a 10-day period which included a strategic and a tactical deployment by Air Force aircraft, and numerous tactical ground and air moves. Approximately 200 simulated and 50 live fire missions covering the artillery sepctrum were conducted with over 5,000 simulated and 700 actual rounds expended.

Looking Forward

Air assault artillery must frequently operate over extended distances and behind enemy lines increasing its vulnerability to enemy ground and counterbattery fire. A number of techniques have been developed to increase our survivability on the battelfield. One idea — still in the experimental stage — is to split the battery into two or

three gun platoons, each 500 to 1,000 meters apart, thereby reducing the size of the position and making it more difficult to discover the battery with normal target acquisition means. A similar technique is the offset registration. (See "Evolving Field Artillery Tactics and Techniques," January-February 75 **Journal**.) The base piece is moved to a supplemental position for the registration. It is then returned to the primary position which remains silent until the critical point in time and fires only at lucrative targets.

Our prime mover, the CH47 Chinook helicopter, must be used for numerous other missions and, at times, it may be necessary to move with less than the ideal number of birds. To accomplish a move with the assets available, we are prepared to externally carry one, two, four or six howitzers with each aircraft.

The developmental 155-mm towed howitzer, XM198, could have tremendous impact on the capabilities of the air assault division. All of the implications are not yet known, but the feasibility of adding a battalion equipped with this weapon to the air assault division is presently under consideration.

In a recent article in the **Journal,** (See "Forward Observations," November-December 74 **Journal**), MG Ott stated that the future of the Field Artillery can be characterized by one word — change. The vanguard of that change in terms of light, mobile artillery will be the "flying artillerymen" of the 101st.

MAJ Richard L. Arnold, FA, former Assistant S3, Headquarters, Division Artillery, 101st Airborne Division, is now serving in the G3 Section of the division, Fort Campbell, KY.

Do your operators have trouble reading scales and centering cross hairs on your theodolites?

Are your reaction times consistently over the prescribed time?

Having problems with your missile maintenance?

Relax! If you are in a Pershing, Lance or Sergeant Missile unit—you are in good hands. Just get a cup of coffee, pick up the phone and call FAMSEG, the Field Artillery Missile Systems Evaluation Group. Direct communications from any missile unit is authorized with FAMSEG for any type of technical assistance your unit might require. In addition, if the 30 or so experts at FAMSEG cannot solve your problem right away, they know the people who can.

Providing technical assistance at any time for Army missile units worldwide is FAMSEG's primary mission. This mission involves FAMSEG teams in about six months of TDY each year as they monitor these missile units.

by MAJ Richard M. Stroud

At least once a year or as requested by the major commanders, FAMSEG evaluates each missile unit during its Annual Service Practice (ASP) or Operational Readiness Test (ORT). To accomplish this, FAMSEG is organized into a command and operations section and two evaluation divisions—the Pershing and the Sergeant/Lance. The strength of the unit is about 30 career soldiers. Recently, to more effectively position FAMSEG with other missile units, it was attached to the US Army Field Artillery Missile Group #9 at Fort Sill, OK. This move placed all Fort Sill missile activities under one commander and facilitated official communications between FAMSEG and the missile units.

FAMSEG retains its worldwide mission and is still authorized direct communications with any missile unit regardless of the unit's location. In addition, FAMSEG personnel are authorized direct coordination with higher and adjacent headquarters when preparing range firing schedules, and coordinates with the US Army Field Artillery School (USAFAS) concerning missile actions. Copies of the evaluation reports are given the school to provide background for adjustment of unit reaction times as well as technical manual reviews. FAMSEG personnel also have participated in seminars and classes at USAFAS to give the students better understandings of how to prepare units for their ASP. Reports of assistance visits are distributed only as desired by the commander requesting the assistance. Evaluation reports are given limited distribution to those agencies requiring the data for the systems improvement.

FAMSEG history goes back to the Corporal Missile when the unit was organized as the Corporal Technical Assistance Team. Since that time, whenever the field artillery puts a missile system in the hands of the troops, FAMSEG adjusts its organization to provide experts to support the new system. The specific FAMSEG missions have really never changed. The aim remains: provide on-call assistance to field artillery missile units during their training programs; provide highly-trained teams to evaluate the checkout and firing of field artillery missiles; act as technical evaluators during ORTs and Army Training Tests; provide liaison between commanders and technical agencies, contractors and other agencies on matters pertaining to missile firings; coordinate action recommendations pertaining to organization, tactics, techniques, doctrine, procedures, product improvement and developmental matters pertaining to field artillery missile systems; schedule and chair prefire conferences; and prepare, publish and disseminate the firing directive for each field artillery missile in CONUS.

The unique missions and highly flexible organization insure that FAMSEG will always be ready to aid all Army missile units. FAMSEG is retained as a one-of-a-kind unit to provide the necessary continuity and standardization during the testing, training, unit activation and deployment of each new missile system. After the system is fielded, FAMSEG acts to maintain the high standards of technical expertise, training and safety through its assist and evaluate policy.

Assignment to FAMSEG is not accomplished by chance. Personnel considered for assignment are carefully screened prior to acceptance. Officers, warrant officers and noncommissioned officers are school-trained and must have unit experience. Due to the TDY requirements, conduct is also scrutinized.

The fall of 1974 was a period of great activity for FAMSEG. The Sergeant/Lance Division provided technical evaluators for the USARPAC Sergeant unit during late August. They also gave briefings on the Lance system that was to replace both Sergeant and Honest John in USARPAC. The Pershing Division was at McGregor Range Camp, Fort Bliss, TX, for the Artillery-Ordnance Pershing firings which lasted from September until December 1974. Both German and US Army Pershing units were evaluated. The Sergeant/Lance Division also evaluated Fort Sill's 1st Battalion, 12th Field Artillery, and a USAREUR Lance battalion's ASP in October at the White Sands Missile Range (USAWSMR), NM. The Sergeant/Lance Division returned to Fort Sill for a brief stay during which they had more work to do. They provided technical assistance to a USARPAC Lance Packet which formed at Fort Sill. When the USARPAC Lance Packet and the Italian Battalion fired, the Sergeant/Lance Division again journeyed to USAWSMR to evaluate the firings. The Pershing and Sergeant/Lance Divisions finished their range periods the second week in December and were home for Christmas.

Of course, there are always the "extra" functions taken on by FAMSEG to help the missile community. For instance, Pershing Division will assist USAFAS in a training evaluation of the Pershing Operation/Developmental Test III and both divisions will provide personnel for the Redstone Arsenal Project "Missile and Munitions Evaluation 74" (MAME-74) with the aim of improving missile maintenance training and logistic support. The Sergeant/Lance Division will help the US Army Missile Test and Evaluation at USAWSMR fire four test Sergeant Missiles for the Air Force this year.

The job is demanding, but it is also professionally satisfying. Members of FAMSEG believe that the "assist" in the unit motto, "Assist and Evaluate," comes first and is a very important part of the mission. The thrust of the evaluation mission is to keep evaluations fair while maintaining high standards. FAMSEG is a unique group with a unique set of missions, and FAMSEG personnel stand ready to help at any time.

Need some technical help? Remember, direct coordination with missile units is authorized. Just write Commander, USAFAMSEG, Fort Sill, OK 73503, or call AUTOVON 639-6306 (Pershing) or 639-4494 (Lance).

MAJ Richard M. Stroud, FA, is the Executive Officer of FAMSEG, III Corps Artillery, Ft. Sill, OK.

World War I was a watershed event for the field artillery of the US Army. It saw the confluence of a multitude of materiel developments with new tactics and doctrine to produce the dominant force on the battlefield. Indeed, progress since then seems fractional compared to the rapid changes of 1914-1918. In some respects we may have regressed and are only just now recognizing anew some battlefield requirements that were obvious to the artillerymen of WWI. The US field artillerymen of World War I had an undistorted perspective of the function of field artillery; its primary purpose was close support of the maneuver force. The chief means of rendering this support was massive doses of indirect fire planned in great detail and delivered with as much flexibility as communications, command and control allowed. "Mass" was the key to success and the term is used in the article in the general sense as an appropriate word to describe great concentrations of fire on preselected areas. Only occasionally was massing accomplished in the current, more restrictive connotation of firing multiple units on a location determined by adjustment of a single fire unit. Presented here is the first of two parts—the conclusion will be published in the July-August 1975 **Journal.**

Mass Fire in WWI

by
LTC Alexander T. Jennette

A landscape as harsh and barren as the surface of the moon, dotted with the skeletal remains of trees, is the common visualization of a World War I battlefield. Such grotesque terrain was the signature of the first application of mass indirect fire. A new concept of artillery employment was permitted by the nearly simultaneous emergence of a number of technical innovations and by the rapid development of tactics and techniques to make effective use of them. The immediate impact and long-term influence of these tactics and techniques were of a scope to warrant the attention of the student of the art and sciences of field artillery employment.

Indirect fire is probably as old as cannon artillery, although it was late in the 19th century before any degree of precision was possible. Likewise, the massing of the effects of a number of weapons over a relatively small area was known from the early days of field artillery, it having been merely a question of concentrating the weapons themselves and firing into a common target area. Ranges were too limited and fire control devices too primitive, however, for serious attempts at massing effects from dispersed cannon firing without benefit of direct line of sight to the target. Thus, it remained through the period of the American Civil War with artillerymen dreaming of the decisive effects of artillery fire delivered by a host of weapons firing at great range from defilade, immune to the small arms fire of the enemy. By the early 1900's, scientists and engineers were on the verge of presenting the field artillery with materiel to implement the dreams and truly elevate it to the status of "King of Battle."

Map Firing

Indirect fire without adjustment was a tactical and a technical achievement. Technically, the prerequisites were sufficient range to take advantage of defilade, accurate fire control instruments, a precise means of computing firing data, location of the guns and target on a common grid system and a means of measuring and compensating for the myriad internal and external variable conditions that affect the flight of a projectile. Tactically, indirect fire without adjustment required, for its profitable use, the imagination and determination of the French. Driven to innovation by the exasperating stalemate of the trenches, the French artillery had, by 1917, worked out the details of indirect fire without adjustment. "Map firing," as it was called, was soon to be considered the *sine qua non* of fire support. The potential value of this and other French experiences was not lost to General Pershing who was keenly aware of the limitations of his small and unsophisticated artillery. Early in the US participation he made provisions for his artillery officers to train at French schools and to adopt virtually everything the French were doing. Instruction included observation of fire, map firing, gunnery, coordination of regimental and battalion fires and the French system of liaison.

The French had perfected a system of ground survey that, under field conditions, could be used to associate the firing batteries and targets together on a common grid system. Precise location of weapons for direct fire was a nicety if not an outright waste of effort; for indirect fire without adjustment it was imperative. The American Expeditionary Force (AEF) was taught artillery survey from a manual on artillery topography sufficiently detailed to train modern surveyors. A reconnaissance officer assigned to each battalion was responsible for bringing horizontal, vertical and directional control into each battery position area. The reconnaisance officer was aided by excellent French maps prepared to a scale of 1:20,000 and so detailed "that an indicated orchard would show the exact number of trees in a row." Instruments available to the surveyor included a 6400 mil aiming circle with magnetic needle, plane table and other impedimenta peculiar to survey. Survey served the AEF well during the static portions of the conflict; its efficacy decreased markedly when mobility became dominant.

Directional Orientation

Indirect fire at extended ranges placed a premium on the precise directional orientation of individual weapons. The old method of orientation or "laying" by pointing the guns at the coat buttons of the battery commander stationed atop a vantage point to the front was dramatic but imprecise. New weapons had panoramic telescopes graduated in a 6400 mil circle and could be oriented with the surveyor's aiming circle or by reference to a distant aiming point, other than the target, the direction to which had been accurately determined. Indirect fire no longer required that the artillerymen be able to see the target or the battery commander's coat buttons at any stage of the mission.

The battery commander, sited majestically on a hill, computing for his battery using rules of thumb was unsatisfactory for the complexities of indirect fire without adjustment. Computation of firing data required special equipment used in an atmosphere of calm precision. The basic medium for the graphical portion of firing data determination was the "firing board," a 1:20,000 map mounted on a suitable board and annotated with points critical of the solution of the gunnery problem such as battery locations, targets and registration points. Firing tables specific to the weapon concerned were provided to convert gun-target range and gun-target altitude difference to mil values applicable on the guns. Innovative though they were, these new procedures did not get at the heart of the chief difficulty in fire-for-effect without adjustment. The most exact measurements and calculations based upon pure firing table data could not persuade projectiles to impact on target when fired from a nonstandard gun and propelled by nonstandard powder through a nonstandard atmosphere. Also, the projectile was subject to a host of other spurious influences, particularly variations in its own weight, balance and finish. Artillerymen of both sides adopted an empirical method of measuring the sum and direction of nonstandard effects. By firing a weapon of known location on a target of known location and comparing the firing table values with values achieved in firing, the sum of the nonstandard effects could be inferred and expressed as a correction. The corrections thus determined and applied in proper ratio would permit fire without adjustment on other targets. The technique, termed registration by the French, remains valid to this day.

Weather Data

Conditions in the atmosphere were recognized as normally the biggest and certainly the most capricious contributor to inaccurate fire; however, it was not always possible to register predictable changes, much less to compensate for the whims of European weather by firing. The French incorporated periodic measurement and dissemination of weather data in their scheme for map firing. Air temperature, air pressure and air density were measured on the ground at the French weather station. Wind speed and direction were sampled at selected altitudes from station level up to 5,000 meters and reduced to ballistically significant values. The Americans

were content to use the data furnished by the French, transmitting it down to the using unit through the Artillery Information Service (AIS). Not only was there great respect for external effects, the unique character of each lot of ammunition in contributing to nonstandard performance was considered. Registrations were conducted with each lot when feasible and corrections were updated to account for changes in wind direction, wind speed, air temperature and air pressure. These were among the most important functions discharged by the battery commander who acquired them almost overnight without diminution of his traditional tasks. Revealing of this new dimension in firing procedures was the "BC Data Book" in which space was provided for computing and recording such information as survey data, prepared firing data for specific missions, registration computations and corrections for wind and air density. (The data book was sufficiently detailed to see the battery commander court martialed 10 times over in the event he fired on friendly troops as a result of erroneous calculations.)

A considerable degree of first round accuracy, short of a capability to attack point targets, was claimed as a result of this attention to practical ballistics. An observer of the 101st Field Artillery Regiment adduced that, even in the case of point targets, "the first burst was ordinarily within 25 meters of the target and then the observer could speedily adjust the fire to the spot desired." This boast should be taken with reservation as the accuracy touted is far superior to that attainable today with the most modern equipment. It does, however, illustrate the esteem in which map firing was held. Conversely, US artillerymen could, when pressed by circumstances, forego the subtleties of registration and the other accompaniments of map firing and rely on sheer weight of firepower directed generally toward the target area. On 13 July 1918, at Soissons, the 7th Field Artillery Regiment, lacking preparation time, fired a rolling barrage in front of the infantry advance without so much as a round in registration. It was credited by the infantry with being the most perfect barrage they had ever seen. At St. Michiel on 26 September 1918, under similar circumstances, some of the preparation firing was without benefit of registration. "All the theory we had hammered into us in the States and at Ornans is about to be eliminated. There is to be no adjustment of the guns, no correction for powder lot. We have been given a pile of shells and we're to shoot them. What could be simpler?" was the account given by a battery executive officer. Still, these must be considered exceptions proving the rule; generally, field artillerymen ascribed powers to map firing it has even today not achieved.

Target Acquisition

The enemy in World War I was not only numerous, tenacious and well equipped, he was difficult to locate. Moreover, new cannon had the potential to attack targets at greater range than ever before. This potential could never have been realized had not advances in target acquisition remained ahead of developments in cannon hardware and new tactical concepts. As events developed, World War I was a veritable golden age of target acquisition. Indeed, modest improvements in target acquisition since 1918 invite the conclusion that a century's worth of innovations materialized during the period 1914-1918. The association is so close between developments in target acquisition and mass indirect fire as to evoke considerable interest.

The increased complexity of battle, the plethora of targets within the province of the field artillery and the sophistication of target acquisition equipment and techniques demanded specialization in the business of intelligence within the field artillery. The largesse bestowed by the French on the AEF included the concept of an artillery intelligence organization. This prompted the formation of the AIS, the key personnel in which were Artillery Intelligence Officers (AIOs) stationed at levels from Army artillery to field artillery battalion and sometimes, battery. At each level the AIO unified the target acquisition effort by receiving, evaluating and disseminating information and by actively supervising portions of the technical effort. The AIO exchanged information with AIOs at higher and lower echelons, advised the artillery commander, maintained a plot of enemy locations, disseminated meteorological data, coordinated observation and adjustment of fire and supervised sound and flash ranging. Equally important, he worked closely with conventional intelligence officers throughout the AEF. The AIO was a single point of contact in his field of endeavor for his organization at any given level.

Of the elements contributing to mass indirect fire, the cannon and their ammunition were the most thoroughly tested, having been introduced prior to 1914. The US had lagged somewhat behind Europe in cannon development and efforts to produce field guns in sufficient quantity for participation in World War I ended in chaos. The British and French declared themselves capable of furnishing the AEF with artillery, an arrangement agreeable to the US. As it turned out, virtually all field artillery pieces used by the AEF were of French manufacture. Most US artillery used were coast and naval weapons modified for railway use. The high density weapons provided by the French were howitzer and gun models in 155-mm and the legendary French "75" was not unique among weapons then existant. It had characteristics that recommended it as the chief mass fire weapon

of the AEF. Vintage French 75s occupy places of honor beneath numerous post flagpoles throughout the US Army today.

Command Retention

Of the principles and techniques to which the success of mass indirect fire in World War I may be attributed, none stands out more clearly than the retention of command of artillery at the highest feasible level. As a general rule, the lowest maneuver commander exercising command of field artillery was the division commanding general. A typical division artillery was a brigade of three regiments, two 75s and one 155, each with six batteries. Battalion headquarters were interposed between the batteries and regiment, but they appear to have been less important than now. The chief firing planning headquarters was the light regiment which had a direct support relationship to an infantry brigade. Backing up the light regiments were a divisional 155 regiment and artillery at Corps and Army. Control of this artillery was jealously guarded according to a philosophy typified by the injunction of French instructors that "no fraction of artillery is ever put under the orders of the infantry it has to support." The French—and Americans—reasoned that the senior maneuver commander had already planned his artillery support and could not afford to have it disrupted by a subordinate maneuver commander. This accorded well with intricate and extensive mass fire applications, but it did not always facilitate rapid response to targets of opportunity.

Fire planning, at least in theory, was based upon the scheme of maneuver of the supported force. Full-time liaison teams (an officer, a sergeant and several enlisted men) were provided to the maneuver force down to regimental level. According to the Saumur Artillery School, "Manual of Artillery," Vol. III, the liason officer was dispatched with a charge to report to his commander the support requirements of the infantry and their plans and dispositions, to brief the infantry commander on reconnaissance and to conduct his own reconnaissance. Further, he was to inform the supported commander of the "normal and eventual barrages," implying that some planning had occurred in a vacuum and was to be presented as a *fait accompli*. To communicate with his headquarters, the liaison officer was provided a telephone and enlisted wiremen, but he also relied on visual signals, pigeons and infantry wire, radio and runners. Difficulty maintaining wire communications dictated frequent recourse to the alternate means.

Most fire planning was accomplished at field artillery regiment or higher level by the commander and his staff. Numerous references to combined infantry-artillery command posts infer that physical circumstances, at least, were favorable to fire planning. In addition to its relationship to the scheme of maneuver, the fire plan also had a firm basis in intelligence. The AIO was the commander's primary adviser on intelligence in general and counterbattery in particular. The graphical product of the AIO's efforts was an annotated intelligence map called the *plan directeur*. The *plan directeur* and the scheme of maneuver were the foundations for the fire plan or "plan of employment." Reduced to its simplest terms, the plan of employment was nothing more than a set of instructions, to subordinate units designating units to fire, targets to be fired, time to fire, methods of fire and ammunition to be used. Reproduced in multiple copies by a gelatin pad process, the plan of employment was distributed to subordinate units accompanied by a sketch of *calque* prepared to map scale. Although relatively simple in format, its proper execution was a severe test of men and equipment.

Barrage

The heart of the plan of employment was the barrage, referring to the rapid fire of a battery delivered on a relatively small area. At any given time a battery could be firing only a single barrage; however, it could be assigned any number of on-call or sequentially scheduled barrages. The normal barrage was assigned on the basis of one per 75 battery; it was planned for a critical sector to cover a width of 200 meters and was calculated to impact about 200 meters forward of friendly troops. Primarily a defensive technique, the normal barrage was fired on signal from the infantry, the liaison officer or a ground or air observer. The normal barrage was a measure of the last extremity and its rapid delivery was facilitated by having the guns, when not otherwise engaged, lay on precomputed, periodically updated firing data. Supplementing the normal barrage were eventual barrages planned to accommodate every imaginable situation. Eventual barrages were plotted on hostile batteries, reserve locations, ammunition dumps, exposed flanks and anywhere else deemed necessary. The moving wall of fire in front of advancing infantry, the rolling barrage, was the best known; given the offensive nature of AEF operations in 1918, it was also the most important.

Seemingly inordinate reliance was placed on preplanned and scheduled fires of all types; however, upon closer inspection the rationale is clearer for trying to plan for a myriad of contingencies. Narrow sectors of responsibility allowed barrages to be plotted for any reasonably foreseeable situation. In the fall offensive of 1918 the concentration of infantry was heavy with a commensurate amount of artillery. For example, the attack of the 1st US Corps in the first phase of the

Meuse-Argonne offensive was supported by an average density of one gun per 15 yards of front. Division fronts as narrow as two to three kilometers were common; division artilleries covered the entire front of the advancing infantry with a solid rolling barrage using only 75 batteries. On-call barrages could be fired concurrently by batteries not engaged in the rolling barrage. Exhausting preplanning was imperative in view of the difficulty of a spontaneous response to a situation as it developed. Unreliable communications discouraged faith in adjusted fire in a rapidly developing situation. Artillerymen of the 101st Field Artillery Regiment claimed that by preplanning a number of barrages, assigning them code numbers or names and precomputing firing data, a mission could be initiated within 30 seconds. While this claim has the ring of exaggeration, the principle was valid and remains so to this day, although much larger sectors of responsibility make futile efforts to blanket an entire sector with preplanned fires.

To be effective the barrage had to fall approximately 200 yards from the friendly infantry. Moreover, a high rate of fire was necessary. The quick-firing 75 with its small bursting radius was well suited for the barrages nearest to friendly troops. Great responsibility fell to the 75 battery commander and literature of the period shows that relief of command for firing short rounds—a current practice with a bright future—is at least as old as World War I. On the other hand were the deep fires of converted coast artillery guns. At St. Mihiel, coast artillery cannon, modified for field use, were credited by General Pershing with barrage fire that encumbered German rail movements in the vicinity of Metz. Sixty-six heavy railway guns and five 14-inch naval railway guns were organized as the Railway Artillery Reserve under Army control, employed at St. Mihiel and elsewhere on a mission basis. Between the extremes of deep interdiction by the Railway Artillery Reserve and the close-in fires of the 75s, Corps and Army artillery sought out the enemy batteries. Thus, the AEF artillery could claim the application of mass-indirect fire for every situation from a wall of steel in front of the infantry to long-range fires on communication centers. No US Army prior to 1918 had seen anything approximating artillery fire support rendered with such fury over the entire battlefield.

Preparatory Fires

It is hard to appreciate the detailed planning and length of execution characteristic of AEF preparatory fires in 1918. Recent experiences in Vietnam, where the efficiency of a violent preparation not longer than 5-10 minutes was widely recognized, tend to color perception of other wars. It is essential to note that the AEF, in the summer and fall of 1918, was part of a force facing a German army numbering some 206 divisions as recently as the spring of 1918. The combatants were arrayed along a front only 150 miles wide. Only field artillery had the potential to create the initial conditions for a breach of this line, portions of which had been occupied by the Germans continuously since the end of mobile warfare in 1914. The AEF artillerymen turned to the task with a will. Preparations fired before the infantry assault in the offensives of 1918, ranged from several hours duration to none in the case of the 1st and 2d Division attacks at Soissons on 18 July 1918. (A preparation was planned but the artillery was too late arriving in position after a confused night move.) Overshadowing the preassault portion of the preparation was its minutely planned continuance throughout the attack. One of the main goals of the infantry was to overrun the artillery of the defenders. In support of this, some preparations in the Meuse-Argonne offensive had barrages scheduled to sweep ahead of the infantry, from the trenches to a depth of 11,000 meters; plans of such length were, designed to support bold advances. Lesser gains had turned to ashes in the mouths of the French and British during 1914-1917 when they were harshly repelled after limited initial success. More typically, an AEF preparation included barrages planned to a range of several kilometers. In the initial Meuse-Argonne offensive, the 129th Field Artillery Regiment, supporting a brigade of the 35th Division, fired a preassault preparation for 25 minutes across a one-kilometer front followed by a rolling barrage of four minutes per 100 meters of advance out to a distance of 2.5 kilometers, there it continued an additional 10 minutes. At H+150 minutes barrage responsibilty was assumed by a nondivisional regiment and the 129th displaced forward. Fires went according to schedule and Vauquois Hill, impregnable for four years, was secured in one hour. Clearly, the volatile, modern battlefield does not lend itself to extended projections in such detail, although there is a premium on selective preplanning for quick response fires.

Once the battle was joined, practically all barrages were fired using map firing techniques. Scarcity of observers and erratic communications limited the possibility of adjusted missions carrying much of the load. This made it imperative that ballistic data be determined before the preparation for use throughout. An unidentified former division artillery commander set forth procedures which seem typical of those used throughout the AEF. He allocated up to two hours before a preparation for the registering of each battery, using a planning figure of 5 to 10 minutes per battery. Failing the availability of daylight for this precision work, it was attempted at night. This is not to say that AEF artillery

units demurred for want of registration data. As already noted, preparations were fired without registration when time did not allow, with the hope that sufficient volume would compensate for reduced accuracy. Dangers of close fires to friendly troops was a consideration, however. At Soissons (18 July 1918), the 1st and 2d Divisions, unable to register, merely moved the barrages farther ahead of the infantry and proceeded according to plan.

Once initiated, the barrages comprising the preparation were fired on a fairly rigid schedule. This sometimes resulted in the barrage straying too far in front of the infantry and allowing the enemy time to recover. On occasion, field artillery units were able to inject enough flexibility into plans to account for these contingencies. The 101st Field Artillery Regiment, fighting toward the Chateau Thierry-Soissons highway on 20 July 1918 and in the Ourcq Valley on 30 July 1918, showed great imagination in adopting the plan of employment to the circumstances. The barrages were identified on the *calque* with code letters. When resistance was encountered, its location was associated with one of the lettered barrages and a call transmitted to repeat the barrage. Prior to refiring, the location of the infantry was verified by intersection from multiple observation posts. The infantry was instructed to fall back 300 meters from the enemy position while covered by the fire of two batteries. A third battery, designated for the purpose, was adjusted precisely on the target using "creeping" techniques. The 101st seems to have pleased the supported infantry commander who, at the conclusion of the campaign remarked, "I didn't know what artillery support was till I saw the 101st in action."

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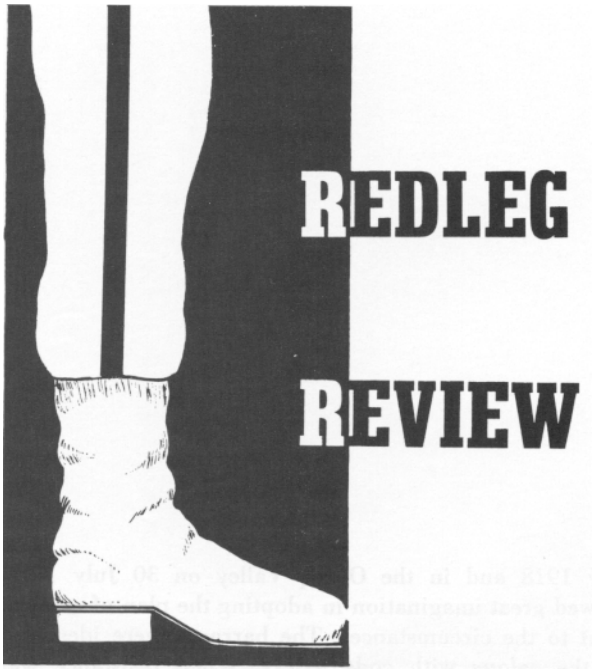

AMERICA'S ARMY IN CRISIS by COL William L. Hauser, US Army, The Johns Hopkins University Press, Baltimore, 242 pages, 1973, $8.50.

Colonel Hauser has written a highly readable analysis of today's military establishment. The book's purpose, as the author has noted in the preface, is "not to expose the faults and troubles of the Army but to note such shortcomings as are already public knowledge, and to suggest how professional soldiers and other men of good will might build a better Army for the future." Colonel Hauser accomplishes his admittedly limited mission in a forthright and obviously well-researched manner that left this reviewer wishing he had written more deeply on the subject matter at hand. But in this age of perjoration [sic] of things military, this book is a most welcome addition.

America's Army in Crisis grew from research conducted by the author at The Washington Center of Foreign Policy Research at Johns Hopkins University under the auspices of the Army Research Associates Program. This program allows selected officers an opportunity to conduct independent research in the field of national security affairs in lieu of attendance at the Army War College. Colonel Hauser spent his year conducting a "that was the year that was" look at the American Army of 1971. He examined the Army's reaction to a number of specific issues: "race and dissent, discipline and justice, drugs, recruitment, and professionalism — using a pattern for analysis determined both empirically, from foreign case studies, and theoretically, from . . . sociological concepts." The foreign case studies were brief but informative looks at how the militaries of three western democracies reacted to a period of major transition. The countries examined were post-World War II Germany and its attempts to create a democratic army from the shambles of a defeated military; France and its army after the fall of Algeria and the rise of DeGaulle; and England's military and its reaction to the disintegration of the British Empire and the resultant loss of a worldwide military involvement.

The book's real *raison d'etre*, however, is not the excellent foreign case studies, nor the issue analysis of the American Army of 1971, but what both of these can tell us about the future of our military. Colonel Hauser has read the tea leaves with care and understanding and prognosticates a future both challenging and hopeful. The American Army can avoid the trauma experienced by the other Western democracies. In fact, it has already demonstrated its proclivity toward survival during the difficult days of 1971. But more than just survival, the colonel charts a course of proposed reform that would enable the Army to prosper. He proffers two proposals: "first that the Army be divided organizationally into two parts, a 'fighting Army' and a 'supporting Army;' second, that the military profession be divided into two distinct patterns, commanders and specialists." The latter of these, of course, is already well underway and the author makes a convincing case for the former. Only time will tell, however, whether the fighters and supporters will ever be segregated.

The future of the American military will depend to a large extent on its own membership and how we learn to cope with a changing society and an ever-changing world. With fellow artillerymen such as Colonel Hauser counted among the faithful, you've just got to be a little more optimistic than you were before you read his book. This is not to infer that *America's Army in Crisis* is a biased polemic or that its author uses it for the aggrandizement of things military — it isn't and he doesn't. It is a well-researched look at some of our current shortcomings in the Army and how all of us can work toward their elimination in the future. Colonel Hauser set a limited objective for himself and achieved it without losing a man. I hope he continues to press forward with the attack.

MAJ T. A. Girdon, FA, is the SGS, Headquarters, 1st Armored Division.

THE CANNON'S MOUTH: THE ROLE OF THE U.S. ARTILLERY DURING WORLD WAR II by Lewis J. Gorin Jr., Carlton Press, Inc., New York, 1973, 286 pages, $7.95.

"The hero of this book is the field artillery," Mr. Gorin tells us, and ". . . it is time to set the record straight on the dominating role the field artillery played in World War II." To "set the record straight" he tells the story of artillery in that war as it was practiced by the 6th Field Artillery Group and one of its units, the 59th Armored Field Artillery Battalion.

Mr. Gorin served in the 6th FA Group, as did other men bearing names familiar to Redlegs past and present: COL Joseph C. McCain, COL James W. Totten (later Major General, USA), COL Beverly E. Powell (later Lieutenant General, USA), COL Thomas E. deShazo (later Major General, USA; Commandant, US Artillery and Missile Center, 1956-1959).

The 6th FA Group was organized early in 1942 and sailed for Europe in August 1943. In the interim, its members shared problems common to many artillery units — its officers and men had never seen the weapon they would take to battle, self-propelled artillery. Officers in school at Fort Sill were taught the conduct of fire system used throughout the war — the forward observation method — but a great deal of time was spent in more complicated methods (Small T-Large T) which were rarely used in battle. Gorin says, "Sill had violated one of war's most basic principles — keep it simple."

The 59th FA Battalion entered the war at Teano, south of Cassino, firing off 4,000 rounds that first night as preparation for an infantry attack. Working closely with the British, they learned quickly the effectiveness of Time On Targets. About this, Gorin writes, "Surprisingly, the Germans never seemed to use this firing system, though they must have suffered greatly from its use by us. In general, German tactics in artillery fell far short of ours."

Succeeding chapters tell us why as the 6th FA Group moves to participate in the capture of Rome, the assault invasion of Southern France, the siege of Toulan and the capture of Strasbourg. (This under the command of COL Johnson Hagood Jr., who, on 10 October, had replaced Colonel deShazo, Group Commander since Camp Chaffee days). After Strasbourg, the group laid siege to the Siegfried line where a Piper Cub (organic to the group) adjusted the fire of 8-inch howitzers upon the emplacements. To insure accuracy, "esoteric" measures, to include the use of "metro messages," were taken. VE was applied and the rotation of the earth was compensated for — principles still valid today and not so esoteric.

"On to Berlin" became the cry but such was not to be the case as Gorin chronicles the actions of the 6th FA Group through the breaking of the final German defense lines in the hills north of the Black Forest, the liberation of Austria and the capture of the Brenner Pass. On 7 May 1945, Colonel Hagood gave the order to stand down and the group's duties were constabulary in nature until its departure from Europe 13 October 1945. It was inactivated (the author still a member of it) on 22 October 1945.

The *Cannon's Mouth* is replete with excellent maps and photographs (often sorely lacking in books of this genre) making it easy to follow the path of the 6th FA Group across Europe. There is also a series of appendixes listing missions fired (number) and rounds expended in various campaigns. But more than technically excellent it is a loving tribute to field artillerymen who fought, learned from their mistakes and went on to meet the next challenge. I recommend it to Redlegs everywhere.

LTC Ray K. Casteel, FA, is Director of the Army-Wide Training Support Department, USAFAS, Fort Sill, OK.

THE ARMY OF THE CAESARS, Michael Grant, Charles Scribner's Sons, New York, 1974, 365 pages, $15.

Grant offers a new approach to the oft-recounted history of the Romans. Those readers interested in the political aspects of Rome can find numerous works dealing with the Roman Republic as well as the Empire. Equally as plentiful are the volumes written on the military system, tactics, organization and doctrine of the Roman army. Many of its innovations have been used as a basis of modern military thought and practice on the subject of raising, maintaining and utilizing armies in combat. *The Army of the Caesars* combines the army and politics; showing the relationship between the two.

To capture the essence of the army and the political system of Rome simultaneously, the author writes about the five-century life of the Roman Empire from the middle of the first century BC through most of the fourth century AD. It is a history of the army as the dominant political force of a nation.

The author appropriately begins with a look at the Roman soldier as the foundation of the powerful army in the early part of the first century BC — the transition period from the Republic to the Empire. He was tough, could endure physical hardships: kept ready by constant and intensive training, famous for his fine discipline, held in high esteem by the Roman citizen and, in general, a proud and highly-respected member of the state. The army leadership placed much emphasis on providing him the weapons and equipment that would exploit his capabilities to the fullest. Weapon systems were constantly improved, a good case being the javelin. Only the socket portion of the javelin was tempered, and the point was left in its original soft state in order to bend on impact. If it stuck in an enemy shield it would bend

and he could not remove it easily, losing the use of his shield. If it missed, it would bend upon impact with the ground or any other object, and could not be retrieved and thrown back.

Shields were changed from round to rectangular in shape. The elongated shield protected the soldier's legs, making it unnecessary to wear shin protectors, thus increasing mobility. A dagger for hand-to-hand fighting (if all other weapons were lost) was carried back on his left side so it would not interfere with his shield. This was his "last resort" weapon, and not only provided protection but gave him a feeling of security. His main weapon, the famous (or infamous) double-edged broad sword, was carried high on his right side. This might seem awkward, but it was protected, did not become entangled with his legs and was out of the way of his left side where he carried his shield.

The Roman army trained as hard during periods of peace as it fought in war. The author quotes the historian Josephus, a commander in the First Roman War (AD 66-73) against the Jews. The Roman ". . . nation does not wait for the outbreak of war to give men their first lesson in arms. They do not sit with folded hands in peacetime . . . they never have a truce from the training . . . peace maneuvers are no less strenuous than veritable warfare." Grant also tells us that parades, commendations, recognition and an intense campaign to have the army accepted by the citizens were some of the means with which the morale of the army was kept high.

The Romans employed a refined technique of hand-to-hand fighting which was contrary to most of the major armies of the day. The soldiers were mentally and physically prepared for this, giving them a distinct advantage over their enemies once the battle passed the stage of the spear and javelin.

Their organization into entities began with the "mess unit," which can be compared roughly with our squad today. Standard organizations, command and control, march and fighting formation discipline, signals and engagement of certain type elements at certain times of the battle all combined to make the Roman army one of the most formidable of the day.

The trend toward the emperor (or dictator) started at the beginning of the first century BC. As the Roman Republic grew in strength and territory, military leaders began to win the favor of soldiers and citizens alike since they, in effect, won the victories for Rome. The Marsian War (91-87 BC) of Italian people against Rome set the stage for political unification of Italy, isolated certain prestigious military and political figures geographically and gave rise to sectionalism and civil strife. The basic dilemma was whether to continue with the present republican system of government and its ability to prevent civil war, or to have tyranny enforced by the army, leading to overall military control. This question was to be asked time and again over the next several centuries.

The First Triumvirate of Pompey, Crassus and Julius Caesar in 63 BC virtually abolished the Republic in favor of a government by military force. Crassus was murdered. Pompey was murdered in Egypt after Caesar defeated him in a civil war by crossing the Rubicon from Gaul into Italy (*jacta est alea*) in 49 BC; and in 46 BC the Roman Senate conferred on Julius Caesar the power of commander-in-chief of the entire Roman army. He has had a tremendous influence on armies since because of his innovations: tactical concepts, army administration, intelligence services, the basis of an officer career plan, pension upon retirement, training methods, rewards and general organization of the army.

Throughout the next several centuries, the interplay between the Senate, the Emperor, the army and the families involved makes for an interesting and informative presentation of the power of Rome and her acquisition of the vast Empire. In most instances the senior military commanders were also members of the Senate. Since the Emperor commanded the army, he also exercised a great deal of influence in the Senate itself. Some of the Emperors were elected by the Senate, others were raised to the throne by the Army and some bought their way into power. Most did not die from natural causes. Being Emperor was a high-risk business.

The book is fascinating. The constant interplay, exposed by Grant, the organization and reorganization, the degree of involvement of the personalities and the frequent internal as well as external crises make the *Army of the Caesars* a valuable and informative work. The leadership of this Empire — based solely on military support, profoundly affects our lives to this day.

LTC Robert T. Fischer, FA, is Chief of the Reserve Components Branch, Office of the Director of Instruction, USAFAS, Fort Sill, OK.

Annual Readership Survey

In order to insure we are meeting the needs of our readership, the staff of the *Field Artillery Journal* asks that you take a few minutes and fill out this readership survey questionnaire.-Ed.

Survey

1. Present Military Status:
   _____Active Duty
   _____USAR
   _____NG
   _____Retired
   _____Other_____

2. Service:
   _____US Army
   _____USMC
   _____Allied
   _____Other_____

3. Current grade:
   _____E1-E4
   _____E5-E9
   _____Officer
   _____Warrant
   _____DAC
   _____Civilian

4. I am presently assigned to:
   _____Howitzer Unit
   _____Missile/rocket unit
   _____Staff section
   _____School (ROTC, service, civilian school, etc.)
   _____Other_____

5. How do you receive your copy of the *Journal*?
   _____Subscription
   _____Dayroom
   _____Distribution
   _____Library

6. Of each issue, I usually read:
   _____All
   _____Most
   _____Selected items only

7. I rate the information in the *Journal* as:
   _____Highly useful
   _____Moderately useful
   _____Slightly useful
   _____Useless

8. My educational background is:
   _____Less than high school
   _____High school/GED
   _____Baccalaureate
   _____Graduate degree

9. The standard features of the *Journal* I read most are:
   _____Incoming (Letters to the Editor)
   _____Right by Piece (Notes from the Field)
   _____Forward Observations (USAFAS Commandant page)

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FOLD ON THIS LINE AND STAPLE

_____The Journal Interviews
_____View from the Blockhouse (Notes from School)
_____Redleg Newsletter
_____Redleg Review (Book review)

10. I would like to see heavier emphasis given to:
_____History
_____FA tactics, techniques, organization
_____Strategy
_____Maintenance
_____Administration
_____Innovations in FA
_____Foreign Armies and Equipment
_____Career information and guidance
_____Humor
_____Future concepts
_____Other_____

11. Which articles in the *Journal* interest you most? For example, select three articles from this issue or past issues which you especially enjoyed reading:
1._____
2._____
3._____

12. After reading the *Journal*, I:
_____Pass it on
_____Keep it for reference

13. Would you be capable to contributing to the Journal?
_____Book review
_____Article
_____Feature
_____Other_____
_____No

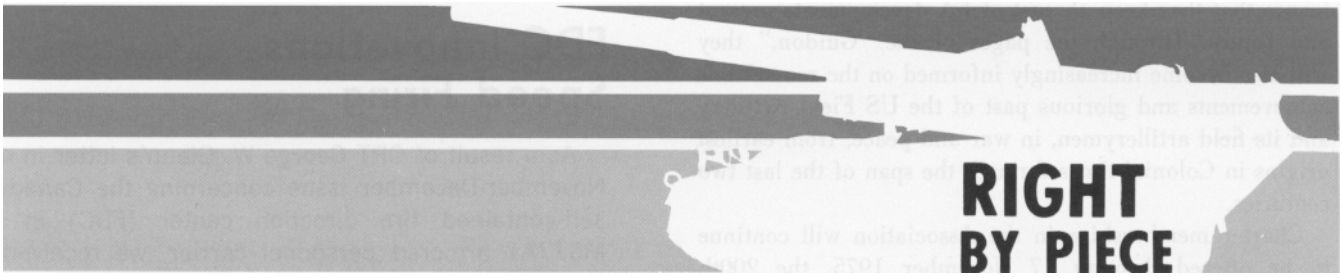
14. One of the aims of the *Journal* is to become a forum for all field artillerymen around the world. Is the *Journal* making progress toward this goal?
_____Yes
_____No
_____Comments_____

15. My one recommendation to improve our *Field Artillery Journal* is:

_____
_____
_____

The time you took to participate in this survey is appreciated. With your assistance, we will continue to publish a viable forum for field artillerymen around the world.

Your comments are solicited and welcome anytime to: Editor, FA *Journal*, Box 3131, Fort Sill, OK 73503.



FA Historical Association Founded

On the auspicious date of 17 November 1974, the 199th birthday of the founding of the US Field Artillery, a new organization was born at Fort Sill that should be of much interest to all Redlegs. Its name is the Field Artillery Historical Association—the offspring of the FA Museum Association.

The FA Historical Association is a nonprofit historical and educational organization devoted to perpetuating the proud history, traditions and accomplishments of the US Field Artillery worldwide. The Association offers subscriptions to the *FA Journal* and dues-paying memberships. Memberships are open to all persons who subscribe to the *Journal*.

Membership benefits include an illustrated bimonthly newsletter, the Redleg "Guidon" (news and feature items are welcomed from members), to be mailed concurrently with each subscription issue of the *Journal*; a free bicentennial color print of the noted Tom Lovell painting, "Noble Train of Artillery. Knox Brings the Guns from Fort Ticonderoga, 1775," reproduced especially for the members in 11x14-inch size on quality paper suitable for framing; a membership card; and a 10 percent discount on all purchases, by mail or in person, from the Museum's Old Post Corral Gift Shop.

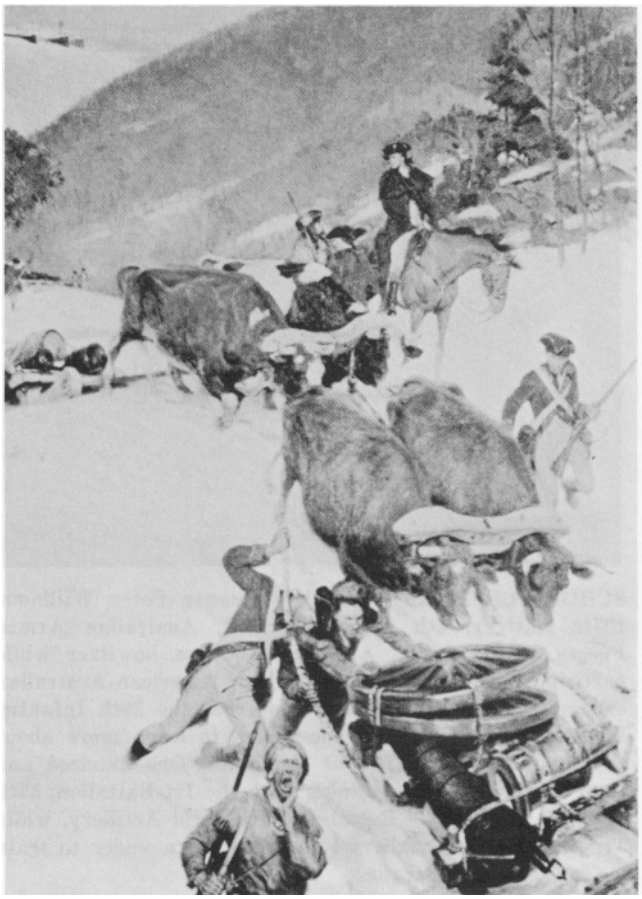
All funds generated by subscriptions and memberships will be used to enhance the historical collection, facilities and services of the FA Museum, which is the largest in the US Army museum system and one of the world's great military museums.

The initial response has been outstanding. As of 28 March the Historical Association had a total of 544 charter members, including 169 active duty and retired general officers. As of the same date, it had a total of 943 paid *Journal* subscriptions. The number of members and subscribers continues to climb daily.

The Association's officers include LTG (Ret) Harry H. Critz, former Commanding General of Fort Sill and Commandant, USAFAS, as chairman of the board of trustees; COL Frank W. Nadeau Jr., president of the Museum Association, as president; Gillett Griswold, director of the FA Museum, as association director; and the members of the Museum Association Council. Griswold also serves as editor of the Redleg "Guidon." The first issue was due to be published in April with a roster of all charter members.

The Historical Association promises to forge a unique bond between field artillerymen of today and yesterday. It is also attracting the attention of Redleg boosters, cannon buffs, military historians and artillery enthusiasts throughout the country. Through the pages of their personal copies of the *FA Journal*, active duty members can

"Noble Train of Artillery. Knox brings the Guns from Fort Ticonderoga, 1775," by Tom Lovell.



insure that they keep abreast of FA developments present and future. Through the pages of the "Guidon," they will also become increasingly informed on the remarkable achievements and glorious past of the US Field Artillery and its field artillerymen, in war and peace, from earliest origins in Colonial times through the span of the last two centuries.

Charter memberships in the Association will continue to be offered through 17 November 1975, the 200th anniversary of the US Field Artillery. Inquiries on *Journal* subscriptions and Association memberships should be addressed to the FA Historical Association, Fort Sill, OK 73503. Write today for your charter membership!

SCHOFIELD BARRACKS, HI—Gunner Peter Williams, 107th Battery, 4th Field Regiment, Australian Armed Forces, sights in an American 105-mm howitzer while participating in Pacific Bond, a joint American-Australian exchange program. Artillerymen from the 25th Infantry Division and Australia trade places to learn more about the weapons and tactics of the other. One hundred and sixty Australians are training with the 1st Battalion, 35th Infantry, and the 2d Battalion, 11th Field Artillery, while Tropic Lightning soldiers have gone down under to train in Townsville, Australia.

FDC Innovations Speed Firing

As a result of CPT George W. Glann's letter in our November-December issue concerning the Canadian self-contained fire direction center (FDC) in an M577A1 armored personnel carrier, we received a visit from CPT Robert L. Richardson, the commander of C Battery, 3d Battalion (155 SP), 18th Artillery, located here at Fort Sill.

He described the following equipment modifications, techniques and procedures developed by his fire direction officer, LT Michael J. Ruggiero, and his chief computer, SP5 Ronald Schroeder. We are passing them along with the thought that other tracked fire direction sections may want to consider their adoption.

All units are invited to forward to the **Journal** any techniques or modifications developed that facilitate speed, efficiency and, as a result, responsiveness.

—Ed.

Within the M577A1 of Battery C, 3d Battalion, 18th FA, the FADAC, firing chart, situation map, all plotting instruments and forms fit snugly in the working area while the generator feeds power to FADAC from a mount on the top of the vehicle. The FDC crew goes into action swiftly and effectively, unhampered by the distractions and dangers of the battlefield outside the walls of the vehicle.

Such speed in preparing the FDC for operation is achieved by positioning and preassembling many items

View from the front of the track showing the HCO, RTO and the FDO, Lieutenant Ruggiero.

View from the rear of the track showing the FADAC operator and the chief computer, Specialist Schroeder.

prior to departure. For example, the RC-292 antenna is strapped to the top of the track in three elements, two containing two sections of pole and one containing three pole sections. The head of the antenna is preassembled (less the ground plane elements) on the top of the antenna shaft and the antenna wire is attached to the antenna head with a safety loop taped to the top section of the shaft. The other end of the wire is fed through an antenna hole into the vehicle.

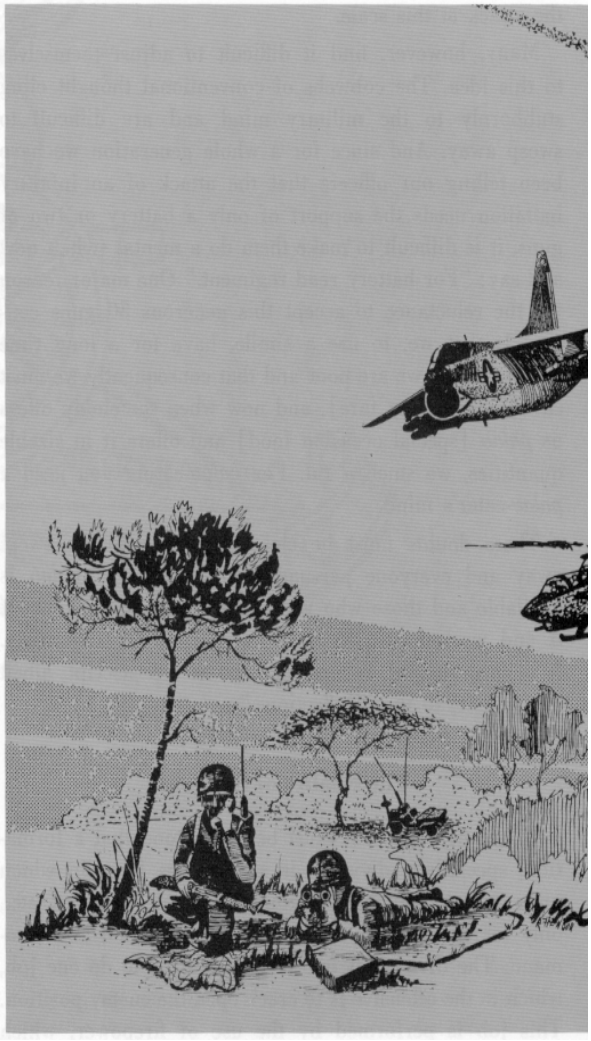
A three kilowatt 400-cycle generator is mounted on the top of the track, eliminating the need for a ground. The FADAC cable is attached to the generator and again fed into the vehicle through an antenna hole. Inside the M577A1, the FADAC is strapped to a shelf with foam rubber pads placed under it to shield against shock and vibration.

The set up procedure is quick and simple. As the team rolls into and stops at their designated FDC site, only the driver leaves the track. He climbs up to start the FADAC generator and, with the generator running, he moves to begin construction of the RC-292 antenna. Meanwhile, the advance party man enters the rear of the track, hangs his preconstructed firing chart and then establishes communication with the howitzer sections. The FADAC operator removes the straps and protective cover from the computer and inserts the power cable. The chief computer readies his equipment while the advance party man returns to assist the driver in the erection of the RC-292 antenna. Total time elapsed thus far is approximately one minute and 30 seconds.

Some three minutes later, the RC-292 is completely erected with guy wires emplaced. The ramp is raised and locked and the driver assumes his post as RTO. Battery C is ready to shoot!

AGOS
On The Go

HURLBURT FIELD, FL—The field artilleryman has always taken pride in the timeliness and destructiveness of the product he provides. There is another service he provides that is not only taught at the Field Artillery School but in every school of all services dealing with fire on surface targets: the artilleryman is the fire support coordinator whether he be a fire support



(Continued on page 59)

Fifty Guns

by Lieutenant General A. I. Akram

The following article is reprinted courtesy of the Pakistan Army Journal. The author is the Pakistan Permanent Military Deputy to CENTO in Ankara, Turkey. Assistance in preparing "Fifty Guns" for reprint was rendered by Pakistan MAJ Masud Khan Khalid, a student in FAOAC 2-75.—Ed.

In my "Reflection's,"* I had affirmed that there must always be at least 50 guns to support a battalion attack. This was not, and is not, a tentative suggestion but a definite demand: that those who are responsible for the planning and execution of the offensive must make certain that artillery is available to support the attack at this scale.

Many, however, find it difficult to adjust themselves to this idea. The cobwebs of conventional thought cling stubbornly to the military mind and are difficult to sweep away. And since for a whole generation we have been telling our officers that the attack of an infantry battalion needs the support of only a battery or two of guns, it is difficult to make them do a mental switch now and say: "For battery read regiment." One major reason for the reluctance to accept this generous 50 guns concept is that we, to use a simile, have for a long time been told that we are poor and that consequently we must eat *dal* [everyday fare], and now when somebody offers us *palao* [special occasion food] and offers it in sizable quantities, we smell a rat. For *palao*-eating you need a *palao*-eater's mind.

These doubts must be cleared, these cobwebs swept away and everyone persuaded to realize that *palao* is available and those who wish to eat it must think about it and work for it. That is the purpose of this essay. It is an argument. It must be read as a postscript, albeit a long one, to the "Reflections."

The Reality of Economy

In the first place, it must be understood that a formation, specially a division, is an all-arms force in which units are thought of as infantry, armor, artillery, etc., only for convenience of training, organization and command. The division is one force, required to do one job, which in the offensive is to crack open the enemy position. This job is performed by the use of firepower, which at the tail end of the assault includes bayonet power, and this firepower comes from the weapons of artillery, of tanks and of infantry. The part to be played by the arms with the various weapons which they possess depends upon various factors in the situation which the tactical appreciation brings out. A combination of the power of these weapons results in the overall weight of fire which is brought to bear against the enemy. At the divisional level there is no infantry attack, no armor attack, no artillery attack; there is but one attack, and that is the divisional attack.

Relative strength is not an overall mathematical comparison of the number of units of various arms ranged along the front but an assessment of the strength which can become effective in time and space. The greatest elements of strength are mobility and firepower, and the application of strength is deeply influenced by the state of morale. Moreover, the effectiveness of a force in battle is not a matter of the infantry or artillery which it has in its order of battle but of the firepower which it brings to bear upon the given objective. The infantry battalion attacking with the support of two field batteries is not to be equated with an infantry battalion attacking with the support of a tank squadron, two field [artillery] regiments [battalions] and a medium regiment.

The basic objection to the 50 guns rule arises from a false understanding of the meaning of Economy of Effort. We tend to believe that we do not have so much artillery and so much ammunition, but it is assumed that there is no need to practice economy in the use of infantry, that men are available in plenty whose lives can be thrown away as cannon-fodder just so we can save so many rounds of artillery ammunition. This is a false economy which must be rejected. And this is the thinking of those who forget the value of the infantrymen and forget how many years it takes to produce a first class fighting soldier, who is precious because only he can win battles. Lives, especially of highly trained soldiers, are more precious than equipment and ammunition and must be preserved and expended only when

* *Pakistan Army Journal,* December 1973.

there is no other way to achieve the aim. The cost of human life is much higher than the cost of artillery ammunition. In any case, it can be established that there is no need for this kind of false economy, that it is a *dalkhor* [*dal*-eater] economy.

Economy does not lie in not using weapons and ammunition, and this point has already been emphasized in general terms in the "Reflections." It lies in actually using them and getting the most out of their use. Thus, the final test of economy is not how much ammunition we have saved but how much ground we have taken and how much enemy we have destroyed in return for ammunition expended. If two infantry divisions are given an equal amount of ammunition and an equal size of objective in terms of opposition and extent and after fighting their battles, one division has not moved at all but saved 60 percent of its ammunition, while the other has almost no ammunition left but has the City of A in its possession, it is obvious which is the successful division and which has achieved true economy of effort. (A is just a letter of the alphabet; you can call the place B or C.) What is the price of the City of A? Can a great objective be measured in terms of second line lifts of ammunition? The City of A is priceless. The greatest economy in war lies in winning the battle and achieving our military and political aim. Against this achievement, any talk of saving 65 rounds per gun is immature and meaningless.

Overwhelming Force

In the offensive battle the commander has to crack open an enemy position. We are not talking here of the general offensive where he can maneuver or outflank the enemy, capture his lines of communication and so on. At some stage or the other he has to attack a proper defensive position—it may be a company or a battalion position—and it is this action that is referred to here as cracking open the position. So the commander has to crack open the position and he determines the firepower that he needs to do the job. He may use infantry weapons, tank weapons and artillery weapons, with various possible combinations. The requirement is not of a theoretical combination of arms which might be laid down in some training pamphlet, but of effectively cracking open the position. If the commander puts the entire divisional artillery against a strong point held by only an infantry company, which would otherwise cause a loss of many lives and the delay of many days but which he now reduces quickly and with a saving in human lives, he is practising Economy of Effort; and he is a wise and able commander.

It could be argued here, and often is, that you do not use a sledgehammer to crack a nut. In Vietnam we have seen US patrols meeting opposition from a few men and calling at once for air support, helicopters, gunships, artillery and even naval gun fire when in range. The Americans say that they have the war materiel available and that they place a higher premium on human life. The important thing is to get the job done, and if it can be done by using ammunition, it should be done that way. And on this question of the sledgehammer, Field Marshal Slim has given the best answer: If you have a sledgehammer and do not care what happens to the nut, go ahead and use it! So let us go ahead and use the sledgehammer. And if the nut happens to be an enemy nut, who cares what happens to it?

We are trained to think of artillery fire and the fire of other weapons as covering fire, i.e., fire with which we keep the enemy's head down until the infantry gets close to the objective, after which the fire lifts and there is a short period of exposure during which the assaulting infantry has to get to grips with the defender. This is a short period of exposure in terms of time, but it can be very long in terms of enemy fire and our own vulnerability. (At Jarpal, a battalion of Frontier Force Regiment lost most of their 57 dead and 71 wounded within the first few seconds of enemy fire.) But now we will use 50 guns, and even more if the enemy defenses are stronger. We will think not of covering fire but of shattering fire. We will shatter the enemy, devastate him, put him in such a state of mental shock that he is incapable of taking any action to defend himself, let alone kill our men. We will subject him to an intense concentration of shells, bursting on the ground and in the air, fired in a short period of time, which will leave him in a dazed condition, unable to use his weapons during the last critical moments when the infantry charges. We want not covering fire but shattering fire.

In this manner of attack we shall see greater economy even in terms of ammunition expenditure. We will find that we have actually saved ammunition which would have otherwise been used over a long period to support failure after failure with nothing to show for its use. What can be achieved by firing 50 guns at 20 rounds per gun in a rapid concentration against one enemy position cannot be achieved by firing 400 rounds from one battery in 20 hours.

This should leave no doubt that in the normal set-piece attack we have to have 50 guns to support a battalion. Yet, in our teaching, must there always be this amount of artillery fire? If we say "yes," we may find a situation where every young officer commanding a company demands 50 guns before he will assault a platoon position, which is not acceptable, of course. Thus, we must also be trained to have a battery supporting a company and a field regiment supporting a

[maneuver] battalion (there must never be less than this anyway), and emphasize the importance of maneuver to approach the enemy from a direction in which his fire is less effective. But in the major training of our battalions for war we must make two-three regiments available for the attack—three regiments of artillery—two field and one medium. This makes 54 guns, but that is fine. The figure of 50 is a round figure and is meant to be used more as a slogan than a mathematical gun count.

As for guns, we have quite enough in the country to make them available, by judicious planning, at the scale suggested here. It is all a matter of right concentration in time and space, correct phasing and skillful movement. As for ammunition, we should have it. The general staff has no business to tell us on the very first day of the war that economy is necessary and please do not fire more than 10 rounds per gun. It is no general staff if that is how it plans for war. In any case, in the long run this sort of restriction does not lead to economy but the opposite, because we lose our battles to save ammunition. (What is the value of the Shakargarh Salient, of our military honour, of a million refugees—in terms of second lines of ammunition?) We just have to have ammunition, and it is up to the nation and the high command to provide it if they want to fight a successful war. And we will prove our economy by winning battles rather than make timid and futile efforts and getting nowhere.

This is all about the deliberate attack. We will now go on and see how 50 guns are allotted to even smaller forces against an even smaller enemy. We will become still more generous in the use of firepower. More *palao!*

The Advance to the City of A

The situation which we will now study for the use of 50 guns, in support of a company, is the advance in which we move against an enemy who intends to delay our advance. In this situation the advance would take place over a distance of 20-30 miles, and is unlikely to be longer before a main defensive position is contacted. It would follow the breaking of a crust, and precede a major battle deep in enemy territory. The enemy is not in strong defenses on the way but has weak-to-medium-strength delaying positions in a classical covering troops or rear guard role. Our advance is conducted with two vanguards per battalion, as already explained in the "Reflections," which is a technique that I have tested in many exercises with troops under my command and found to be eminently successful.

The way the 50 guns technique works here is as follows: The brigade advances with two battalions up, each on a clear axis; each battalion advances with two vanguards, separated by a mile or so and still has two companies in reserve for a major battalion action. Of the divisional artillery two field regiments and a medium regiment (could be more) are deployed for the support of the brigade near the start line, their positions fully surveyed. The targets on which the guns are likely to fire are already chosen, and these are the tactical objectives of the infantry—distributary and minor canal crossings, towns and villages, road junctions, high ground. With well-trained commanders it is not difficult to determine the places at which the enemy is likely to oppose our movement, and these also become our preselected artillery targets. They are not surveyed, but that does not matter, because inaccuracy of up to even 100 yards in the artillery fire is acceptable under this system.

Let us come down to the vanguard. The company advances with two platoons up, deployed on a front of 500-800 yards. It moves in assault formation, knowing that enemy opposition is likely at X, then at Y, then at Z. Near X the vanguard is fired upon by several automatic weapons and the infantry goes to ground. What happens next is like a battle drill.

This place which the enemy is occupying is obviously X, and has already been registered as an artillery target. But to make sure that it is indeed X, the artillery fires one round per regiment at it. This is important because we cannot leave this matter to the map reading ability of a platoon or company commander or an FOO [forward observer officer] who might actually have his own company at X while the enemy is sitting a little beyond it and firing at X. In the latter case, if our 50 guns immediately start firing at the preselected target of X, they would do to our own troops what we want them to do to the enemy and the result would be tragic. In fact, one round per regiment could be fired at X even before the troops get there, when the vanguard is still half a mile away, to make sure where we are and where X is and to save time in correction of fire. We allow some necessary adjustment of fire, but not too much time should be spent on this because only a fair degree of accuracy is required. Then 50 guns (actually two field regiments and a medium regiment) come down with a terrible crump on the enemy for two or three minutes, firing at a rapid rate of three or four rounds per minute. As the fire starts, the vanguard goes into the assault. Even if the infantry is 400 yards or more from the objective when the fire is lifted, it is good enough, because the enemy would be in no state to offer resistance. The vanguard should go through the enemy like a knife through butter.

Let us go back to the old system. There would be a point platoon, perhaps strung along the road behind a point section and possibly advancing with two sections up. The enemy would fire and the platoon would stop

and go to ground. Then, according to the book, it would be required to "probe" to discover the strength and layout of the enemy opposition. But how does one probe? Sitting in a comfortable office we can explain the basic requirements of the probe to an attentive audience, but at that critical moment, under fire, in a situation of extreme danger, the probing has to be done by a confused and ill-trained JCO [junior commissioned officer, equivalent to warrant officer] who is perhaps also ill-directed by a young company commander with less than three years service. (It is amazing what vague and impractical answers are given by young officers and JCOs when you ask them how they would find out all about enemy strengths, weapons and locations. They talk of "probing," in a very general and academic way, and do not know how they would actually do it in the reality of a given situation.) We have to be realistic about this. Even so, let us say that conditions are perfect and probing is done. At least a half-hour would be spent in probing and casualties would be taken as the commander tries to get his men back, under fire, to move them left and right to probe.

If, on the old system, the advance is with two platoons up which have been pinned down, they would have to be extricated. They would have to crawl back, move to a flank, reform in an FUP [forming up place]. How long does all this really take in action? And how long does it take for the company commander to do all this and make a tactical plan, give orders, make a fire plan for the attack, in actual war? There would be casualties in the movement and in the FUP, which is often in view of the enemy; there would be the confusion of movement inevitable in a flanking operation—especially when all this has to be done under the stress of battle by a young captain with less than three years service, not by a mature and experienced DS [instructor] at the School of Infantry and Tactics, fighting a rehearsed battle on a model. All this means casualties and much delay—just what the enemy wants. The enemy gets away lightly, happy in his success. And if he decides to stay, we find that after two hours or so our company has lost 15-20 men and has still not cleared the enemy, who could hardly be affected by the fire of six miserable guns. There is loss of morale on our side, everyone blames everyone else, unpleasant questions are asked and everybody curses everybody else.

Even if the battalion commander takes control and deals with the opposition as a battalion action, the process is much the same, though at a higher level. He too would have to take casualties and there would be exposure and delay. During training we have to allow two hours for the battalion to attack the enemy position; in war it would take at least four hours.

But now with one neat stroke we do away with the problem and with the sub-problems of delay, of exposure, of unnecessary casualties and their adverse affect on morale, of the confusion of battle and fog of war; the problem of training semi-literate JCOs as platoon commanders and green subalterns and captains as company commanders and expecting them to act like mature majors. We solve the difficult problems which are created by battle conditions and the confused mental processes resulting from the danger of combat, from the lack of experience which affects most of our officers; and many, many other problems. We solve them all, with 50 guns!

With our 50 guns technique, the vanguard company, as it advances in assault formation with two platoons up, is taking with it a mobile FUP. Actually as it moves it is in an FUP which is also moving. It needs no other. As it goes to ground the company commander starts the artillery fire, after the check round (if necessary, with his CO's permission) and the company rises and assaults, frontally. There is no probe and no patrolling, nor are they needed because there is no regrouping, no reforming, no changing of direction. In fact there is no need for further planning, so long as we are certain about the enemy's position and our own.

The vanguard's advance is like the assault. We are in assault formation all the time. There would be fewer casualties because there is less movement under fire and less exposure and because the enemy is hit very, very hard. The biggest advantage of this system is that it gives the enemy little time to impede the advance. The increased speed and momentum which our advance gains are priceless pearls. We go through and over the opposition rapidly, with least disorganization and delay. The enemy gets less time in which to inflict casualties and to prepare stronger defenses for the City of A. In the matter of morale, it is we who gain and the enemy who loses. The enemy will be hit by our 50 guns in one position and will be shattered. He will be hit again, with the same results, in his second position. In the third position, he will run before our artillery opens up. Our advance would be a relentless movement, behind the heavy bulldozer of the fire of 50 guns, clearing a path for the infantry to move on and on.

This is one method of vanguard advance and assault, i.e., moving with two platoons up. While the concept of 50 guns in support would remain the same, there can be variations in the method of vanguard movement. For instance, it could be advancing with just one platoon up, deployed on an extended front, with the remaining two platoons following the first in company assault formation or some formation from which they can rush into assault formation in seconds. In this method, if the forward troops are pinned down and inextricably committed, the bulk of the company would still be uncommitted and safely in its commander's hand, to be launched through

the leading platoon. Or the attack could go from a flank and should go from a flank if strong obstacles are encountered in front. Or, with two platoons leading the advance, the vanguard commander could build up his third platoon on one of the forward ones and attack left-handed or right-handed. Many variations are possible in infantry company tactics but the factor of 50 guns remains constant, as do the speed and violence of the attack.

The size of the enemy opposition is immaterial. It could be a platoon or a company and either could be tackled by the vanguard on the same pattern with 50 guns. Even an enemy platoon would get the 50 guns treatment. Anyway, how would we find out whether it is a company or a platoon? We have already mentioned the problems of the probe. How do we probe? How many casualties are we prepared to take while probing and how much time are we prepared to lose? And for what gain? What about the confusion, the rising tempers, the irate brigadier wanting to know what the heck is causing the delay? The simple-minded answer—by the number of LMGs firing we would know how strong the enemy is—is as academic as the question of the probe.

So no matter what the enemy strength, we give him the same treatment of 50 guns. And if the objective is smaller, held only by a platoon, six to 10 rounds from our artillery would shatter it even more and lead to speed in our movement and earlier contact with the enemy's main position, perhaps before his defenses are fully prepared. Moreover, for a vanguard company to attack a defending company is perfectly feasible, because a rifle company with 50 guns in support is much more in strength than a company which has only a field battery on call. It is a matter of firepower which we use to bash the objective; where that fire comes from is not material.

With two vanguards moving with the advance guard battalion, it is possible that both make contact simultaneously. But what about our 50 guns support if both want to attack at the same time? The answer is that there should be a basic fixed allotment of one field regiment and one medium battery to each vanguard and that makes 24 guns. One medium battery is the CO's reserve, and if both vanguards are assaulting simultaneously, the CO can give it to the one that needs it more. Normally, of course, the assault should be staggered, but in case of a simultaneous attack the artillery can be divided between the vanguards, provided the overall enemy strength is not too much.

The Movement of Guns

The movement of guns to keep 50 guns in range all the time is not the problem that it seems. Before the start of the advance our 50 guns (actually 54) are in position a little behind the start line from where they can cover about six miles of advance. As the advance proceeds and covers several miles, one field regiment moves forward to a second gun position, already chosen off the map, and the remaining 36 guns continue to cover the advance from the first position. The regiment moving forward would normally need one hour for survey, and we can make sure that it does not take longer, by placing the gun position at some spot which makes survey easier—a distributary, a milestone, etc. And an inaccuracy of 50 yards which would occur if we do not give the gunners more time for survey is quite acceptable because in our technique a very fine degree of accuracy is just not required.

As the first regiment settles down, prepared to take on the covering role, the other field regiment moves forward to come into position beside the first, and the medium regiment remains in the old position, to move forward when the second field regiment is fully settled in the new gun position. Thus, we find that all the time we have at least 36 guns available to fire at a moment's notice. Normally the movement of the guns should be so timed that it takes place when we do not actually have to attack, but if the attack has to go in during that critical period, it can either be launched with the support of 36 guns or we can throw in a platoon of infantry mortars also.

In order to have time in settling down in the new gun position, artillery recce parties should move behind the vanguard (as close as security will permit), and when the latter has cleared the area selected for the gun position, the recce party can get down to doing its work and complete its survey even before the guns move. Thus, a field regiment arriving at the position will need only a quarter or half an hour for getting ready to fire. There is, of course, no digging involved. The movement of these regiments has to be coordinated with the advance of an entire brigade of infantry, but this is a matter of mechanics and offers no insuperable difficulty.

This is the 50 guns movement system. The principle of movement is the same as before but better organized and better planned. Instead of artillery leap-frogging by batteries in an advance which seemed to have no end against an enemy whom we had not placed (as in the old system), we now move by regiments in a deliberate move from chosen gun position to chosen gun position through X, Y and Z, beyond which lies the enemy's major position—the City of A.

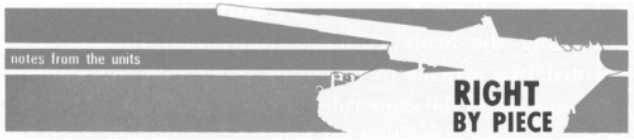
Summing Up

All this has been tried out in practical exercises at the brigade and battalion level and has worked very well indeed. I have found that officers take time to grasp

the new technique and the massive support which is promised. They are used to old ideas which die hard. It takes time to convince them that there really is all that firepower which they can use, that a company attack should never go with less than a field regiment in support and that a company commander could ask for the whole 50 guns should he need them. It takes time to convince them that *palao* is available and that they do not have to eat *dal;* to convert them into *palaokhors*. When we do convert them they find that offensive operations go with a swing. The 50 guns provide them with a big hammer with which to hit the enemy and crush him instead of the little old hammer which had to strike at a specific point in order to hurt the enemy and usually missed.

The arguments about economy are perfectly valid; but we achieve economy on the 50 guns system. We will get there. We will win the battle. We will kill the enemy. We will get to the enemy's main position quickly, before he is ready for us. We will capture the City of A with our 50 guns. We will crack the position and capture the city and inflict a major defeat upon the enemy. And if every division in our Army were to do this, we will win all our battles and by so doing win the war. And that, i.e., winning the war, is the greatest economy.

This is it. This is the solution to our tactical problems in the offensive. This is the hammer which will crack every nut. This is the key which will unlock all doors.



(Continued from page 53)

officer (FSO) at battalion or brigade level or a fire support coordinator at division or corps. Every officer who wears the crossed cannons is viewed by the other branches and services as the fire support expert—but how knowledgeable is he?

With the increased emphasis on employing the combined efforts of all fire support available (in particular the fire support of the Air Force combined with that of the Army), the FSO and all Army officers who operate in the air-ground system must be familiar with requesting, allocating and scheduling fires of more than field artillery. DASC, TACE, CRC, TACP and FSE—these are but a few acronyms for agencies you must know. Their functions and what they can do for you is essential knowledge.

You don't have to wait to attend the Advanced Course or Command and General Staff College to become knowledgeable in the air-ground system. The Air-Ground Operations School (AGOS), Hurlburt Field, FL, is dedicated to providing the background upon which air, ground and naval cooperation and coordination must be built. The courses and briefings of the school are focused on the joint and combined operations necessary to achieve the greatest utilization of weapons and manpower.

AGOS is conducted in a joint service atmosphere. Its mission is to instruct personnel in the concepts, doctrine, tactics, techniques and procedures by which component air and surface combat forces plan, integrate and conduct joint and combined operations. For Army personnel the instruction is designed primarily for commanders (battalion and above) and staff officers who are involved in providing coordination of the fire support on surface targets (G3/S3, G2/S2, G2/S2 Air, G3/S3 Air, FSO and fire support coordinator). AGOS has a staff of 35 officers, 10 of whom are Army field grade with extensive backgrounds in combat units.

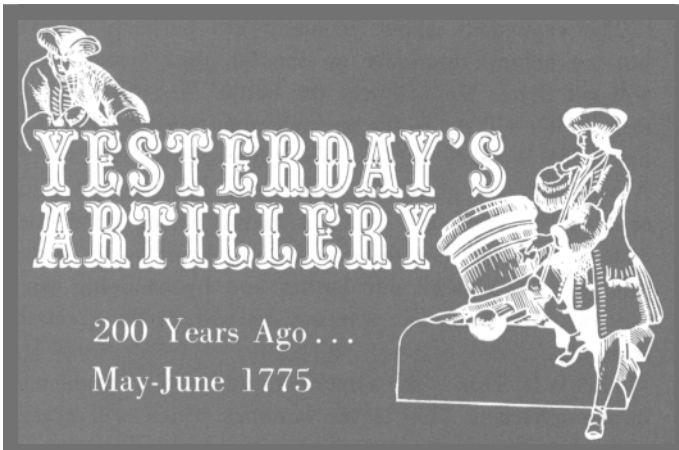
The School has three basic courses:

Combat Operations Course (one week)—This course acquaints commanders and staff officers of combat units in the coordination and control systems employed to integrate service effort. Emphasis is placed on air-ground operations matters of special interest to senior officers who may occupy command and key positions in component elements of a joint task force, subunified or unified command.

Combat Operations Specialist Course (two weeks)—This course is designed to instruct officers and selected civilians in the joint doctrine, techniques and detailed procedures for the integration of tactical air support in the support of ground forces during joint combat operations.

NCO Air-Ground Orientation Course (one week)—Noncommissioned officers of combat units are instructed in the concepts, doctrine and techniques of the Tactical Air Control/Army Air Ground Systems. Emphasis is placed on subject material of special interest to noncommissioned officers who may assist command and key staff officers in component elements of a joint task force or a unified command.

For more information on the Air-Ground Operations School, refer to Department of the Army Pamphlet 350-10. There are spaces for 40 Army personnel in each class.



In combating the rebellious colonies, one of the main objectives of the British was the capture of military stores, especially artillery equipment. Americans expended much energy keeping such materiels from being taken. This was somewhat ironical because America did not have experts in the field of gunnery and there was precious little written on the subject in English. Part of the artillery craft was the construction of fortifications, hence anyone who had experience in engineering could pass as an artillerymen. One of the surest ways for a foreign officer to obtain a commission in America was to pose as an expert in the artillery or engineers.

On 13 April Congress had authorized the creation of six companies "of Train for the Artillery." This contingent was difficult to raise because of the lack of qualified artillerymen. As a result, two engineers were chosen to command the artillery, COL Richard Gridley and COL William Burbeck. On 26 April Congress authorized life pensions for both men as Gridley forfeited a half-pay military pension from England and Burbeck actually deserted the British to join the Americans. This guarantee of a life income was the only such offer ever made by Congress but the need for qualified artillerymen was that great.

Congress began to concern itself with artillery matters after 10 May when Fort Ticonderoga fell with a sizeable supply of stores and cannons. This capture was followed by one on the 11th at Savannah, GA, and one on the 12th at Crown Point, NY. On 18 May Congress authorized the removal of cannons and supplies from Ticonderoga to the south end of Lake George. Because Fort Ticonderoga had not been a frontier fort since the end of the French and Indian War in 1763, it had fallen into a state of decay. The name had been so formidable for such a long time that its capture gave Americans a secure feeling even though the cannons were in poor repair and the powder was old and in short supply.

Realizing the importance of artillery, on 25 May Congress authorized the erection of batteries in the Highlands of New York to prevent British warships from passing north on the Hudson River and harassing the citizens. Again, on 16 June, Congress mentioned its intention to build forts approximately at the present location of West Point.

The manpower for the artillery was another Congressional problem. It was the practice to enlist men into the artillery from infantry units, but this usually caused hard feelings and gave the artillery a poorer quality man than if they had been able to recruit directly.

When New York City patriot John Lamb offered his services to New York on 2 June, he was given a captaincy and began to form a company from men in the city. The position of artilleryman was considered a skilled job that demanded higher pay. Lamb informed the New York Committee of Safety that, "Artillery companies in every country are always looked upon in a superior light to other foot companies."

Later in June, Congress, as part of its 69 articles governing the army entitled "Rules and Regulations," devoted two articles to make the point that the artillery *did* come under the same rules as the "Continental Troops." It was also declared that all artillery equipment captured or taken from public stores became the property of the "United Colonies."

The only significant action involving artillery in this period began on the night of 16 June when the Americans moved their army onto Breed's Hill and thereby posed a threat to the British that could not be ignored. From Breed's Hill the smallest rebel cannon could reach all parts of Boston as well as British shipping areas. If the Americans had moved to Bunker Hill, where they were supposed to go, it is doubtful that the battle would have ever been fought. On Breed's Hill they constructed several small redoubts about 130 feet on a side. It is difficult to determine how much artillery support was moved onto Breed's Hill, but there were at least two small brass cannons and six iron field pieces.

There were 10 companies (about 40 men each) organized and in the Boston area, but only three were on the hill to face the British. Compared to American musket fire, the artillery did not have a prominent place in the battle. There is no record of the artillery taking part in the devastating fire that drove the British from the hill on two occasions, but it is reasonable to assume that there were artillery rounds fired at the British.

Not too many of the 370 artillerymen at the battle of Bunker Hill waited to see the whites of the British eyes. The few who did, distinguished themselves. All of the guns were captured, except one! Of the three company commanders, MAJ Scarborough Gridley was court-martialed for cowardly actions, but because of his youth he was later freed. Captain Callender was cashiered, charged with disobedience of orders and alleged cowardliness.

Callender later served so gallantly as a volunteer in the battle of Long Island that Washington removed all record of his court-martial and restored his commission. The third officer, CPT S. R. Trevett was able to bring his piece off the hill and from all reports fought bravely. There was a fourth officer, Captain Foster, who arrived at the front lines where the Americans were being overrun and abandoned his cannon during the retreat.

The battalion commander, Colonel Gridley, was wounded servicing a piece and General Putnam poured his pouch of shot down the muzzle of a gun to supplement for grape shot. Captain Trevett set up his piece at a second defense line and covered the retreat, but the British had paid such a price that there was no pursuit.

When a group of untrained and new soldiers faced the best army in the world, valor was only good for so long. Without good leadership, the artillery (as the rest of the men at Bunker Hill) folded under extreme pressure. However, before 1775 was over the artillery would be organized, led and equipped with basic resources that would see it through the next six and one-half years of combat.

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An Essay

Remembering

Friday, April 25, as reveille sounded through the early morning mist, a casual passerby at Bell Hall might have seen a group of soldiers of many nations, some proudly wearing their campaign medals, attending a military formation at the foot of the garrison flag. The unknown observer can be forgiven for wondering what was happening. Even if he knew what was taking place, he might have wondered why, at a time when a far away war is once again on every front page, military men were assembled to recall a particularly bloody battle of long ago — indeed a resounding defeat resulting from serious political mistakes beforehand and major operational blunders at the time.

As it happens, Friday's ceremony recalled the actions of the Australia and New Zealand Army Corps, the ANZACS at Gallipoli 60 years ago, when an effort was made to knock the Turks out of World War I and open a passage to Russia. History has recorded the failure of that enterprise.

The ceremony, however, did not celebrate the battle or its outcome. It simply remembered the men who fought and died there at Gallipoli in 1915. The dignity, silence and solemnity of the observance were in total contrast both to the clamor and urgency of the battle and to the public anguish of that day. Perhaps it provides us with the opportunity to examine our own feelings on such an occasion.

Few will question that, in this imperfect world, there will always be tensions and pressures between nations. When these pressures seek to impose an alien way of life on an unwilling people, that people, if they are to retain at least their self respect, must resist. They must do what they believe to be their duty. Should their resistance fail, let nobody suggest that duty well done is not an honorable course of action which both dignifies and enhances the spirit.

In a world where spiritual values are in danger of being overwhelmed, it is good that the spirit be strengthened so that, at its inevitable next test, it is prepared for whatever hardship and duties may be required. Without the spirit to do or die, there might have been no Revolution to create the United States; the men of the Alamo would have died for nothing; Pearl Harbor would have generated despair rather than determination; and those who landed at Omaha Beach would never have fought their way inland. The soldier's spirit, often welded in the heat of battle, is fundamental to national character and strength and to the ability of that nation to perceive and carry out its duty.

Further, without the ability and will to defend and preserve our fundamental values and institutions, we might one day have imposed upon us the tyranny we see elsewhere.

Anzac Day, and Gallipoli, then say to us: Do not be distracted by any transient perception of the value of the armed services, or by the simple outcome of their trials, or by a preoccupation with any setbacks or defeats. The defeat of aspirations in any particular area lessens neither the nobility of the cause nor the honor of those who strove. Moral and material readiness must be maintained.

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