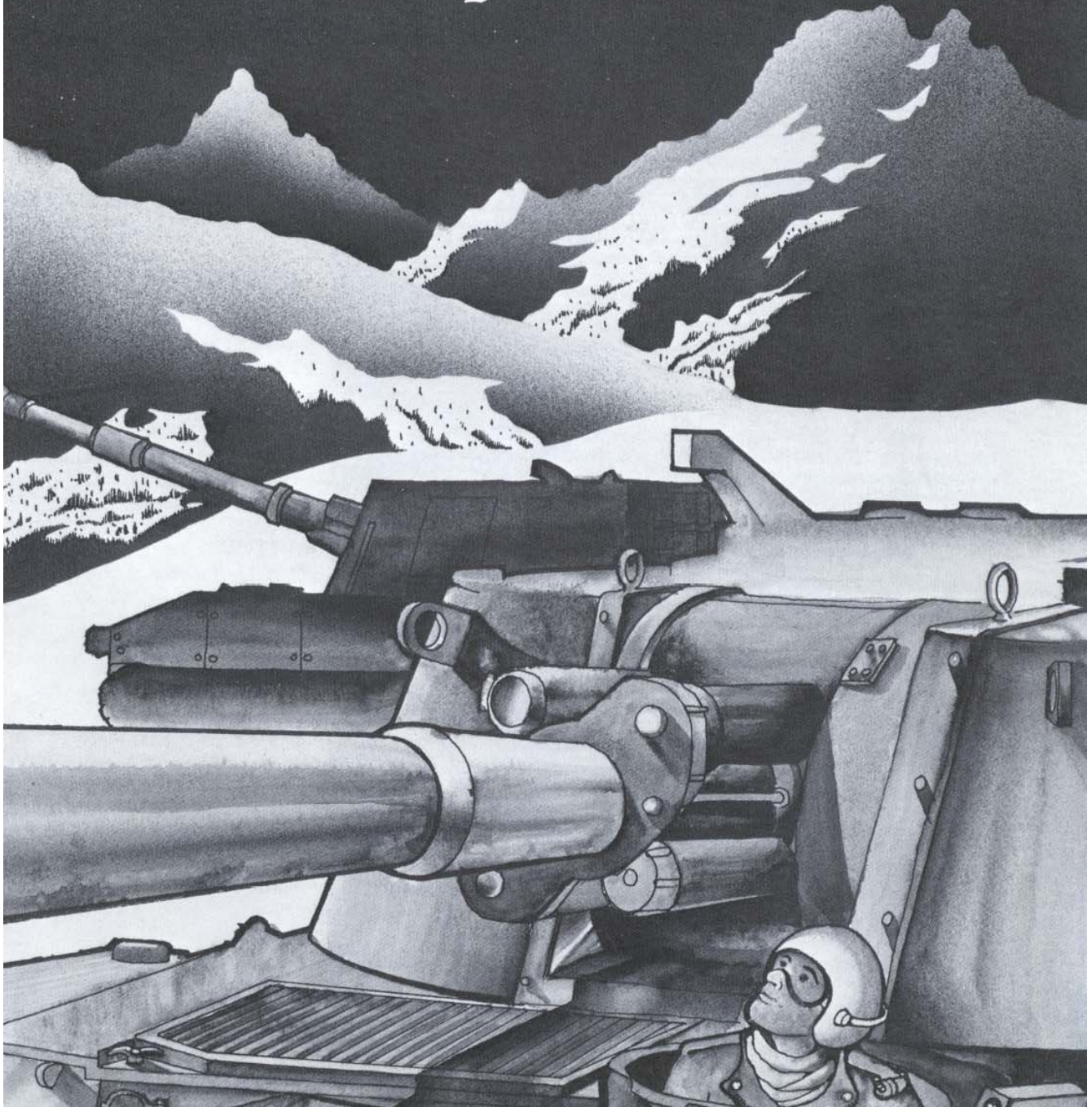


# FIELD ARTILLERY JOURNAL

November - December 1977

Seasons Greetings



# FIELD ARTILLERY JOURNAL

Volume 45

November-December 1977

Number 6

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

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

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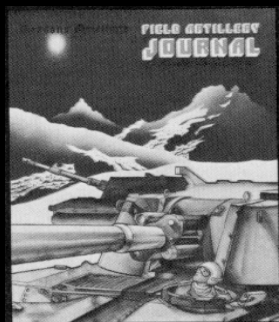
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The cover for this issue was prepared by Mr. Dan Enger of Fort Sill's Training Aids Service Center.

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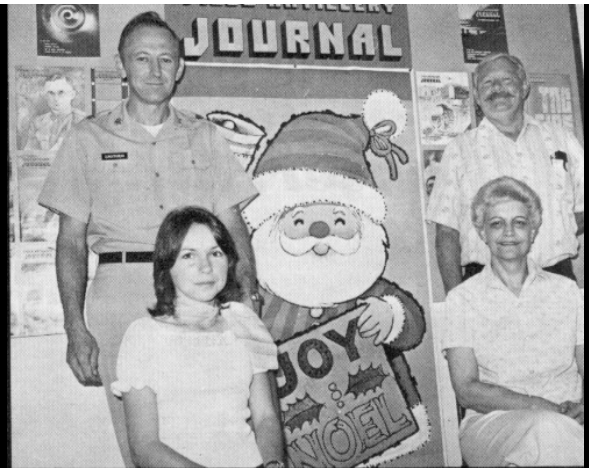
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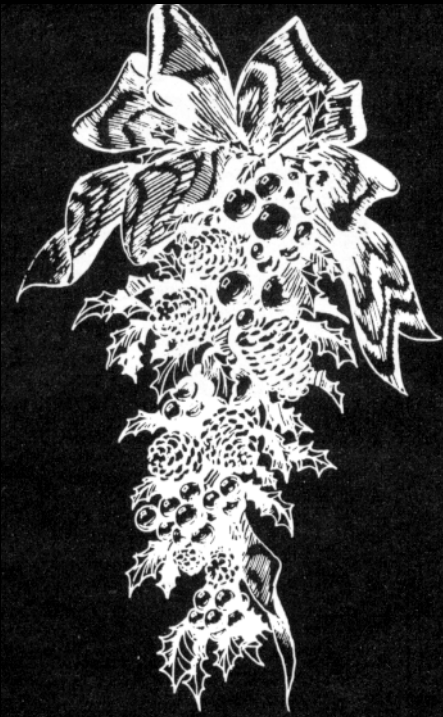
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*Your Journal Staff wishes  
each of you joyous seasons  
greetings.*

*Bill Elaine Bill Mary*



Ms. Elaine Henrion, our Circulation Manager and Editorial Assistant, has left the *Journal* after more than two years as the Editor's right hand. Our loss is the Recruiting Command's (Fort Sheridan, IL) gain. Elaine will be sorely missed and we wish her Godspeed!

**Editor and staff**

# *forward observations*



by LTG Donald R. Keith

It is not trite to say that I leave Fort Sill with very mixed emotions. I am certainly pleased with the confidence shown in me and my new assignment but truly regret having to leave this superb command after only 13 months. It has been a busy, exciting and rewarding period, and my association with the Fort Sill and Lawton people has been a wonderful experience.

A lot has happened in my short tenure — largely due to the great people here at Sill. For example, the General Support Rocket System is now on contract and should be fielded on schedule in the early 1980s. The GSRS will provide the added firepower needed to silence the enemy's artillery during the surge conditions expected on a European battlefield.

TACFIRE has been on the front burner all year as we made final preparations for OT III. We have had our problems, so Fort Sill hosted a critical TACFIRE in-process review which took a hard, impartial look at where we are and what we have to do to insure success. It has been a great team effort, and preparations for operational testing at Fort Hood are underway and doing well. After a decade of work, this equipment will start being issued to our divisions in 1978.

The fire support team (FIST) concept was approved and has now been implemented worldwide. While there are still some aspects to fine tune, such as getting the correct vehicle for the FIST, we have the organization, the personnel spaces, and the doctrine. School training for 13Fs will start in two to three months.

Two more important concepts have been solidified. The Corps Field Artillery Section gives the Corps Commander the people and equipment to perform the fire support coordination function and to command the artillery units retained under corps control. It is flexible

enough to handle any situation foreseen on the modern battlefield. The other organizational and doctrinal change is the conversion of all our FA Groups to Brigades. This is not a cosmetic change; the group organization needed beefing up to do all that is required of it and the new FA Brigade is the answer.

This is a good place to mention the ingredient that has made Fort Sill a pacesetter in TRADOC and the Field Artillery a leader among the combat arms — the full support and positive attitude of our people in the field. As an example, we sent drafts of the concept papers on the Corps FAS and the FA Brigade to the field and got no-holds-barred, well thought out responses from everyone. Fort Sill does not presume to have all the answers within its confines, but with the input from the field, we end up with 99 percent of the answers. This has been true of all of our new doctrinal and training developments products. You all have made my job much easier and I sincerely appreciate your efforts.

Back to some accomplishments I take pride in sharing. We exhaustively studied the fire support needs for our light divisions (excluding airborne and airmobile that are being addressed separately) and determined that the recently standardized 155-mm howitzer M198 is the best weapon for direct support. This position was driven primarily by range and munitions available in the 155-mm system.

The School has published some quality publications — Soldiers Manuals, SQTs, ARTEPs, TCs, and FMs. We are especially proud of our How-To Fight manual, FM 6-20 — the total fire support manual for the maneuver commander and the fire support coordinator. In the nuclear area, a major hurdle has been cleared in getting realistic nuclear training objectives into appropriate ARTEPs and curtailing the insidious administrative

burdens of technical proficiency inspections. We must continue to work in this area to insure that we will indeed train as we will fight.

There are many things yet to do and it would be wrong to leave the impression that my successor won't have his hands full. To list a few:

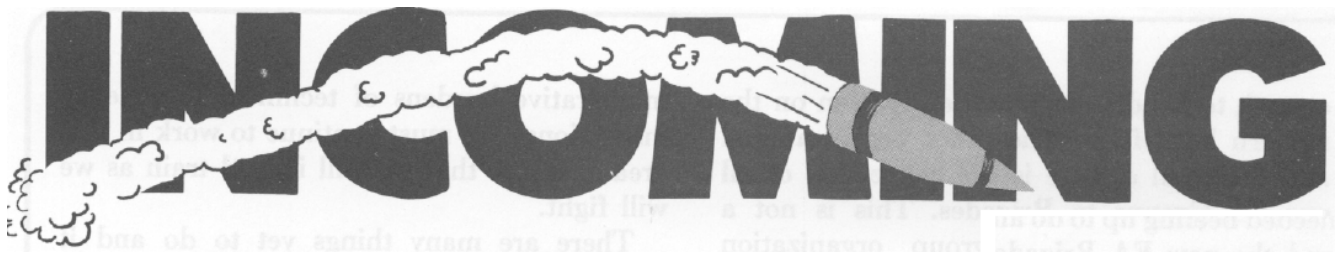
- Pushing our publications and aids to training out to the field.
- Correcting the ammunition distribution and handling system.
- Perfecting and fielding Copperhead.
- Obtaining an optimum FO vehicle.
- Taking advantage of technology to make each element of the Field Artillery System more lethal and responsive and then "closing the loop" via automated command and control.

This is just a partial list. There is much to be done and it *can* be done, given the time and resources. The major resource we need is a continuing flow of good people with fresh ideas and the desire to work and contribute to our branch and the Army. Fort Sill is a great place to be these days. The dedication, excitement, and sense of accomplishment is contagious.

This has certainly been the most challenging and rewarding assignment of my career. I thank you all for your support and wish each of you continued success. You can be sure that I will continue to try to do what is right for the Army — and having a strong fire support member of the combined arms team is right.

General Keith has been promoted to Lieutenant General and reassigned as Deputy Chief of Staff, Research, Development and Acquisition, Department of the Army.

The new Commandant is MG Jack N. Merritt, who comes to Fort Sill from Fort Hood, TX.



## letters to the editor

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

### **Let's get back to basics**

The more letters I read in reference to the "ARTEP editorial," the more concerned I become about how and why we train in the artillery.

I have little quarrel with those who are delighted to see the ATT relegated to history. The ATT was not a good measure of unit readiness, nor was it a particularly effective training device. It was, however, an honest attempt to set some standard measure of performance to gauge how well a unit could do a set of tasks on a given day. To imply that the people who relied on ATTs were "dumb" is not fair — they just aren't as smart as we members of the "new breed." Neither did they have the advantage of the years of thought, research, and hard work of Generals DePuy, Gorman, Siegle, Starry, and Ott and untold thousands of worker ants.

The ARTEP is an outstanding training device. Its effectiveness rests on the lists of minimum performance objectives (tasks, conditions, and standards) a unit should be able to accomplish. Used in conjunction with the Soldier's Manual, it tells everyone — soldier through battalion commander — what they must be able to do. If the only time these documents are used is during the annual formal evaluation or the biennial SQT, then we have missed the mark. These documents are our daily bread. Informal evaluations at all levels should be a frequent, regular, unannounced and non-pejorative part of our everyday life.

What one's "boss" does with the formal evaluation results is the boss' business. I don't hear any anguished cries from our captains and lieutenant colonels about the uses of SQT results. Fellas — it means no promotion, possible reclassification or a bar to reenlistment if our EM fail.

What I do hear are officers who either haven't done well or who are afraid they

will not do well on their unit's formal ARTEP evaluations. There are no free gold watches in this world. If your boss gives you the necessary resources, after a reasonable length of time you should be able to put it all together and come up with a unit able to perform to the expected standard. If not, why should you be trusted with more and more scarce resources? He must have some way to measure your performance because, whether you believe it or not, captains need to be "trained" as battery commanders, lieutenant colonels need to be "trained" as battalion commanders, and colonels need to be "trained" as division artillery and group commanders.

Not all will succeed and somehow, somewhere, there has to be a way of discriminating between the guy who can cut it and the guy who can't. "Trust me" might have worked on your first date, but, in the hazardous world of the modern battlefield, proof is required.

I would hope that future discussions on the ARTEP would be: Are the right tasks there; are the conditions appropriate; are the standards valid; how often should evaluations be conducted for proper sustainment of skills; what kinds of cost data have been collected thus far; etc.? I'm sure all of us can think of a lot more productive subjects for discussion than whether or not our bosses use the ARTEP to measure our effectiveness as commanders.

Michael J. Langrehr  
LTC, FA  
2d Bn, 75th FA

### **Use that ARTEP**

I have read and heard numerous comments concerning the ARTEP. The ARTEP is very flexible and, if used properly, will assist the commander in

training his unit to fight and win with minimum losses.

Many units fail to instruct individual sections on the tasks they must perform during the ARTEP. Break the booklet apart if there are not enough copies for each section. Insure that the section chief is aware of his mission. It is up to him to train his men and evaluate them.

I recently assisted in the evaluation of 12 battery ARTEPs in Europe. During the evaluations, I talked to some very good artillerymen, but over 50 percent of these soldiers had not seen the ARTEP booklet and had no idea of the tasks they were to perform.

The FO must be well trained in map reading and must be quick in target selection. He must train his NCO and radiotelephone operator/driver to shoot in his absence. The FO section must be effective.

Get the ARTEP booklet in the classroom, gun park, motor pool, and local training area before going to the main training area and see greater effectiveness from the cannoneer to the commander.

Use the M31 Trainer. This is a super device that will sharpen the skills and improve proficiency throughout the firing battery.

The cost is minimal for the knowledge gained.

Ferman Buckner Jr.  
SGM, Advisor  
MOARNG

### **A better nuclear posture**

I read with amazement your three-part series on the Limited Defense Option (FA Journal, Vol. 45, No. 1-3). Although I am in complete sympathy with the motivations which spawned this theorem, namely, a last-ditch nuclear

response which promises to halt the attacker without bringing on a general holocaust, I find the preferred solution wholly unacceptable.

Blasting our allies' territories which become initially occupied during an enemy offensive to demonstrate our resolve, whatever that is, seems as logical as responding to the attack of a mugger by cutting one's fingers off with a knife, rather than thrusting that weapon into the assailant's heart.

It is obvious that the use of tactical nuclear weapons would have to be carefully controlled lest their employment mushroom into a strategic exchange. However, a policy which suggests to the foe that his own territory might be spared nuclear devastation is nothing less than an open invitation to adventurism, and seriously degrades the desired deterrent effect of our sizeable tactical nuclear arsenal.

And what of our allies? Are we to expect that they shall sit quietly while we crater their countrysides? I suspect that this idea will fall on deaf ears in the remainder of the NATO community. And should we adopt this suggestion and press on with it unilaterally, we might face a situation where, as the conflict opens, our ground forces are deployed, not to counter the adversary's attacks, but to protect our nuclear munitions from seizure by our allies themselves.

Rational men stay clear of criminals and the insane, as the normal parameters of society do not limit their behavior. A dangerous amount of physical power, with little or no restraint perceived, has a similar effect in the inducement of a defensive, rather than an offensive, attitude. The combat power possessed by the Warsaw Pact just across the frontier has certainly induced such an attitude amongst our forces. I submit that policies adopted by our forces need to appear a bit reckless for the same reason, to deter our antagonists by sowing doubt as to their own survivability in a general conflagration. And we should make it further clear that we will not limit our response to their fighting forces, but carry the riposte to their logistical and industrial support bases, which conveniently enough for our purposes, tend to be located in population centers. Again, what our actions are should war come will depend entirely on the senior commanders at the moment. But in the meantime, it is important that we wage a

bit of psychological warfare by insuring that the leaders on the other side *perceive* a serious threat to themselves, their cities, and their peoples should they bear their hopes above wisdom and fear and attack in Western Europe.

Returning to the example of the citizen and the mugger, giving assent to the LDO plan would be like wandering through dark streets wearing a sandwich board that says in large letters, "I am carrying a great sum of money and am unarmed," when in reality, we should be carrying a shotgun and wearing a marksmanship medal.

George L. Humphries  
CPT, INF  
Fort Benning

### **The commander's role**

I believe the following is worth reading:

#### ***The Chain of Command***

*Probably the most remarkable fact about exercising command is that while most officers know it in theory, a good many fail to put the theory into practice properly. One reason for this is that peace-time organizations are so small that field officers have not much opportunity to actually command units suitable to their rank. Having spent many years of their service as troop commanders, they now use their spare time to interfere with the prerogatives of their own troop commanders. The latter, having small organizations, take over the duties of their lieutenants, sergeants and corporals. The young lieutenant, noting the manner in which his captain exercises command, continues the system when he is promoted, and so the vicious circle goes on.*

Sound familiar? . . . It was first printed in the January 1928 *Cavalry Journal*.

Senior commanders listen up!! There is an important responsibility for commanders to "teach" subordinates. In peacetime, this means allowing subordinate commanders opportunities to train and make mistakes.

Why are many junior officers and even some field grade officers in the Field Artillery resigning?

The defense of our country and the

perspective of such future leaders deserve better. THINK ABOUT IT!!

Douglas N. Stinson  
CPT, FA  
Fort Sill, OK

### **A record for variety?**

At the recent reunion of those who served with the 208th FA Battalion in WWII, the discussion turned to the topic of what made our battalion different from (better than) the run-of-the-mill outfit.

We didn't agree on any terribly logical reasons why we were different and why one-fifth of the battalion's strength still shows up biennially for these reunions after thirty-odd years. We did acknowledge that we are a fine bunch of over-aged field artillerymen (including three who made general rank) who like to drink a lot.

We did come up with an interesting thought, that in almost five years of Active Federal Service we may have had a greater diversity of weapons than any other field artillery battalion. Because of this, we did get a reputation for versatility. Of course, some said it could have been that the Army was simply trying to find a weapon we could shoot well.

Nonetheless, I would be interested in hearing from any of your readers who might have been in units involved with a greater variety of weapons than the following:

#### **Organic weapons (1941-1945)**

75-mm gun M1897A4  
75-mm gun M1A3  
155-mm Gun M1918 (GPF)  
155-mm gun M1

Employed as school troops,  
The Artillery School (1943)

105-mm howitzer M1A1  
240-mm howitzer

Used in training in North  
Ireland (1944)

155-mm howitzer M1918 (Schneider)

## Incoming

Assigned (and employed) in combat  
for direct fire (1944-45)

155-mm gun, self-propelled, M12

Captured and fired by a crew from  
Hq Btry (1944-45)

8.8-cm gun

In addition, the battalion's fire direction center controlled the firing of a 90-mm antiaircraft (gun) battalion (for surface firing only) and a 240-mm howitzer battery during certain periods of combat in the ETO.

Any one have a wilder tale to tell about diverse weaponry?

Incidentally, the battalion was inducted into Active Federal Service in March 1941 as the first battalion of the 124th Field Artillery Regiment, part of the 33d Division, Illinois National Guard. In the triangularization process in 1942, it was spun off and became the 208th FA Bn and served in the ETO as part of XV Corps Artillery.

William R. English  
MAJ (Ret), USAR  
Clinton, NY

### **No criticism intended**

Reference the interview with Major General Trefry in the May-June 1977 Journal, in which he states that ". . . the 'R' in ROTC is for Reserve. The ROTC program is designed to provide officers of limited tenure for the Reserve Components . . ."

I suggest that the General would have some difficulty explaining his remarks to those ROTC graduates who traditionally comprise some 60 percent of the Active Army officer corps. I know that those of us on ROTC duty will have some difficulty explaining his remarks to our many career-motivated and highly qualified cadets.

Richard L. Murphy  
CPT, FA  
Army ROTC, MIT  
Cambridge, MA

*No derogation of ROTC graduates was intended. The legislation creating the ROTC program fully recognizes that military instruction is an adjunct to the cadet's civil education and that not all officers commissioned through ROTC will*

*elect to serve to retirement. While attendance at OCS and more militarily oriented schools such as The Citadel, VMI, and West Point imply more obvious intent to remain on active duty, it is also obvious that many of our greatest senior military officers were commissioned through ROTC at totally civilian institutions. —Ed.*

### **Motivation revisited**

A few months ago I was reflecting on some advice that had been given to me by a much respected senior officer. He told me that an officer has a responsibility to the profession of arms to think and write on subjects of general interest to other leaders and within his own area of expertise. Well, since I've spent the past couple of years teaching leadership, I figured it must be about time for me to begin exercising a little of that responsibility.

I took a quick look around and decided to share the kernel of truth that I had discovered concerning motivation. Of course, I would start with Maslow's "Need Hierarchy" (chapter 7, FM 22-100). Then glide smoothly into Herzberg's "Hygiene Factors and Motivator Variables," (chapter 8, FM 22-100). Just to show I had advanced beyond the field manual stage, I would throw in a flowery description of Vroom's "Expectancy Theory" and lace the next paragraph with properly documented ideas from Douglas McGregor. In the event there was still a doubter or two in my audience, I would add industrial applications from Texas Instruments and General Electric to prove that all these great theories work.

Not only did I have all of these ideas, but I actually did it. I wrote all that stuff down and then read the article. There wasn't anything wrong with what I had written, but it really didn't say anything that was new or different. You would still have to take those concepts and translate them into actions that made sense to the soldiers. The thought also occurred to me that anyone who is interested in what behavioral scientists have to say on this subject can go to the local library and pick up a book by any or all of the authors I mentioned. If you don't care much about any of them, don't despair. There are several pages of resource material listed in the back of FM 22-100 and FM 22-101. Exploring those sources will be well

worth the time and effort required.

Why am I still writing? Because I continue to believe that something can be and needs to be done to increase the "want to" of our soldiers. Furthermore, if you're a commander now, you may not have the time to sort out all the ideas that have been expressed by our great thinkers and apply them to what's going on today. Since I've had the opportunity to do a little of that reading, maybe there is an idea or two that I can write down and you can think about. After you think about them for awhile you may even want to try one tomorrow morning.

First of all we have a whole bunch of wisdom in some old Army sayings. Consider for example that, "The Army gives you three hots and a cot." That says that it's OK for a soldier to expect a reasonably well-prepared meal at a more or less predictable time. It also recognizes a need for rest from time to time. If you want to stretch a point you could go into things such as the correct amount of pay on payday, uniforms that fit, understandable policy, supervision, and so on. The point here is that your subordinate is a human being who pulls his trousers on one leg at a time just like you do. He has the same general sort of requirements that you have and in a very real sense depends on you to make sure the system works the way it should for him and for the rest of the folks in your unit. If you can't do that much for him, it seems to follow that he won't be much interested in going out of his way for you.

The second thought I want you to consider might require a little soul-searching. I'm convinced that leaders don't have a lock on all the good ideas. Private Jones and Specialist Smith actually think about what they do, how they do it, and why they do it. There are lots of times that their thoughts should be translated in a change in the way you operate, or at the very least given an honest try. Don't get me wrong; I'm not advocating majority rule in the unit or even a committee decision. The commander has the final say and neither of us would have it any other way. However, here's where the soul-searching comes into the picture. Have you ever wanted to suggest an idea but hesitated? Why did you hesitate even for that second thought? Were you afraid of crossing the old man? Was it because you had heard that Captain Brown had



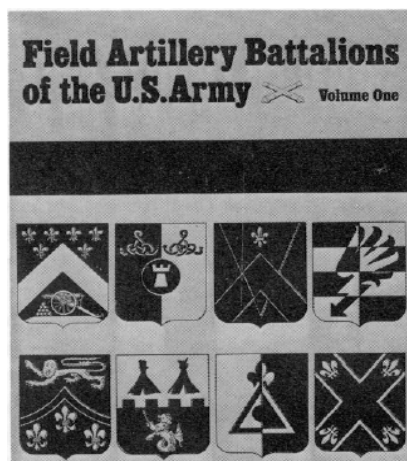
## Incoming

been ridiculed for his suggestion yesterday? Perhaps you just figured you were getting orders soon anyway, and in the long course of human events it wouldn't make any difference. Here's the last question: Are you sure none of the people who work for you have any of those feelings?

I have a serious reason for asking you to look at yourself for a minute. I think it's the real key to "turning on" your soldiers. What you have to do first is take care of the basics. Then listen to what your folks have to say. Listen in the motor pool, the chow line, the supply room, or wherever you are. Then, when someone says something that gives you a good idea, tell him. That's right, go to him and say "Thanks Jones, I'm sure glad you mentioned that. Things are better around here because of your ideas." My guess is that you could end up with a whole unit full of motivated soldiers. Think about it for awhile and then start tomorrow.

Emile A. Robert Jr.  
MAJ, FA  
Assistant Professor, USMA  
West Point, NY

### **New FA reference work available**



It may be of interest to your readers to know that Field Artillery Battalions Of The US Army — Volume I will be available about 1 September. This volume covers the first 400 battalions of Field Artillery which existed between 1939 and 1959. The campaigns and decorations of each battalion are given together with an illustration and description of its insignia. The volume should be of special interest

to those interested in the history and service of the World War II and Korean War Field Artillery battalions.

Inquiries should be directed to the publisher, Centaur Publications, Box 188, Dumfries, VA 22026.

James A. Sawicki  
LT, (Ret)  
Woodbridge, VA

*We have written a review of your book in this issue. Thank you for the word. —Ed.*

### **Favors 155-mm**

I take grave exception to MAJ G. J. Oehring's article, "Which Weapon," in the March-April issue of the Journal. In particular, I disagree with his statement, "Gun-end features are a matter of design and not essential in a discourse on effectiveness," and his failure to address two vital areas, survivability and tactics.

First, let's examine gun-end features, starting with range. If the weapon system cannot reach the target, there will be no terminal effects. Range, therefore, is a critical factor in a DS system. If the zone of fire corresponds, as it does in most cases, to the maneuver unit zone, the 105 system cannot provide fire support throughout the zone of the brigade on the modern battlefield. Massing of fires will be extremely limited and little depth will be added to the battlefield due to wide dispersion of firing units and limited range capability of the 105 system. The 155 system greatly ameliorates all three of these problems.

Regarding survivability, most 105-mm systems are towed, lack crew and ammunition protection, and have longer emplacement/displacement times. Comparatively, towed systems lack the mobility provided by SP 155s. The towed 105 system is inherently more vulnerable than the 155-mm SP systems. The 105's greater emplacement time detracts from providing immediate fire support during the march. Their "hip shoot" reaction time is much longer than the SP 155's. Once located and targeted by enemy counterfire, their displacement time is longer than the 155 SP systems.

Tactics are vital to the successful employment of any FA system. Of course,

the tactical spectrum is very broad, so I shall keep the discussion here to a minimum. The 155 systems, round for round, are far more effective than the 105. For example, the 155 illumination round provides a far greater zone of illumination and virtually doubles the 105 burn time. The 155 smoke rounds are more than twice as effective as the 105 both in length of burn and in thickness of the screen. Mixing smoke and WP for a quick smoke buildup further highlights the advantage of the larger round, since the 155 WP round is almost three times as effective as the 105.

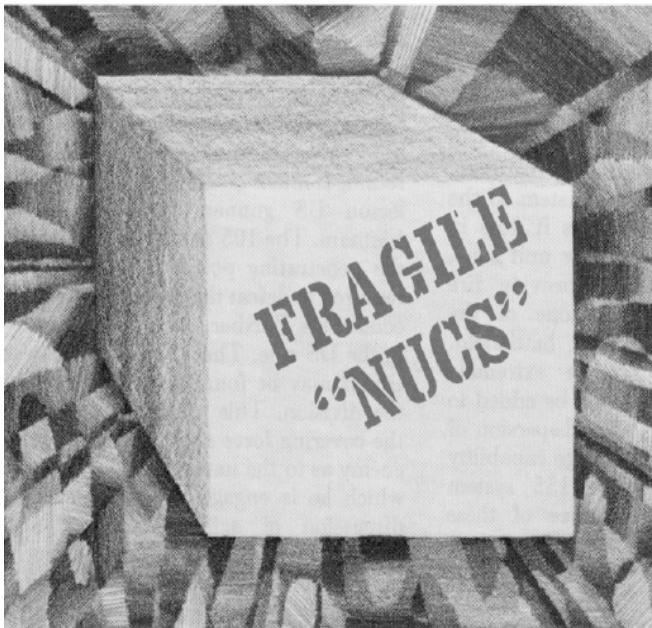
Major Oehring's concept of sustained fire from a static position simply will not cut it in the face of massive enemy counterfire capability. Once we shoot, we must displace to survive.

The ICM round of the 155 provides more than twice the effective coverage of the 105, not to mention that the 155 is nuclear capable, a significant tactical advantage. So, in immediate suppressive fires, the 155 is more effective than the 105. Against enemy armored and mechanized forces, or fighting in the jungle or forest, or against fortifications, the 155's hitting power, round for round, is much greater than the 105's, a lesson US gunners learned well in Vietnam. The 105 simply does not have the penetrating power and blast effect required to defeat the enemy under these conditions. Further, the 105 is used only in the DS role. The 155 may be DS or GS. It may be found in, or external to, the division. This aids, particularly in the covering force area, in deceiving the enemy as to the nature of the force with which he is engaged. Major Oehring's discussion of safe distances doesn't wash. Any good infantryman, cavalryman, or tanker knows that, when the enemy is in close, the artillery must also be in close, and minimum safe distance be damned.

In summary, the days of firing multiple battery volleys from the same position are gone. We must survive, fire fewer rounds for more effect, and support, at all costs, the maneuver arms. To accomplish this mission, the 155 system whips the 105 hands down.

Kenneth J. Mellin  
MAJ, FA  
Wonju, Korea

# *The Nuclear Package*



*Packing it is serious business.*

by CPT Peter M. Ossorio

Nuclear fire planning is too important to be left to the target analysts. Effective tactical employment of nuclear weapons requires timely, informed command guidance and a professional, coordinated staff. This is especially true at corps and division levels, where new doctrine is being translated from theory into reality.

Graduates of nuclear weapons employment classes often retain a distasteful memory of classified tomes, myopia-inducing nomograms, and an arcane process bearing little apparent relationship to conventional operations. Their lingering impression is a mixture of awe and disdain, resulting in a desire to ignore the whole topic of nuclear weapons employment. This reluctant attitude is a barrier to developing a workable process for effective nuclear battlefield support.

Currently, US tactical nuclear doctrine as expressed in FM 100-5 (draft) is based on the concept of mutual restraint. US employment will be kept within "clearly perceivable limits" of time, space, number, and yield. Self-interest will then induce the enemy to avoid any response which might trigger a nuclear free-for-all.

Under the "constrained use" policy, the National Command Authority (NCA) selects an appropriate "flexible response" from among five tactical employment options. Options range from a highly constrained demonstration (limited nuclear option), using only a few weapons, to the theater-wide use of large numbers of weapons subject to relatively few restrictions. The names of the options may change. The important point is that they are intended to provide the National Command Authority with a spectrum of flexible response.

Our nuclear plan rests on corps packages. A "package" is a specific quantity (by type and yield) of nuclear weapons, employed within a given geographic area and delivered during a specific period. The package is the key to planning, requesting, releasing, and employing nuclear weapons in support of any of several employment options. Corps plan the fewest discrete packages necessary to meet all contingencies specified by higher headquarters. (Divisions plan sub-packages, but only as part of the overall corps effort.) If released to the corps by the NCA, the package must produce a dramatic reversal of an otherwise critical tactical situation. A package is analogous to a conventional reserve; it will be requested only when the corps' capability to perform its mission is in serious jeopardy. A package contains a large number of low-yield nuclear weapons, mainly 155-mm and 8-inch cannon projectiles and Lance missile warheads. Corps would fire the weapons in a short, intense "pulse" over a specific time span. Because the exact timing of the pulse critically affects its effectiveness, the NCA allows the corps commander to select the start of the time span. However, the package must be delivered within a closely controlled "time frame" of 12 to 24 hours. Thus, the NCA restrictions on numbers, yields,

area of employment, and time of employment provide the enemy with the "clearly perceivable limits" which are the *sine qua non* of mutual restraint. Lieutenant Colonel Carrington's "Limited Defense Option," Part II, *Field Artillery Journal*, March-April 1977, contains a good discussion of both physical and psychological factors which would influence escalation.

Package planning starts with an unlikely candidate for nuclear fire planning — the Civil Affairs Officer (G5). The G5 section creates a damage preclusion overlay showing all areas which must be protected from nuclear strikes. This overlay is literally the foundation for the techniques of preclusion-oriented analysis. Preclusion policies come from both US and allied civilian authority and reflect humanitarian considerations and the political requirements of coalition warfare. This guidance must be presented to corps and division level planners as practical, statistical criteria, clearly understandable by all concerned. For example, a directive to "minimize damage to urban centers" would be impractically ambiguous. The desired goal could be achieved with a statement such as "provide 90 percent assurance of no more than 5 percent incidence of injury to personnel in the open, no more than 5 percent incidence of moderate damage to single story frame buildings, and preclusion of thermal ignition of newspapers and debris, for all towns over 1,000 population."

Target analysts in the fire support element need the damage preclusion overlay to determine buffer distances large enough to limit the undesirable effects of each nuclear yield size. These collateral damage distances are then applied as contours around preclusion areas. The larger the yield and the less the acceptable collateral damage, the larger the distances required. Civilian authorities should be made aware that demanding exceptionally high assurances of exceptionally low levels of collateral damage may reduce corps packages and flexible response options to unworkable fantasies.

The operations and intelligence sections prepare separate, but complementary, overlays for each contingency envisioned by the commander. The G3's operations overlay shows an assumed line of contact, the disposition of friendly forces, and key portions of the barrier plan. The G2's nuclear-planning threat overlay contains the predicted locations of enemy company-sized units.<sup>1</sup> The two overlays have meaning only in relation to each other; together, they depict the friendly and enemy interaction in a single assumed tactical situation. Before preparing these overlays, the G2 and G3 require detailed command

guidance — there should be no doubts about unit mission, assumed friendly and enemy situations, and the commander's personal approach to the conduct of the operation. The more closely the package planning predicts a future battlefield situation, the more likely it is to be requested and approved. Poorly prepared overlays are never useful.

Creating threat overlays is as much an art as it is a science. Doctrine, terrain analysis, and partial knowledge of the opponent must all be seen *through enemy eyes*. Changing capabilities, on either side, seasonal changes, and even different phases of the moon may generate different enemy situations and require changes in the threat array. This multifarious exercise spells success or failure for the package. After release (assuming approval by the NCA), there will be little time to precisely locate sufficient enemy targets to dramatically affect the tactical situation. Most of the package will be fired at targets predicted in peacetime, partially refined before release, but never really confirmed!

Has target analysis degenerated into some massive nuclear "recon by fire"?<sup>2</sup> Not at all. Whenever the analyst has sufficient time and has accurate information about a target's location, size, and composition, he can select a weapon which will give a high assurance of meeting the commander's guidance for attack. Unfortunately, target-oriented analysis requires a target; therefore it is useless during the planning stages of a corps package. To determine the minimum number of nuclear weapons and the proper mixture of delivery systems and yields to produce the required results, the corps staff employs the techniques of preclusion-oriented analysis.

A preclusion-oriented analysis is relatively quick, stresses knowledge of terrain and enemy tactics, and does not require exact enemy locations. The underlying assumption is that if enough weapons are planned in areas which terrain and enemy doctrine indicate *should* be occupied, a predictable percentage of enemy units *will* be hit. For example, a corps commander may require his staff to plan for the destruction of 80 percent of enemy multiple rocket launchers and 30 percent of enemy first echelon tank companies. Using traditional target-oriented techniques, the corps must *acquire* 100 percent of both types of targets before the analyst could provide assurance of meeting the commander's criteria. Only after the targets had been located could they be analyzed sufficiently to insure destroying the required percentage. A preclusion-oriented analysis is the answer to this type of problem.

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<sup>1</sup> Although the rationale for concentrating on company-sized units (best fit with the characteristics of small yield weapons) is persuasive, planners should be receptive to the commander's targeting priorities (i.e., command posts or single missile/rocket launchers might justify nuclear expenditures).

<sup>2</sup> Vietnam era jargon for firing into areas where the enemy might be and where, if he is there, he poses a threat. Although preclusion oriented analysis need not lead to wasteful, ineffective nuclear weapons employment, its apparent simplicity in comparison to target oriented analysis could lead to overconfidence and unimaginative, rote application.

Peering through the damage preclusion, operations, and threat overlays, the target analysts place colored, radius-of-effects templates over the predicted enemy positions. By covering a sufficient portion of the probable locations, the analysts can be reasonably certain of targeting the required percentage. They start out with the most destructive weapons available, nudging their nuclear tiddlywinks along minimum safe distance (troop safety) and collateral damage contours, and substituting a smaller yield whenever a target is too close to friendly lines or protected areas. The analysts must use a different size template for every combination of weapon yield, weapon effect, and type of target. Therefore, to narrow the scope of the analysis and save considerable time, the commander should clearly specify:

- The weapons effects required.
- The yields and delivery systems to be considered.
- The target categories to be attacked.

This is not the time for a "blood and iron" order to "wipe the creeps out with all available!" The commander may have to compromise between amounts of coverage and rapidity of casualties or between target coverage and collateral damage and risk to friendly forces.

Consider the question of required weapons effects. The layman normally thinks of nuclear weapons in the context of an incandescent ball which burns and blasts and causes immediate casualties. Yet, for weapons below about 70 kilotons, the lethal radius of radiation effects is greater than the radii for blast and thermal casualties. For this reason, current nuclear weapons employment manuals stress radiation effects on personnel. For each yield there are three personnel protection categories (exposed, in open foxholes, and in tanks). There are also three effects tables for each yield and protection category:

- *Immediate permanent incapacitation* (8,000 rads) means that people become unable to perform demanding physical tasks within about five minutes and remain that way until death (1 or 2 days).

- *Immediate transient incapacitation* (3,000 rads) results in incapacitation within five minutes, which lasts for 30 to 45 minutes before partial recovery (but death occurs within 4 to 6 days).

- *Latent lethality* (650 rads) creates partial impairment within two hours, which lasts until death occurs (several weeks).

To a certain extent, weapons effects are interchangeable — they kill the enemy. However, the same one-kiloton weapon which destroys tanks within about 10 percent of a

grid square will cause immediate permanent incapacitation to tank crews over about 40 percent of a grid square, immediate transient incapacitation over 70 percent of the square, and latent lethality over about 1.4 grid squares.<sup>3</sup> Thus, the commander's weapons effects guidance greatly affects the numbers and types of casualties.

In specifying weapons effects criteria, the commander may be making the most important decision of the battle because of the often ignored element of psychological effects. How will people react during the five minutes to several days which it takes them to die? Will enemy troops form fanatical suicide units or will they turn on their leaders and "fraternal allies" who led them to a lingering death? How will the inevitable civilian casualties respond? These questions are highly speculative but very important. Because the outcome may be beyond corps control is no reason to neglect their implications. And, of course, the corps has considerable control over the extent and quality of prehostility training given to US forces. An effective troop information program is as much a part of readiness for nuclear operations as are nuclear surety inspections.

By specifying the yields and delivery systems his staff must consider, the commander can greatly streamline the analysis. According to one unclassified source, there are 26 different versions or yields of US nuclear weapons stockpiled in Europe.<sup>4</sup> Each one requires a different contour for damage preclusion and troop safety. A simplistic order to "plan for all in the inventory" would insure a complicated, error-prone overlay so thick with grease pencil that it would obscure the map beneath it.

A third area requiring specific command guidance is targeting. Setting priorities for attacking various types of targets not only affects the analysts and the intelligence section but also reflects the commander's integrated approach to accomplishing the corps mission. Synergistic, flexible targeting priorities prevent taking things as they pop up on the battlefield or lumber out of the fog of war. Without firm direction, the field artillery concentrates on its demanding counterfire responsibility and slights opportunities for exploiting enemy communications. The "all-source" intelligence center focuses on targets wherever they can be found, regardless of whether they are out of range of most corps weapons. *All* acquisition sources and attack agencies must be guided by, and responsive to, the *commander's* priorities.

An integrated approach to targeting is particularly important in nuclear fire planning. The unavoidable necessity for firing part of the package at merely suspected locations in no way reduces the value of accurate data about

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<sup>3</sup> By taking the probable minimum radius of damage associated with a hypothetical 1 KT weapon and multiplying by itself and then by 3.14 (i.e.,  $\pi r^2$ ) the approximate area of coverage can be computed and then equated to a percentage of a grid square. The less than rigorous computational method is justified by the fact that all data are hypothetical — they serve to make the point that the same weapon can kill over a much greater area, depending on the commander's requirements for rapidity of incapacitation and death (FM 101-31-3).

<sup>4</sup> Op. cit., Carrington.

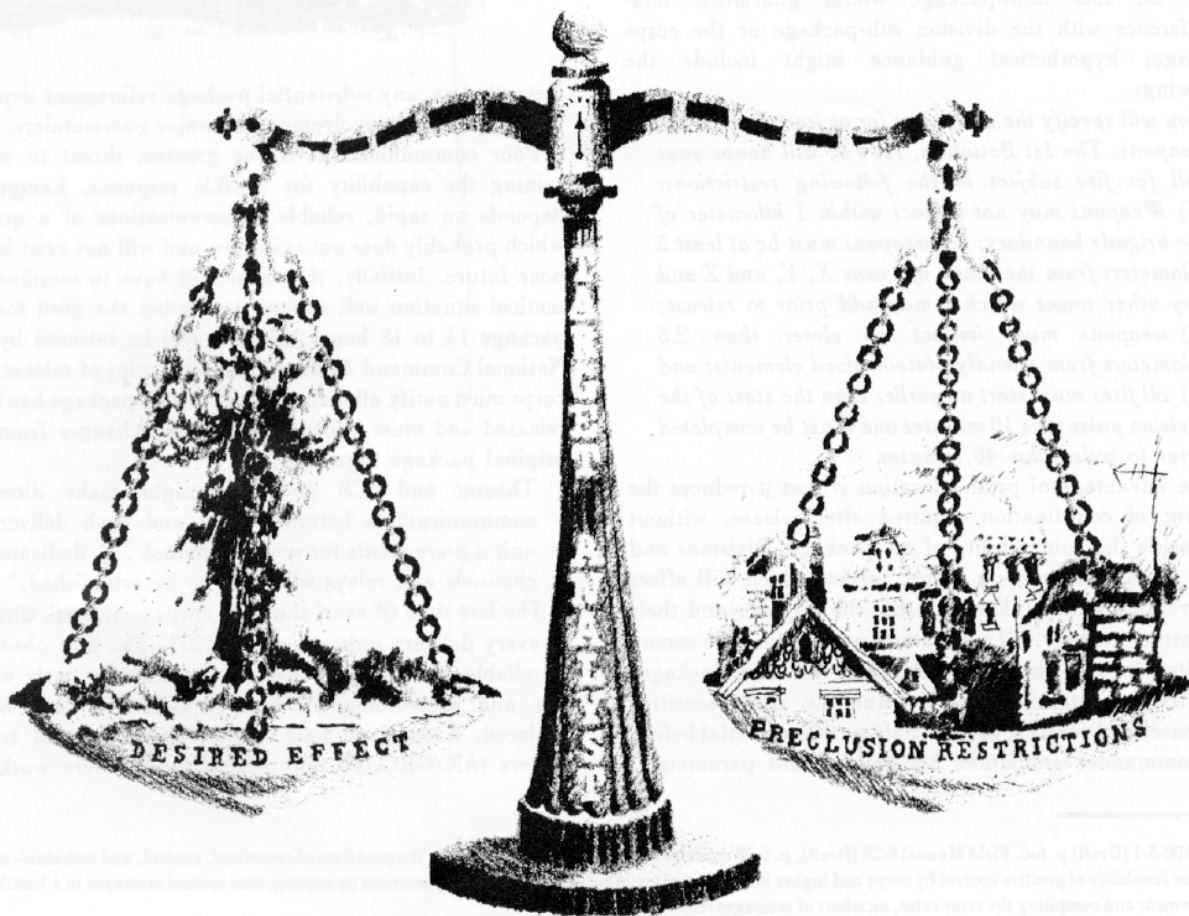
priority targets. In fact, the very need to use the nuclear shotgun of damage preclusion oriented analysis places a premium on those few targets located with sufficient accuracy to apply the rifle technique of target-oriented analysis. For best results, targeting priorities should be few, clearly stated, and widely disseminated. For example, the corps commander might first blind the enemy by attacking reconnaissance elements. Later, indications of chemical or nuclear attack might warrant maximum effort to destroy enemy missiles and rocket launchers. Finally, the commander might decide to cut off fuel and ammunition to the enemy units as they bog down from a lack of chemical and nuclear fire support.

Once the commander issues his guidance, the divisions plan sub-packages; these are sent to corps, supplemented as necessary, and passed to higher headquarters as corps packages. Although a package contains initial aimpoints (i.e., targets) for each weapon type and yield, these data are not fixed target lists. They are subject to constant revision, during exercises and upon receipt of new information. If released to the corps commander, the package will be refined to meet the actual tactical situation. Weapons will be shifted from one division sub-package to another, timing will be adjusted,

conventional fires will be planned to supplement the package, and the aimpoints will be refined. As enemy targets are located, they will be scheduled according to the commander's priorities, and this process will continue until the start of the pulse.

So far, the "constrained use policy" is clear (if debatable in its basic assumptions), and responsibilities for its implementation are well defined. However, as one looks in detail at the nuclear fire support coordination process below corps, the picture becomes murkier. Many of the problems are internal to the divisions and may be attributed to the growing pains that accompany any change in doctrine. Others appear to be basic structural flaws in the flexible response edifice; if left unsolved, the architects of national policy may find that they have built on a foundation of sand. Two of the most important problems are package refinement and communications.

As currently addressed in Army manuals, package refinement not only requires the active participation of the corps and division fire support elements, but anticipates a role for the maneuver brigades, division artilleries, and direct support (155-mm) field artillery battalions. Ideally, this gives flexibility to the commanders closest to the



tactical situation, without affecting the corps commander's centralized control. Divisions and corps will insure that activities in one sector do not interfere with those in another (e.g., scheduling fires to safeguard aircraft and avoid preinitiation). The undesirable side effect of participation by various echelons is the necessity for each headquarters to maintain detailed package information, *including all last minute changes*. Each element must have its own damage preclusion overlays; lists of the types, numbers, and yields of weapons in each sub-package; the pulse starting time; the geographic limits on employment; scheduling constraints; etc. The difficulty of rapidly updating this information, during high intensity combat, borders on the impossible. Yet, the alternative is to concentrate the package refinement process in a handful of highly vulnerable headquarters — a dangerous gamble.

A partial solution to the problem might be prior allocation of a portion of the package. If a division knows that if release is granted a minimum number of types and yields will be included in its sub-package (even though the actual sub-package might contain many more), part of the coordination can be completed before release. For example, a division commander could tell his brigade commander to target at least three 1-kiloton (KT) weapons. The restrictions on this mini-package would guarantee noninterference with the division sub-package or the corps package; hypothetical guidance might include the following:

*You will specify the aimpoints for at least three 1-KT weapons. The 1st Battalion, 1st FA, will honor your call for fire subject to the following restrictions: (1) Weapons may not impact within 1 kilometer of the brigade boundary; (2) weapons must be at least 2 kilometers from the limits of towns X, Y, and Z and any other towns which I may add prior to release; (3) weapons must impact no closer than 2.5 kilometers from friendly platoon-sized elements; and (4) all fires must start no earlier than the start of the division pulse plus 10 minutes and must be completed prior to pulse plus 40 minutes.*

The advantage of prior allocation is that it reduces the amount of coordination required after release, without increasing the vulnerability of the package. Divisions and corps can concentrate on deeper targets which will affect the overall operation, knowing that the brigades and their supporting artillery will concentrate on stopping the enemy frontline forces. The exact guidelines for mini-packages may require extensive technical analysis, using sensitive references and sources; careful staff work is essential before the commander announces his policies and parameters.



Nevertheless, any substantial package refinement depends on the personal involvement of major commanders.

Poor communications is the greatest threat to maintaining the capability for flexible response. Everything depends on rapid, reliable communications of a quality which probably does not exist now and will not exist in the near future. Initially, the corps will have to monitor the tactical situation well enough to predict the need for the package 14 to 18 hours before it will be released by the National Command Authority. Upon receipt of release, the corps must notify all delivery units which package has been released and must inform them of any changes from the original package requested.

Theater and JCS directives might make direct communications between corps and each delivery unit a *prerequisite* for weapons launch . . . dedicated channels and relays will need to be established.<sup>5</sup>

The last time (if ever) that any corps could talk directly to every delivery unit was about 1971. The now obsolete, unreliable, vacuum tube AM receiver used for early warning and meteorological data (AN/GRR-5) was never replaced. Even if all field artillery battalion AM transceivers (AN/GRC-106 and AN/GRC-142) were working,

<sup>5</sup> FM 100-5-1 (Draft) p. 6-6. Field Manual 6-20 (Draft), p. 6-38 contains a more realistic discussion of the problems of command, control, and communications. The true feasibility of positive control by corps and higher headquarters could be established during exercises by sending time critical messages in a hostile EW environment and compiling the error rates, numbers of messages received late, etc.

were properly operated, and remained unjammed, there would be no direct communications down to firing battery level in the 155-mm howitzer units — corps has no way of talking directly to the batteries which contain 54 out of the 66 nuclear-capable howitzers in each division. Additionally, the enemy can be expected to make a special effort to locate, jam, deceive, or destroy stations sending or receiving nuclear release and nuclear fire missions.

An additional threat to corps communications is the phenomenon associated with nuclear detonations known as electro-magnetic pulse (EMP), which can deliver a billion times the power necessary for operation of a radio receiver. It is not difficult to perceive the detrimental effect this could have on the equipment. Although the exact effects associated with US nuclear weapons remain classified, EMP may well extend beyond the lethal radii of the weapons. Therefore, essential radios may be damaged not only by near misses of enemy weapons, but also by the firing of our own corps package, particularly the radios of frontline units. Radios can be partially protected from EMP by disconnecting antennas, dismounting, and shielding the radios in armored vehicles. However, these measures are not realistic options at division and below. Radios are too scarce to permit protecting any substantial portion; they are fully committed to tasks essential to nonnuclear operations. Until more radios, hardened against EMP, arrive in divisional units, admonitions to disconnect antennas during combat will be as realistic as directives to move without

fuel or to attack without ammunition. The specific need is for a radio receiver cheap enough to place with every company, troop, and battery and reliable enough to provide a reasonable expectation of receiving transmissions from division and corps.

Effective nuclear fire planning requires looking into a chaotic future and determining the best way to manage catastrophe. The natural aversion to this kind of thinking is reflected in the air of unreality and magical allusions which creep into the target analyst's jargon. "Growing mushrooms" emerges as a safely abstract euphemism for massive killing. "Silver bullets" are no longer antiseptic means for slaying a mythical, half-human menace; the enemy is very real and very human. While politicians and philosophers establish policy and discuss morality, commanders and their staffs adjust to the practical consequences of abstract doctrine. Success at corps and division levels will require clear guidance and a team effort. Nuclear fire planning is too important to be left to the target analysts! ☒

**CPT Peter M. Ossorio is Motor Officer, 3d Battalion, 17th *Field Artillery*. When the article was written, he was assigned to HHB, 1st Infantry Division Artillery, as an assistant fire support coordinator in the fire support element.**

## ATTENTION

### Combat Experienced Field Artillerymen

Researchers at the Field Artillery School are trying to define how the fire support officer should be trained to succeed in combat. If you were a Field Artillery liaison/fire support officer or noncommissioned officer for a direct support battalion in combat anywhere in the world since 1940 we need your help. A questionnaire is being prepared to find out how you were trained, what you did, what you learned, and what you would change. Persons who contribute data (and who so indicate) will be named in the research report.

If you are willing to participate, please send your name and address to:

Commandant  
US Army Field Artillery School  
ATTN: ATSF-TD-TS  
Fort Sill, OK 73503

## Artillery supremacy skittishly substantiated



**Flower power fails as the infantry's representative tries to fight bullets with flowers.**

In rumbles "Captain Crunch" in his tank, saying that he would like to help but he's stranded until spare parts can be found in his box of "Crunch Berries."

Next on the scene is the Air Force, represented by "MAJ O. R. Yonder." Yonder's problem is that he stayed too long at the club the night before and his hangover presents him from flying into action where people would be shooting back with live bullets.

Finally the RTO gets smart and calls in the artillery. A forward observer rides up in a custom jeep, escorted by two beautiful assistants.

FORT LEWIS, WA — Field Artillery is making a hit in more ways than one for ROTC cadets training here.

In fact, artillery familiarization has become a laughing matter since instructors from Battery B, 2d Battalion, 4th Field Artillery, arranged a skit to demonstrate artillery might.

The skit is designed to help break the ice for the cadets who receive 1-1/2 days of artillery instruction. It opens with a radiotelephone operator (RTO) pinned down by enemy fire.

When the RTO calls in the infantry, the "Queen of Battle," out pops a limp-wristed "LT

While the forward observer checks his coordinates, the cadets check those of his assistants. The FO calls for fire and a round screams over the horizon, wiping out the target, and making observation post 8 and the RTO safe for democracy.



**Saving the day with the help of one of his pretty assistants is the artillery's forward observer, LT Charley B. Attery.**





**Armor is stymied as Captain Crunch, the armor man, can't crank up a tank because his search for spare parts in a box of "Crunch Berries" does not produce much.**

The skit ends there but artillery training for the cadets does not. They received familiarization training on all aspects of artillery including fire direction, hasty and deliberate occupations, and firing the guns.



**ROTC cadets react to a scene from the 2-4 FA skit about artillery might.**



**MSG Stanley Brown, 101st Airborne Division Artillery career counselor, accepts the trophy from MG John A. Wickham Jr. for Div Arty for being the top brigade-size unit in reenlistment for 3d quarter, FY77. In a subsequent ceremony, MSG Brown was presented the 2d Oak Leaf Cluster to the Army Commendation Medal for meritorious service as Div Arty career counselor. (Photo by PFC Tyrone Lester.)**

## **1,029 percent!**

FORT CAMPBELL, KY — The 101st Airborne Division Artillery has a unique way of meeting personnel shortages — they reenlist as many people as possible. To accomplish this, unit reenlistment NCOs have been attaining well over 100 percent of reenlistment objectives with the top battery award going to SSG Glen Riggs of Battery A, 1st Battalion, 321st FA, for reenlisting 1,029.41 percent of his objective.

Top battalion quarterly honors went to SSG Raymond Straatman, reenlistment NCO of the 2d Battalion, 320th FA, for attaining 208.33 percent of the objective. Div Arty attained 149.58 percent of its 3d quarter, FY 77 goal and received its fourth monthly award as the best brigade-size unit for June reenlistments.

## **8-inch on station**

CAMP ESSAYONS, KOREA — On 22 July the men of D Battery, 6th Battalion, 37th Field Artillery, commanded by CPT Kirby Walls gained the distinction of being the first deployed US unit to be equipped with the M110A1 howitzer. The event was climaxed by test firing the new system at Wightman Range, ROK on 26 July with Colonel James E. Drummond, 2d Infantry Divarty Commander pulling the lanyard that sent the first round downrange.

# Who's who people on Pacific artillery tours



## Great company on a cold OP . . .

**CAMP PAGE, KOREA** — Then reigning Miss America, Dorothy K. Benham of Minnesota, peers at North Korean positions through a battery commander's scope during a recent visit of the Miss America 1977 USO tour show to artillery units in Korea. After visiting Korea, Benham and six members of her court went to Okinawa, the Philippines, and Guam to complete their 3 1/2-week Asian tour. (Photo by SSgt Carl Schweibinz, courtesy of Army Times)



**SCHOFIELD BARRACKS, HI** — Secretary of the Army, Clifford L. Alexander Jr., prepares to load a 105-mm artillery round during a stop at A Battery, 3d Battalion, 13th Field Artillery. The secretary — himself a former artilleryman — recently visited most major training activities of the 25th Infantry Division in Hawaii.

## Air operations keep B Battery busy

**FORT ORD, CA**—Men and equipment of B Battery, 1st Battalion, 79th Field Artillery, recently loaded aboard two Air Force C-130s to fly from Fort Ord to Fort Irwin, CA as part of an emergency deployment readiness exercise.

B Battery's flight marked the first airlift of a 7th Infantry Division unit since the division's reactivation. The remainder of the battalion made the trip by road to Fort Irwin where they supported the 2d Armored Division during a month-long FORSCOM armored task force training exercise.

The desert climate of Fort Irwin tested the abilities of the artillery unit's men and machines to function effectively under harsh temperature extremes. Navigation and concealment problems on the Fort's open terrain also challenged the artillerymen.

In another exercise, B Battery took part in its first air assault raid when it was airlifted by helicopter to a firing point at Camp Roberts. They set up the firing point for their M101A1 howitzer, which arrived five minutes later, and fired 30 rounds of ammunition at four pre-planned targets.

The mission was completed in less than 20 minutes and the troops returned to Fort Ord in a CH-47 from the 49th Aviation Company, California Army National Guard, which also took part in the exercise.

*The Journal interviews . . .*

# GEN Donn Starry

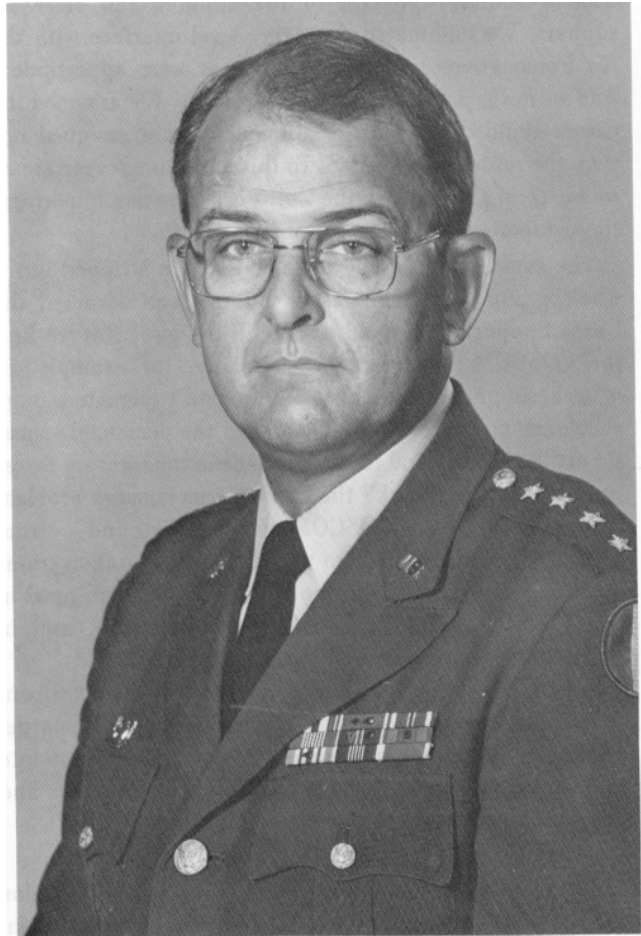
**Journal:** Sir, what is the initial top priority item for TRADOC which will impact on the field?

**Starry:** We are not going to take off on any tangent from what's already been started by General Deputy. Having been a center commander and school commandant at the beginning of TRADOC, I was a party to almost everything that's going on now. We're on the right course. Having just come from command of a corps, I think the most serious problem we face is getting the work we've done in Soldier's Manuals, ARTEPs, and training aids and devices of all sorts out to the field. There just aren't enough of those camouflage-covered field manuals [how-to-fight series] out there. There are a lot of dog-eared "drafts," but we need the manuals where the soldier can get his hands on them. I'm not being critical of anyone — it just takes a long time for all the material to percolate down to the last man — and we're going to speed up that process. I've already changed some printing and production schedules to get the critical manuals and devices to the field sooner.

We've got to focus our resources on the high payoff items. The fastest growing enterprise we've got going is training developments; it's a fairly new field, but one we should have opened up long ago. It is reflected in Soldier's Manuals, ARTEPs, and other devices, mechanisms, and concepts which seek new ways to train with less expenditure of time and other resources. Taken together, these developments are exciting and offer the chance for significant gains in effectiveness and efficiency.

Another area that needs emphasis is the training ability of our leaders. For many years, we have assumed that all officers and NCOs were "trainers" when they came on active duty. And, if you look at our formal officer and NCO training programs, we haven't done much to train trainers for the difficult job of programming and conducting training. We've got to do better. We have an equipment intensive Army — we're not an Army of cannoners — of riflemen, anymore. We're a sophisticated Army with a lot of complex equipment, and we can't afford to let something as important as individual and collective training in the use of that equipment go on the assumption that all of us can train people.

**Journal:** I want to come back to training in a moment, but first I'd like to ask what you see as the greatest doctrinal problem facing the Army. Is it Corps doctrine?



**GEN Donn Starry assumed command of the US Army Training and Doctrine Command in July 1977. He is responsible for developing the doctrine and training to support the Army's mission and force structure. Prior to assuming command of TRADOC, General Starry was Commander, V Corps in Germany. He has also commanded the Armor Center at Fort Knox, KY, and the 11th Armored Cavalry Regiment in Vietnam. During his initial visit to Fort Sill, General Starry granted the following interview.**

**Starry:** There is no doubt we have major areas of concern there but I'm not sure it's the greatest problem. When we studied echelons above Corps several years back, we lopped off much of the layering above corps. This was done under pressure to reduce the number of people in headquarters. The problem was, we did not address the *doctrinal* issues — it was a *manpower* and *structural* action. We cut spaces, but we never went back to address doctrine and functions. This is acutely apparent in fire support and close air support. We eliminated the Army level interface with the Air Force where air support resources were apportioned. And we never put anything in to replace it. We assumed the Corps would do it, but the mission was not assigned nor were the resources provided. In this and many other areas, we are trying to improve the Corps organization to perform those functions.

The same thing is true in logistics. We stripped out a whole group of logistic responsibilities and assumed the Corps Support Command would fill the gap. But we find the COSCOM is very lean, especially, for example, in general support maintenance. We mustn't recreate a huge echelonment above Corps — we need the personnel spaces for artillery, mech and tank battalions in the fighting force. But we've got to "work" the whole Corps logistics problem through — to lay the COSCOM out on the ground — from the Corps' rear boundary to the maneuver battalion trains area, and look carefully to see if it is properly equipped in transportation, command and control, security, and in some cases even the necessary tools to do the job.

We've got to improve the Corps intelligence consolidation capability. All the external surveillance, target acquisition, and intelligence agencies pour information into the Corps, and we do not yet have the assimilation and processing system to make it all come together.

**Journal:** The following areas are a few you saw in operation as a Corps commander and are now in a position to influence as TRADOC Commander —

Do you think the basic and advanced course graduates are prepared to perform their duties?

**Starry:** First the basic course graduate: I think he is as well trained as we can make him in the time we have allocated. If we are to improve his ability, we've either got to increase the time we've got him in the school system, or we must teach him more in pre-commissioning training. The question is, what can we do in ROTC and OCS to, say bring him up to skill level 3 in his branch's core MOS Soldier's Manual, so we don't have to spend basic course time teaching these skills. We could go on from there — from level 3 — and in the same amount of time, turn out a better product. There is a Department of Army study group examining the entire officer education system, and their report will be very important to us.

The advanced course is a very difficult problem, and it always has been. I've looked at other nations' company level officer training and we all have similar problems. If you wait to the six-year service point, you will have a lot of people coming to learn to command a battery who have *already* commanded. One answer is bring them back after four or five years' service. Another is to send the officer to school immediately prior to his assuming command, whatever his time in service. This would require branch career courses on both coasts, in Europe and in the Pacific. I don't like that, but it is an alternative. I think there is a better way, but this is a persistent problem that will last at least through my service and, probably, yours.

**Journal:** The CABL (Consolidation of Administration at Battalion Level), with consolidated personnel, maintenance, and supply, is raising questions as to its practicality for field units. Now training consolidation is being evaluated. Would you comment on CABL?

**Starry:** The PAC (Personnel/Administrative Center) is nothing but a re-creation of the old battalion personnel section, though some would have you believe the wheel had just been invented. The big problem is we don't have the Personnel Warrant Officer the old system had and we are even having trouble getting authorization for a senior NCO to control the PAC. The PAC has new responsibilities because, under the old system, we also had battery clerks. One major problem is that the "paper" keeps flowing into the orderly room, but there is no clerk to handle it. We have to force the lieutenant colonel, the colonel, and the general — the generals are the worst of all — from feeling they must communicate directly with the captain battery commander.

Some of my sergeant major friends tell me that many first sergeants *say* that PAC is forcing them back into the orderly room, when the fact is, these first sergeants find they can't train troops and return to the orderly room as a safe haven. We've got to get the NCOs, from first-line supervisors to sergeants major, back to training our troops. One of the great strengths of our Army is its NCO corps and one of the great strengths of our NCO corps is its ability to train soldiers.

The PAC will work. I'm going to try to see that they have authorizations for the right amount of people, the proper supervision, and the necessary equipment. On stopping the paper flow to the orderly room, it's going to be a long, hard education process.

Maintenance is different. It won't work in every case, especially in mechanized and self-propelled artillery units. I really believe this. Maybe in smaller units, if we go that way after the Division Restructure Study, but the company/battery commander must have control of some maintenance personnel. In light infantry, airborne, and

TDA units, it should work and might result in significant savings and increased efficiency. The consolidation of PLL and ASL offers tremendous opportunities for savings. We will have to establish some different rules for different units, rather than a blanket policy such as with PAC.

Training Management, in my mind, has *always* been centralized at battalion — that's where it has to be. That's why the battalion has an S3 section. I'm talking about the *programming* of training — deciding *what* is to be done. The battalion commander decides he wants everyone trained to a certain level in a certain skill, and he *programs* certain resources to meet that requirement. The battery commander then decides "how" to conduct the training. Are we going to do it in the motor pool? Will we move down the road to the 14.5 range? Will we go to the field for full scale, live fire FTX? That's the battery commander's responsibility. If we need to beef up the S3 — and I think we do — then let's do it. But let's not make a big thing of centralized training. We've got to discipline ourselves to do it right — the way it was intended to be done all along.

Consolidated mess, like maintenance, is severely facilities-dependent. I am a firm believer in battery level mess because its a great morale builder. But we live in a world where we can't afford that luxury; so, where possible, messes should be centralized. In the field, we need to explore new feeding systems that do not require a mess section with each battery. Crew feeding, for example, requires the proper packaging and it may require a new type of ration. Where permissible, as in Vietnam, we can cook centrally and distribute by helicopter.

Centralized supply works in some cases and not in others. In heavy units, it may not be a good idea as was the case in maintenance, but again it works well for light or TDA units, if you have the space. Supply, mess, and maintenance centralization will have to be applied selectively.

**Journal:** Training simulators — especially major weapons firing simulators — are promoted as major money savers. Is the savings balanced by the loss in realism?

**Starry:** There is no question that some training benefit accrues from those training devices. We don't know how much of that transfers to the real performance when you add smoke, heat, noise, and shock, and we can't describe the relative portions quantitatively. We need to do that.

There is something I call the "main gun syndrome" and those affected say "I have to fire X main gun rounds." It's invalid. A whole lot of practice, a lot of dry firing, and some subcaliber firing is transferrable to the real thing and you don't have to fire full caliber all the time, even though it's more fun.

**Journal:** Do we need a skill qualification test or MOS test for officers?

**Starry:** Officers should be proficient in the skills of the unit they command. In a tank unit, the platoon leader is a tank commander, as are the company and battalion commanders. The officer should be trained to be able to pass the same test his soldiers must pass — in fact, his test should be harder. In my mind, it's part of the leadership equation that the officer should take great pride in being able to do those things better than anyone in his outfit. That's his first business — that's why he is an officer. That's why he's a leader.

Does that mean SQTs for officers? Yes, I think it does.

**Journal:** In recent presentations on the status and plans for the defense of the V Corps sector, your assessments have been far more positive than those of Lieutenant General Hollingsworth in his study of USAREUR (*FA Journal*, January-February 1977). Why the difference?

**Starry:** We are short a lot of things — ammunition, artillery pieces — you could make a long list, some of which we have always been short of in Europe as far back as my first tour in the 1950s. We need to take action to redress some of those shortcomings and we are. We've increased ammunition stocks and we're adding more fire support. Brigades 75 and 76 and other changes have markedly improved the force structure.

On the other hand, there are many things the local commander in Europe can do without asking DA for more divisions. For instance, one big problem is getting from peacetime locations to combat positions in time to meet the threat within the enemy's attack capability. A major time factor is that required to upload our ammo. There are pros and cons, and problems to be solved, but we are going back to keeping ammo uploaded. We did it in V Corps and the resulting time saving will allow us to meet the enemy within his attack capability.

We also solved some command and control delays resulting from restraints built up over the years. When I arrived in the Corps, it would take me up to eight hours to find out what was happening on the border. Just before I left V Corps, we had developed the capability to provide critical information direct to the Corps Commander within minutes.

The point is, you can do a lot internally to help yourself. So I don't disagree with General Hollingsworth's assessment of what we need in the long term. I do believe everyone of us is obliged to pull up his own socks first and keep them pulled up in the short term.

**Journal:** Thank you



# Fire Direction!

by MAJ Ralph E. Johnson

## *Centralized tactical fire direction? Decentralized technical fire direction?*

Centralized tactical fire direction (CTFD) and decentralized technical fire direction (DTFD) are terms appearing in current Field Artillery doctrine. What do these terms mean? How can this concept be accomplished? Does it hamper our ability to train effectively as a unit? Will technical expertise in battalion fire direction centers (FDC) be lost? You can rest assured that the concept does not detract from but rather *enhances* our fire direction system and increases our responsiveness to maneuver.

### **Battalion FDC**

Centralized tactical fire direction means nothing more than the tactical control of fires. It is called centralized because this role is assigned to a battalion FDC — in particular, the battalion fire direction officer (FDO). The significance of this concept is that the battalion directly controls the field artillery's most effective means of employment — mass fires. Controlling mass fires alone does not fully explain "tactical control" because another function of the battalion FDO is to make decisions on shell/fuze combinations and volume of fire for each mission. This could be accomplished easily if all fire missions were sent directly to the battalion FDC. However, since the majority of fire missions are sent directly to the battery FDCs, a problem develops for the battalion FDO. Current doctrine allows the forward observer (FO) or fire support team (FIST) to send missions to either the battery FDC or, if the nature of the target warrants, directly to the battalion FDC. If the request for fire is sent directly to battalion, the battalion FDO makes a tactical decision regarding mass fires, shell/fuze combination, and volume of fire. Once this is decided, the information will be disseminated to the batteries. (Decision-making and data dissemination will be discussed later.)

The next function of the battalion FDC in this centralized mode is to control data input. When fire direction was completely manual, this function was not really that difficult. This usually amounted to exchanging known data, such as battery information, observer information, target data, and current GFT settings. Now, with a FADAC/-manual integrated FDC, this function becomes more complex.

The third major role of the battalion FDC is that of backup technical fire direction for the batteries. The key word here is "backup," *not* a check of the battery FDCs. Should a battery FDC become overloaded or nonoperational because of displacement or casualties, the battalion FDC could assume that battery's technical fire direction mission until the battery FDC is back in operation. The main point is that the battalion FDC should become involved in technical fire direction only for extremely limited periods. The mission of tactical fire control is paramount for the battalion FDC and, if it becomes involved in technical fire direction for long periods of time, tactical control could suffer and effectiveness would be lost. The CTFD system works well since it allows the battalion FDO to make sound tactical decisions and guide the less experienced battery FDOs through a battle.

### **The Battery role**

The DTFD concept basically means that technical fire direction — the computation of firing data — should be accomplished at the battery level to make the system most responsive to the needs of maneuver. The majority of fire missions will be sent directly to the battery FDCs, and firing data will not be slowed by relays from battalion to the battery to the guns. This places a major burden on the batteries to insure that their FDC personnel are well-trained. The proper evaluation of battery fire direction skills by battalion is extremely important to assure the commander that the battery FDC is fully capable of operating in a decentralized mode. Otherwise, a system of checks could creep back into the system, decreasing responsiveness.

One aspect of this system that is greatly misunderstood is: How does battalion enter the picture with tactical decisions and does this slow the responsiveness? A battalion decision to mass fires or the decision by the battalion FDO to change the battery FDO's fire order does not in any way slow the computation of firing data for the initial round. In most cases, when operating in a fully decentralized mode, the battalion FDO does not know how the target is going to be attacked until he hears the message to the observer. Then, if he remains silent, he approves the battery FDO's plan of attack; if he does not approve, he overrides the battery fire order by issuing one from battalion. The adjustment procedure or the computation of firing data will not be interrupted.

### The package

Let's now tie the whole system together by following a sample sequence of events from occupation of position through types of fire missions, especially the control of mass fires.

Prior to any operation, the commander and the S3 should give the battalion FDO guidance for the attack of certain type targets, controlled supply rate, conduct of registrations, and other information that affects firing.

As the battery FDCs occupy their positions and begin to set up, one of the first things the battery FDO should do is to formulate his SOPs for fire orders and fire commands and immediately pass them to battalion. The battalion FDO checks standards and makes changes — usually only necessary changes that affect mass fires — in accordance with guidance from the battalion commander or the S3. Battery locations and ranges within their zones of responsibility will definitely dictate which standard charge a unit selects. Therefore, two batteries may be firing charge 5 as a standard while one battery fires charge 4 (figure 1). The battalion FDC posts the battery standards after all conflicts have been resolved.

### Control in operation

A fire-for-effect (FFE) mission has been sent directly to battalion and the battalion FDO decides to mass the battalion.

FIRE ORDER STANDARDS	
ELEMENT	CURRENT STANDARD
UNIT TO FIRE	BTRY
ADJUSTING ELEMENT/ METHOD OF FIRE OF ADJUSTING ELEMENT	#3①
BASIS FOR CORRECTION	FASTEST METHOD
DISTRIBUTION	PARALLEL
PROJECTILE	HE
AMMUNITION LOT AND CHARGE	XY 3 <sup>rd</sup> 4
FUZE	Q
NUMBER OF ROUNDS	①
RANGE SPREAD, LATERAL SPREAD, ZONE FIRE, OR SWEEP FIRE	CENTER RANGE ± DF
TIME OF OPENING FIRE	WHEN READY

FIRE COMMAND STANDARDS	
ELEMENT	STANDARD ELEMENTS BY CURRENT SOP
WARNING ORDER	
PIECES TO FOLLOW/PIECES TO FIRE/METHOD OF FIRE	#3①
SPECIAL INSTRUCTIONS	
PROJECTILE	HE
AMMUNITION LOT	XY
CHARGE	
FUZE/FUZE SETTING	Q
DIRECTION	
QUADRANT ELEVATION	
METHOD OF FFE	

Figure 1. Standards.

To control this mission, he has three options: to fire the mission "when ready," "at my command," or "time on target (TOT)." He will use "when ready" when the element of surprise is not a factor and the target cannot react in time to change its posture significantly, or the element of surprise has been lost. "At my command" is used to fire all batteries simultaneously. Some surprise may be lost if times of flight vary significantly, but this can be highly effective when times of flight are similar. TOT is desired when all rounds are to impact simultaneously achieving the greatest amount of surprise.

The three methods of conducting TOTs are:

- A specific time — TOT 0915 . . . TIME IS NOW . . . 0908.
- So many minutes before it is to occur — TOT IS SIX MINUTES FROM . . . NOW.
- Short countdown TOT — Each battery reports "ready" and time of flight. The battalion FDO adds 10 to 15 seconds to the longest time of flight and gives a time hack — TOT IS 55 SECONDS FROM . . . NOW.

The short countdown TOT procedure is the preferred technique.

Now that the battalion FDO has decided to mass the battalion and has selected his method of control, he can issue a fire order. His fire order might be FFE, BATTALION, ICM TWO ROUNDS, TOT. The battery computers at battalion will disseminate this information to the batteries via a modified fire order — modified because it contains the target location and altitude in the fire order; e.g., FFE, BATTALION, GRID 614328 ALTITUDE 386, ICM, TWO ROUNDS, TOT. The batteries will compute their own firing data and report "ready" and times of flight. The battalion FDO would issue his time hack. The same basic procedure would be followed if this mission were sent to a battery instead of a battalion, whether the battalion FDO stepped in to mass the battalion or the battery FDO called battalion to request additional fires. In this case, the battery that received the mission would only receive the fire order, FFE, BATTALION, ICM, TWO ROUNDS, TOT, because they already have the target location. The other batteries would receive the modified fire order. The procedure would basically be the same for a polar plot or shift mission as for the grid mission described.

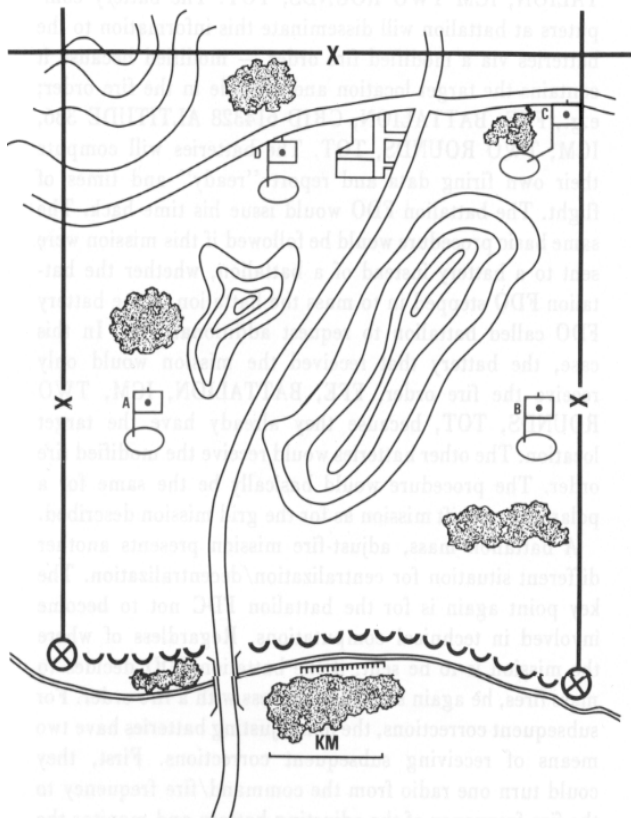
A battalion mass, adjust-fire mission presents another different situation for centralization/decentralization. The key point again is for the battalion FDC not to become involved in technical computations. Regardless of where the mission is to be sent, if the battalion FDO decides to mass fires, he again starts the process with a fire order. For subsequent corrections, the nonadjusting batteries have two means of receiving subsequent corrections. First, they could turn one radio from the command/fire frequency to the fire frequency of the adjusting battery and monitor the

(continued on page 24)

# Survivable, Affordable, and Lonely

## A proposed design for the Field Artillery force of the 1990s.

by LTC William W. Breen



Four-battery, direct support battalion deployed in terrain positions (400 by 200 meters).

The Field Artillery Community will soon begin taking serious steps toward the development and procurement of replacements for the M109 and M110 howitzer families. This is certain to be controversial because every field artilleryman has passionate opinions on the characteristics of the weapons that are his primary reason for being. Unfortunately, the combat developers will never satisfy everyone in their final selection, and compromises, at these prices, would be unacceptable. It is important, obviously, that the discussion of the new weapons begin not with someone's favorite recoil system, caliber, chassis, or other component, but with a *concept of operation* of the field artillery force that will guarantee fire support in the environment in which any new weapon will operate. With this in mind, this article proposes a method of employment that emphasizes the survivability and affordability of the future artillery force. Most of what follows argues a *general* concept with its advantages and inherent challenges; however, the temptation to design the howitzer of the 1990s is not entirely avoided.

### The threat

Every professional field artilleryman is frightfully aware of the counterfire odds in Europe. Our quantitative shortcomings have been documented repeatedly. Add to this the recent introduction of self-propelled, crew-protected Soviet howitzers, and the survivability of a friendly artillery force is not assured by any means. The Warsaw Pact forces will assign the highest priorities to finding NATO fire units and will expend enormous amounts of ammunition to insure their destruction. Simply stated, the hypothesis presented in this article is that the survivability of the friendly field artillery capability can best be assured by having no fire *units* for the enemy to destroy.

### The proposition

The United States and other NATO countries now have, or will develop within the next 10 years, all the technology necessary to conduct effective fire support from individual weapons emplaced on an almost random basis throughout the division or corps zone. As shown in figure 1, each section would be located as if it were a separate entity; there would be no battery positions as such. The battery operations center (BOC) would collocate with the base piece if there is still a reason for such a relationship in that time frame. No two weapons would be so located as to constitute a single counterfire target; yet the whole array of weapons would be capable of massing and responding as if it were deployed by units. For convenience, call this a randomly distributed artillery force (RDAF). (This acronym is offered for convenience and brevity and because no concept would be complete without one.) To further confuse enemy counterfire, an advanced fire control system would be able to select two howitzers from one unit, three from another,



and one from a third in tailoring a particular fire mission. Mixing weapons in this way would enhance deception and might be necessary due to range, masking, ammo distribution, or other considerations. The enemy would be faced with an ever-changing grid of "shooters," each a small point target of little counterfire value. If an enemy unit were to fire against one of the single weapon positions, he could be exposing a complete fire *unit* to our counterfire. It seems reasonable, therefore, that firing on the RDAF would be a losing proposition and not undertaken at all. (The howitzer sections remain *assigned* to their batteries for command and control, administration, etc. RDAF is a tactical arrangement only, to be used in an active counterfire environment.)

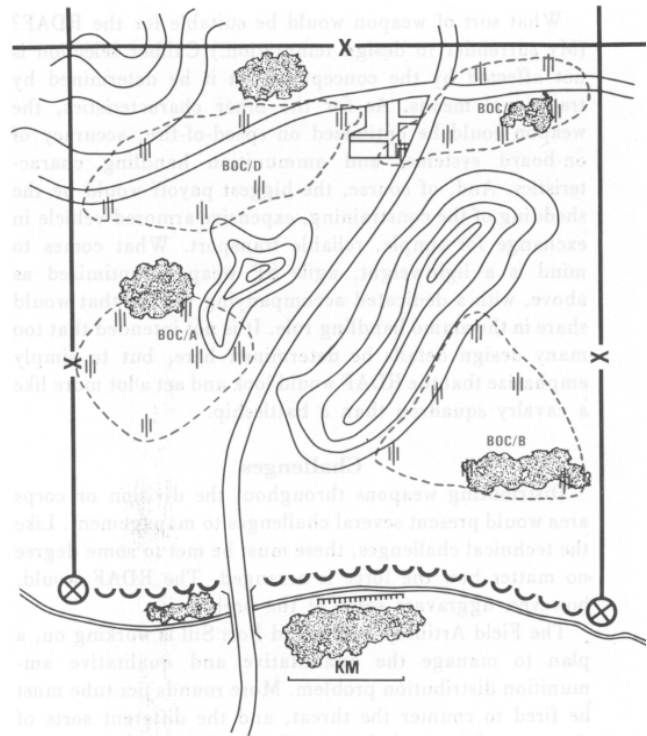
### Technical feasibility

The technical requirements to develop the RDAF concept are already recognized, albeit for different uses. The RDAF weapon must be able to locate and orient itself and transmit digital data on its status to a battery computer system. It must be capable of receiving, primarily by radio, digital gun display data, fuze settings, and other commands. The command and control system must be capable of accounting for great dispersion in developing fire commands for its associated weapons and should be able to custom-design fire missions based on weapon/ammunition locations. Finally, a communications system must exist that could support the added digital subscribers at various ranges from their supporting fire direction centers. Therefore, the RDAF feasibility depends on, and exploits the existence of, a tactical information distribution system (TIDS). Several variations of TIDS are now under development, all of which permit the flexible netting of many more users than the current systems. TIDS will be a high security system, resistant to all forms of electronic jamming. Some candidates include inherent position locating and automatic identification features. The Army TIDS is scheduled to be in the field in time to accommodate the next family of howitzer systems. It is important to note that all of these developments must take place to support proposed *conventional* doctrine. The RDAF requires concept and management inventiveness, not unique technological breakthroughs.

### Affording to survive

Survivability of an artillery force disposed in units can be achieved by building armored howitzers, ammunition transport, command and control centers, etc., that are impervious to indirect fire weapons. The great disadvantage of this method is its huge cost and the likelihood that a part of the system will be lost due to a breakdown in its complex mobility components.

Shoot-and-scoot tactics also enhance survivability. Rules-of-thumb (e.g., no more than 100 rounds or two



**Figure 1. Randomly distributed artillery force. (Dotted lines show unit assignment. No weapon is within 500 meters of another weapon.)**

hours per position), can be adopted and were used successfully during the Yom Kippur War. The drawbacks of this procedure are the loss of a full battery's worth of fire support for relatively long periods of time, difficulty in scheduling space/time for a road march, and the mobility damage of rapid terrain marches.

Ideally, an individually emplaced, low-target value howitzer would survive simply because of its small size and the price an enemy would have to pay for its destruction. Of course the merits of the RDAF concept are greatly enhanced by occasionally moving the howitzers, even a few hundred meters, on an individual basis. If such moves were properly timed, no significant loss in fire support would ever occur. (Weapons would be assembled with the parent unit for long tactical or administrative marches.)

If fired on with any accuracy, the RDAF weapon should simply run away, calling itself out of action at a loss of one weapon to the whole force until it could move out of the effective area of the enemy counterfire. When an individual weapon arrived in a new area, the crew would need to find only one well-covered and concealed position — not six or eight; thus, the natural protection of all the weapons of the force would be better than those arrayed in unit positions.

What sort of weapon would be suitable for the RDAF? (My surrender to design temptation.) Caliber selection is not affected by the concept, so let it be determined by traditional means. As for the other characteristics, the weapon could be optimized on speed-of-fire, accuracy of on-board systems, and ammunition handling characteristics. And, of course, the biggest payoff would be the shedding of the constraining, expensive armored vehicle in exchange for simple, reliable transport. What comes to mind is a lightweight, agile SP weapon, optimized as above, with a dedicated accompanying vehicle that would share in the ammo handling role. It is not intended that too many design details be determined here, but to simply emphasize that the RDAF would look and act a lot more like a cavalry squadron than a battleship.

### Challenges

Distributing weapons throughout the division or corps area would present several challenges to management. Like the technical challenges, these must be met to some degree no matter how the force is arranged. The RDAF would, however, aggravate some of the problems.

The Field Artillery needs, and Fort Sill is working on, a plan to manage the quantitative and qualitative ammunition distribution problem. More rounds per tube must be fired to counter the threat, and the different sorts of those rounds, to include propellant and fuzes, are growing steadily. Decisions on the distribution of specialized ammunition, such as Copperhead, smoke, illumination, etc., must be standardized wherever possible. More people and more qualified managers will be required to cope with ammunition logistics than a current TOE will support. A treatment of the ammunition distribution problem deserves considerably more space than will be provided here. Let it suffice to say that the RDAF would not cause the problem, but it would certainly increase its scale.

A less well-understood challenge is the self-defense of the artillery unit. Division restructuring, higher rates of fire, and more frequent moves are going to consume the manpower that once formed the perimeter and reaction force of the field artillery battery. Once again, this subject alone is worth a separate, extensive study. A commander

who decides to distribute his field artillery as individual sections might collocate them with or near host units if the threat of ground attack merited such a choice. Naturally, if the guerrilla threat were greater than the counterfire threat, the commander would deploy in the conventional manner.

As the cost and complexity of Army weapons systems increase, the responsibility of the crew/section chief increases enormously. Picturing the staff sergeants and E5s of one's personal acquaintance as operators of weapon systems worth more than a million dollars can be sobering. But this is where the Armor branch is going with the XM1, and the Field Artillery must be prepared to do the same with any foreseeable howitzer. Again, the RDAF would not be the root cause for concern over leadership and experience, but it would certainly place even greater responsibilities on section chiefs.

Clearly, the RDAF would present problems in messing, maintenance, etc., but these have been overcome in other instances so they could certainly be met in tending to individual sections on our own side of the lines. If the ammunition distribution challenge can be met, the other logistical problems will be trivial by comparison.

### Summary

A randomly distributed artillery force is the natural extension of terrain positioning and a realistic reaction to the overwhelming threat artillery. The technical risks involved in developing the concept are no different than the risks we now face in creating a unit-oriented force. The greatest challenge will be the management of the logistics problem associated with the increased time and distance factors. It would appear that the RDAF would be far more survivable and affordable than a conventional force, and it is for those reasons that it is presented as food for thought.

**Think about it!** ☒

**LTC William W. Breen is the Artillery Systems Director in the Directorate for Battlefield Systems Integration at the Army Materiel Development and Readiness Command.**

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## Fire Direction *(continued from page 21)*

subsequent corrections themselves. Or, if they are out of range or must leave a radio on their command/fire frequency, then subsequent corrections can be relayed by battalion.

This has been a brief discussion of centralized tactical fire direction and decentralized technical fire direction as taught by the Gunnery Department, Field Artillery School. Only the high points and frequent problem areas have been discussed. For a detailed description of this entire concept,

the Gunnery Department's *Guide for Fire Direction Operations*, can be obtained by writing the Commandant, US Army Field Artillery School, ATSF-CT-TS-S, Fort Sill, OK 73503. ☒

**MAJ Ralph E. Johnson is Chief of the Career Branch, Gunnery Department, USAFAS.**

# REDLEG Newsletter

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## **Students attending FAOAC 78-1**

The Field Artillery Officer Advanced Course (FAOAC), Class 78-1, has been selected to test a procedure which will provide early information to students on their post-graduation assignments. Field Artillery Branch plans to provide this assignment information to most students before their arrival at Fort Sill.

This test will project and establish officer requirements prior to normal requisition cycles. To allow for unanticipated requirements, a reserve pool of students will be established. Officers in this pool will not receive advanced assignment information by specific command and location prior to departure for FAOAC. As a participant in this test, one should keep the existence of the reserve pool in mind and not be alarmed if specific assignment information is not received before starting FAOAC.

You should be aware of the increased importance of the officer preference statement. Under the test, the tentative assignment will be made without benefit of the face-to-face exchange with an assignment officer normally associated with post-FAOAC assignment. The preference statement will play a critical role in the assignment process. Send your completed DA Form 483 to Commander, MILPERCEN, ATTN: DAPC-OPE-F, 200 Stovall St., Alexandria, VA 22332, by 1 Dec 77.

## **Civil schooling**

Civil schooling for an advanced degree is a frequent topic which surfaces during officer interviews. Officers considering civil schooling should take a hard look at its ramifications on their career development. The majority of the civil schooling programs require immediate utilization. This often causes a conflict between the officer's professional development needs and their requirement to be utilized in the discipline studied.

Under the provisions of AR 621-1, the three programs available are: degree completion (DCP), advanced degree program for ROTC instructor duty (ADPRID), and advanced civil schooling (ACS). Each requires utilization after achieving the degree. DCP and ACS each require a three-year Army Education Review Board (AERB) utilization which is normally served immediately following the schooling. ADPRID offers two years of

study followed by three years of ROTC duty. Majors should consider these years of utilization and schooling in relation to their career development prior to applying.

## **RA integration board**

A Regular Army Integration Board will be convened in March 1978. Interested applicants should familiarize themselves with AR 601-100 and DA Cir 601-64 for details. Applications must be received by MILPERCEN no later than 27 January 1978. Inservice officers must have completed two years active Federal commissioned service by the convening date of the board and three years at the time of appointment. Commissioned officers who previously have applied for RA appointments and were not selected may reapply if one year has passed since the previous application.

## **CGSC selection procedures—academic year 1978-79**

The Command and General Staff College (CGSC) selection process began with a listing of officers eligible, regardless of availability, to attend the academic year 1978-79. Next, a DA screening board was convened to independently review the records of all officers, except last year eligibles\* (year group (YG) 63 and 64), and to prepare a nomination list. The Major, AUS, promotion board, designated an additional list of CGSC nominees. This list is merged with the screening board nomination list and the consolidated nomination list was then presented to the DA selection board. In addition, the records of all last year eligibles (YG 63 and 64) were forwarded directly to the selection board. The selection board prepared a selected list and an alternate list, by order of merit. Following approval of the selection board report, the approved list was sent to MILPERCEN for school assignment and for official release of the list.

Officers selected (except those in their last year of eligibility) who had not completed the minimum time on station required by DA stabilization policies were deferred. Officers deferred will be scheduled to attend CGSC during the next academic year, provided they meet stability criteria and are revalidated by the next year's selection

## **Redleg Newsletter**

board. The board will review the records of each deferee solely to determine if there has been any material change since selection.

*\* As a one time exception to policy, school year group 1963 was granted an additional year of eligibility. This changes total years active Federal commissioned service to 16 for the academic year 1978-79 selection system.*

### **Service obligations**

Military personnel with promotion and/or service obligations should be advised that, except for fully defined hardship or compassionate circumstances, they can expect to complete such obligations prior to separation/retirement.

DA policy has continuously required individuals to complete service obligations prior to separation. However, during recent periods of force reduction, a liberal waiver policy was in effect. The relative stabilization of the Army end strength no longer requires this liberal waiver policy. Compassionate or hardship circumstances must be fully defined and documented, establishing that the circumstances did not exist when the obligation was incurred and that the circumstances will be clearly assisted by the service member's release.

### **Organizational effectiveness**

Organizational effectiveness (OE) is the systematic military application of selected management and behavioral science skills and methods to improve how the total organization functions to accomplish assigned missions and increase combat readiness. An organizational effectiveness staff officer (OESO) is a commissioned officer or civilian employee, qualified by approved training or the Army alternate qualification procedure, and appropriately designated with the additional skill identifier (ASI) 5Z.

The US Army Organizational Effectiveness Training Center (USAOETC), Fort Ord, CA, provides a 16-week OESO course which qualifies officers for the ASI 5Z. There are two methods for attendance at the course:

1) *TDY en route to a PCS*—Officers are nominated by Majors Division, based on a validated requirement, to the MILPERCEN OE Selection Board. Funding is a responsibility of DA.

2) *TDY and return to a parent unit*—Officers are selected by the appropriate commander after obtaining clearance from Majors Division. This clearance implies that the officer will be stabilized at the parent installation for a minimum of 12 months following graduation from OETC.

Selection criteria are as follows:

- Grade of CPT, MAJ, or LTC.
- Assigned or projected to an authorized OESO position.
- A graduate of an advanced course.
- A BA level college degree.
- Promotion potential to the next grade.
- Troop experience at platoon, company, or higher.

### **Official photos**

Your photo is one of the most significant documents in your file. It is looked at by selection board members early in their evaluation and selection process and is instrumental in forming the initial impression the board will carry through its evaluation.

All officers (02-05 and CW2-CW4) are required to have a new photo taken every four years during their birth month. You must wear your basic branch insignia for the photo even if detailed outside your branch. You have the option of selecting the photo to be forwarded to MILPERCEN. It's an individual's responsibility (not the servicing MILPO's) to insure that the photo in his file is current and is in accordance with AR 640-30.

Photos have been received at MILPERCEN with the following discrepancies:

- Incorrect and/or missing brass, awards, patches, etc.
- Ill fitted/wrinkled uniforms, high water trousers, blouse sleeves too short, shirt collars out, unauthorized shoes.

Regardless of the many OERs, awards, letters of appreciation, or commendations in your file, "a picture is worth a thousand words."

### **Reenlistment bonuses up and down**

Thousands of soldiers in some 36 MOSs were added to the selective reenlistment bonus (SRB) rolls in October while bonuses in 22 skills were reduced and in eight other skills, eliminated entirely.

Payments of SRBs are set on five different levels based on the reenlisting soldier's pay, his years in service, and the multiplier authorized for each level, according to MILPERCEN.

Artillery related MOSs scheduled for addition to SRB rolls or movement to higher reenlistment multipliers are: 05B (Radio Operator), 15E (Pershing Missile Crewman), 17C (Field Artillery Target Acquisition Specialist), and 31D (Pershing Communications Specialist).

Those scheduled for reduction in SRB multiplier are: 15D (Lance Missile Crewman), 93F (Field Artillery Meteorological Crewman), and 13E (Cannon Fire Direction/Fire Support Specialist).

**Warrant officers**

**Professional Development.** A new edition of the warrant officer's career planning guide has been issued. It is DA Pamphlet 600-11, dated 7 July 1977. Special arrangements have been made to furnish a copy to each warrant officer. The effective date of the pamphlet will be 1 April 1978. Individuals who have not received their copy by 31 December 1977 should acquire one from their MILPO so they can familiarize themselves with the changes affecting their MOS.

**Warrant officer senior course (WOSC).** DA has scheduled the next WOSC selection board to meet 29 November 1977. It will select students to attend in 1979. Preparation of the rosters of warrant officers eligible for consideration is currently in progress. It is anticipated that selection results will be published in January 1978.

**Appointment vacancies.** Watch for two new circulars that will soon be distributed to the field. DA Circular 601-73 outlines the FY 78 warrant officer procurement program, lists the MOSs in which vacancies are anticipated, and gives guidance for submitting applications for initial appointment and/or call to active duty. For warrant officers now on active duty, DA Circular 601-72 outlines the Regular Army WO accession program for FY 78 and lists the MOSs that are open to applicants seeking integration into the Regular Army. In view of the pending abolition of the Managed Tenure Program, all nonregular warrant officers who contemplate filing an application for RA appointment should consult this circular.

**Managed Tenure Program (MTP).** The MTP is the system by which DA selects nonregular warrant officers for retention on active duty past their 20th year of Active Federal Service (AFS). At its current rate of growth, the Regular Army warrant officer corps will provide **all** of the Army's "over 20" vacancies in the foreseeable future. Consequently, DA is studying a proposal to abolish the MTP and rely on the Regular Army as the only means for warrant officer retention beyond 20 years AFS.

A specific feature of the proposal envisions the creation of an "RA decision point" for warrant officers. The proposition is that individuals must accept a "tender of appointment" in the Regular Army no later than their 15th year of AFS or their completion of OBV (whichever is later), or be mandatorily released from active duty upon completing 20 years AFS. Individuals would still be able to apply for an RA appointment up to their **14th** year of AFS or **2d** year of OBV (whichever is later), but at those points in time all nonregulars would be considered by the DA Regular Army selection board. Individuals in OBV status who are not selected or who decline appointment would still have the option of applying for a voluntary indefinite

service agreement that would cover the period between OBV expiration and their 20th year AFS. These proposals are still under study and no decisions have been made to implement them. Meanwhile, HQDA is making arrangements to convene what **may** be its last MTP board. The board has been tentatively scheduled to meet 29 November 1977 to consider for retention all nonregular warrant officers whose current release date falls in fiscal year 1980. Announcement of the board and rosters of personnel in the zone of consideration will be provided by DA Circular 135-10, now pending publication.

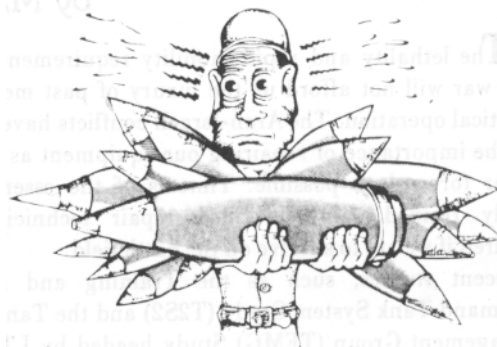
**Officers need to send specialty preference**

DA officials have expressed concern that many commissioned officers in year group (YG) 1970 have not told MILPERCEN their preference for an OPMS alternate specialty.

Only about 25 percent of the 4,200 commissioned officers involved have returned the specialty preference statements sent out last year. MILPERCEN needs statements from those who came on active duty between 1 July 1969 and 30 September 1970.

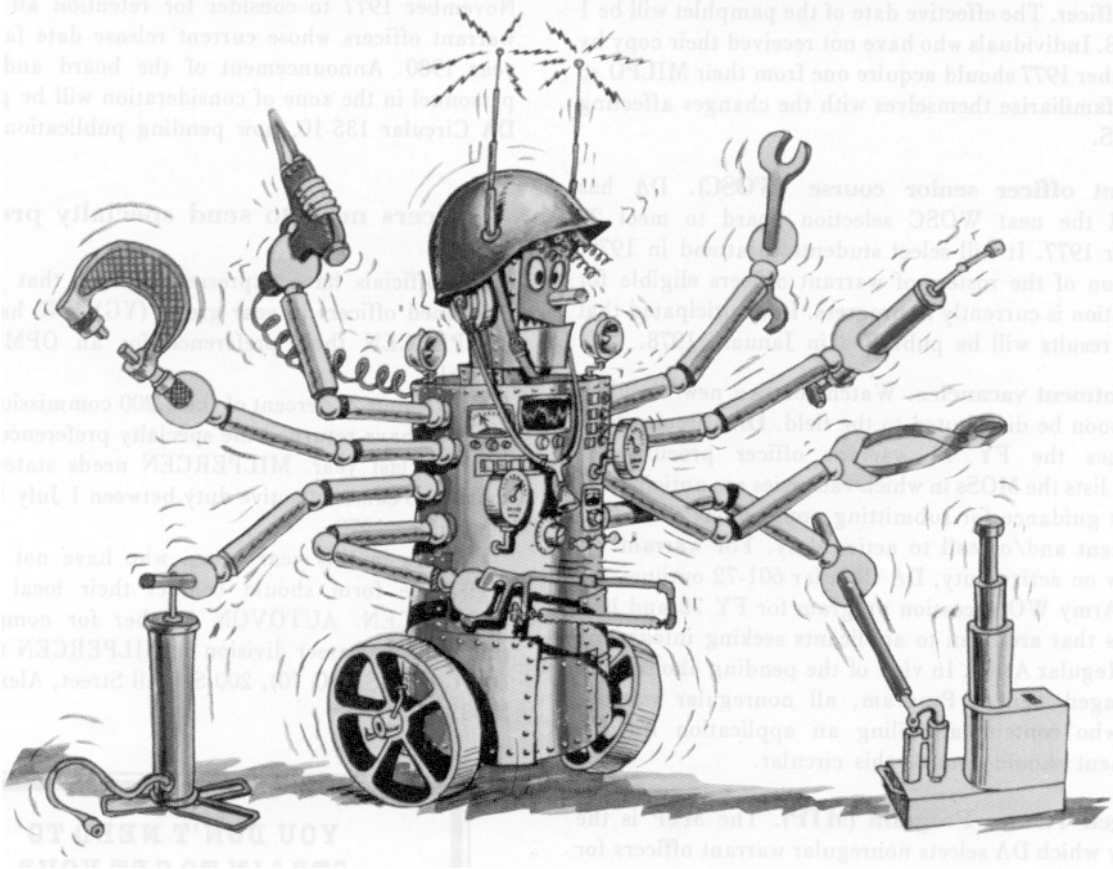
Officers in this year group who have not filled out a preference form should contact their local MILPO or MILPERCEN. AUTOVON number for company grade combat arms career division at MILPERCEN is 221-7820, DAPC-OPP-S (YG 70), 200 Stovall Street, Alexandria, VA 22332.

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# The Master Mechanic



by MAJ(P) Peter M. Wargo

The lethality and rapid mobility requirements of the next war will not afford us the luxury of past methods of logistical operation. The Arab-Israeli conflicts have pointed out the importance of repairing our equipment as fast and as far forward as possible. Time is of the essence, and highly trained, highly skilled repair technicians are required if we are to survive on the battlefield.

Recent studies, such as the Training and Doctrine Command Tank System Study (T2S2) and the Tank Forces Management Group (TFMG) Study headed by LTG (Ret) James G. Kalergis, have pointed out clearly the requirement to reorient our approach. One of the areas addressed is the need to *identify, train, and provide* to the field, a system-specialized organizational maintenance technician. This individual will be trained to maintain and repair both automotive and turret components on a specific

major combat vehicle and a few selected associated vehicles. He will also be capable of maintaining and conducting recovery operations with those recovery vehicles associated with his major combat vehicle. In addition, he will serve as a leader of on-site maintenance teams, as a technical trainer of mechanics, and as a preventive maintenance trainer of equipment operators. In short, he is a mechanic who knows his system-specific weapon from the bottom of the track to the top of the turret. He is a MASTER MECHANIC.

## Who is the Master Mechanic?

The term "Master Mechanic" is a generic term associated with a highly selective, well-trained group of mechanics in the grade of E6 and above. More junior,

system-specialized mechanics will be designated by different duty titles. For example, the E4 and below will be allowed to enter the system as either an automotive or turret mechanic, depending on his initial training. The E5, if qualified and selected, will be cross-trained on the total system — turret, fire control, and automotive. This skilled E5 will then be identified as a *System Mechanic* upon successful graduation from an intensive resident course. This type of training will be required for all members of the program, and successful graduation at each level will be a prerequisite for advancement to each successive skill level.

Although each mechanic in the program will be dedicated to a specific major combat vehicle, he will also be required to maintain other selected tracked vehicles and selected high density wheeled vehicles.

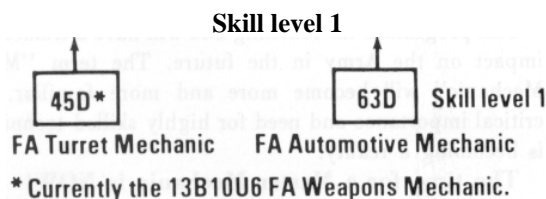
There are currently five system-specific weapons with two more on the drawing board that will comprise the Army's Master Mechanic program:

- M60A1/M48A5 tank.
- M60A2 tank.
- M109/M107/M110 self-propelled artillery.
- M113 family of vehicles.
- M551 Sheridan.
- (Projected) XM1 tank.
- (Projected) IFV (Infantry Fighting Vehicle).

### The Master Mechanic and EPMS

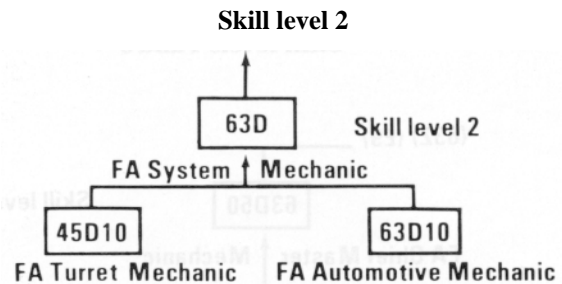
The Master Mechanic program offers a unique opportunity to provide highly trained technicians and teachers to the field and also affords selected individuals an opportunity to become truly skilled master mechanics. The current 63C MOS will no longer exist as we know it today. As a matter of fact, all organizational MOSs in the 63 career management field (CMF) will be somewhat different. This does not mean that everyone is going to be reclassified; it does mean, however, that additional opportunities for schooling and advancement will soon be available for qualified personnel.

Let's explore the field artillery program to see how a new mechanic can climb the promotion and schooling ladder.

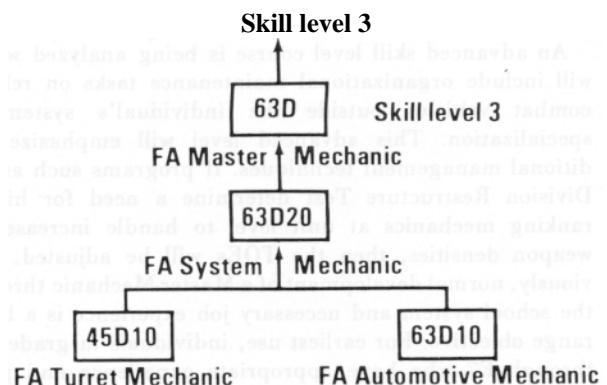


Personnel desiring to enter the self-propelled field artillery system will receive entry-level training for either automotive (63D) or turret (45D) specialization. Training will consist of organizational maintenance tasks to prepare individuals for assignment to self-propelled (SP) artillery

units. The student will be trained on howitzers, recovery vehicles (M548, M113, and M577), and selected wheeled vehicles such as the 1/4-ton and 2-1/2-ton truck. After graduation, the apprentice mechanic must serve a utilization tour in an SP unit under the watchful eyes of both system mechanics and master mechanics. This utilization tour is critical to the development of a master mechanic.



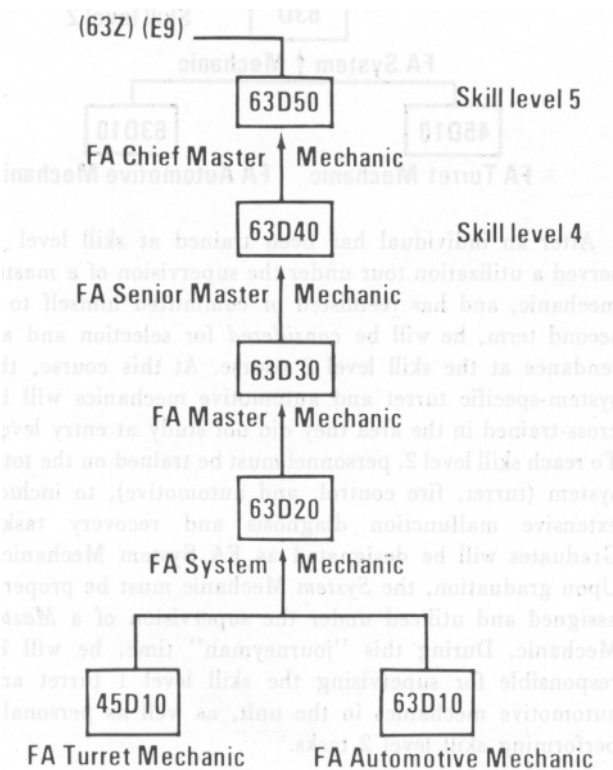
After an individual has been trained at skill level 1, served a utilization tour under the supervision of a master mechanic, and has reenlisted or committed himself to a second term, he will be *considered* for selection and attendance at the skill level 2 course. At this course, the system-specific turret and automotive mechanics will be cross-trained in the area they did not study at entry level. To reach skill level 2, personnel must be trained on the total system (turret, fire control, and automotive), to include extensive malfunction diagnosis and recovery tasks. Graduates will be designated as FA System Mechanics. Upon graduation, the *System Mechanic* must be properly assigned and utilized under the supervision of a *Master Mechanic*. During this "journeyman" time, he will be responsible for supervising the skill level 1 turret and automotive mechanics in the unit, as well as personally performing skill level 2 tasks.



Average time-in-service for skill level 3 course attendance will be seven to eight years. Training will include additional

maintenance and recovery tasks not previously taught, advanced malfunction diagnosis, battle damage assessment, supervisory tasks associated with employment of on-site maintenance teams, and quality control. A graduate will be called an *FA Master Mechanic* for the first time and assigned as the head of the unit maintenance effort. He will have a System Mechanic as well as Turret and Automotive Mechanics to train and supervise. He is the key unit maintenance technician for the field artillery.

### Skill levels 4 and 5



An advanced skill level course is being analyzed which will include organizational maintenance tasks on related combat vehicles outside the individual's system of specialization. This advanced level will emphasize additional management techniques. If programs such as the Division Restructure Test determine a need for higher ranking mechanics at unit level to handle increases in weapon densities, then the TOEs will be adjusted. Obviously, normal development of a Master Mechanic through the school system and necessary job experience is a long-range objective. For earliest use, individuals in grades E4 through E7 who have appropriate experience and prior training will be selected for transition training. These individuals will be entered in the appropriate skill level 2 or 3 transition course mentioned earlier.

Current TOE			
Duty position	MOS	Grade	Auth
Motor Sergeant	63C30	E6	1
Track Vehicle Mechanic	63C10	E4	1
Power Generator Operator	52B20	E4	1
Equip Maint Clerk	76D10	E4	1
FA Turret Mechanic	13B10U6	E4	2
Asst. Track Vehicle Mech.	63C10	E3	2
Total			8

A typical TOE for the 155-mm SP (DS) firing battery under a revised CMF 63 could look something like this:

Proposed TOE			
Duty position	MOS	Grade	Auth
Master Mechanic	63D30	E6	1
FA System Mechanic	63D20	E5	1
FA Automotive Mechanic	63D10	E4	1
FA Turret Mechanic	45D10	E4	1
FA Automotive Mechanic	63D10	E3	1
FA Turret Mechanic	45D10	E3	1
Power Generator Operator	63B10	E4	1
*Maintenance Admin.	63X10	E4	1
Total			8

\*This is a new MOS being explored to replace the current 76D10 TAMMS/PLL Clerk.

There are still many questions that must be answered and avenues explored to insure that the program benefits the Army and the Field Artillery to its maximum. A task force at the Logistics Center, Fort Lee, VA, is currently revising the CMF 63 with MILPERCEN. It is anticipated that a new structure will be developed and approved by the beginning of 1978. It is projected that training will begin in 1979, with the first graduates being sent to the field before the end of that year.

Additional tasks being accomplished in the program include major revisions to the maintenance allocation charts and the annual maintenance manhour figures associated with the manpower authorization criteria.

This program is far-reaching and will have a tremendous impact on the Army in the future. The term "Master Mechanic" will become more and more familiar. The critical importance and need for highly skilled technicians is becoming a reality.

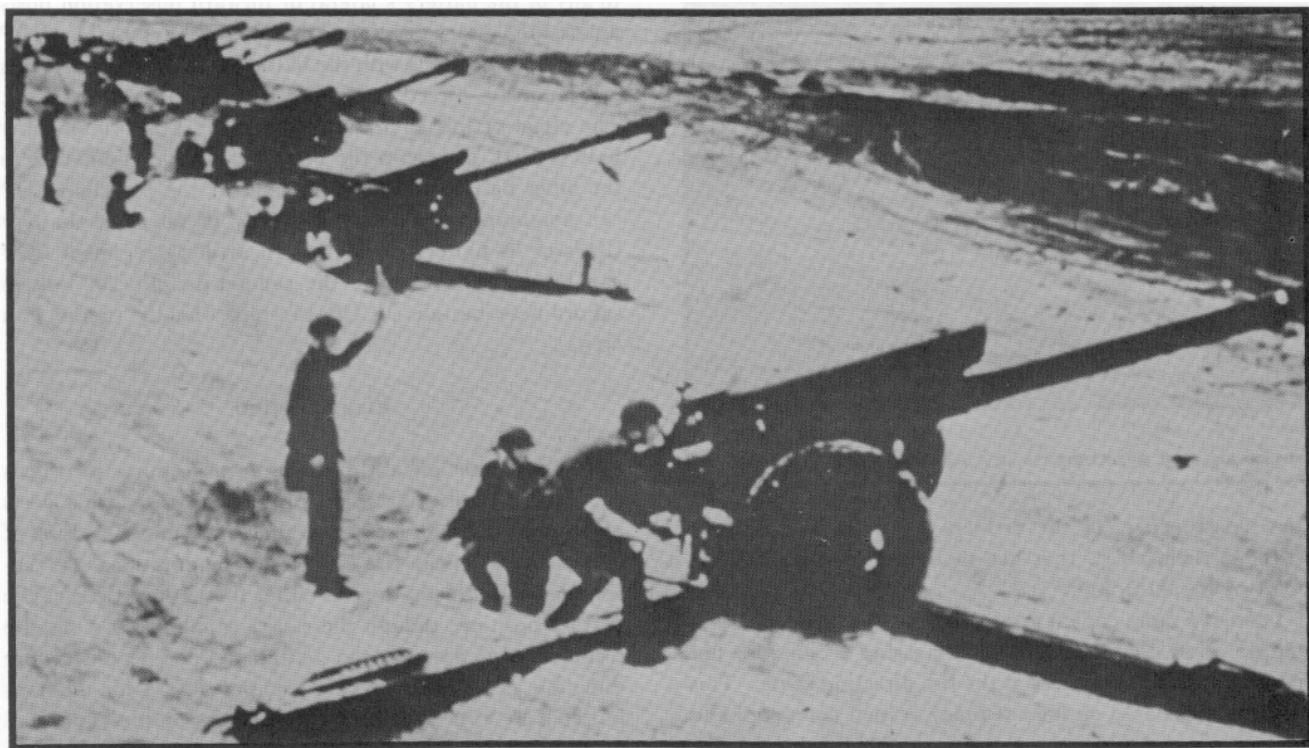
**The time for a Master Mechanic is NOW!**



**MAJ(P) Peter M. Wargo, Chief, Review and Analysis Division, Weapons Department, USAFAS, is the Field Artillery representative to the Master Mechanic Task Force.**



# Soviet Artillery Massing Capability



by CPT Darrell W. Daugherty

"They can only mass at the tubes" is a statement often heard when field artillerymen congregate to talk about how their Soviet counterparts operate. The canard that the Soviets only mass hub-to-hub is perpetuated by misinterpretation of any number of general characterizations of the Soviet field artillery system.

Three such characterizations open to misinterpretation are:

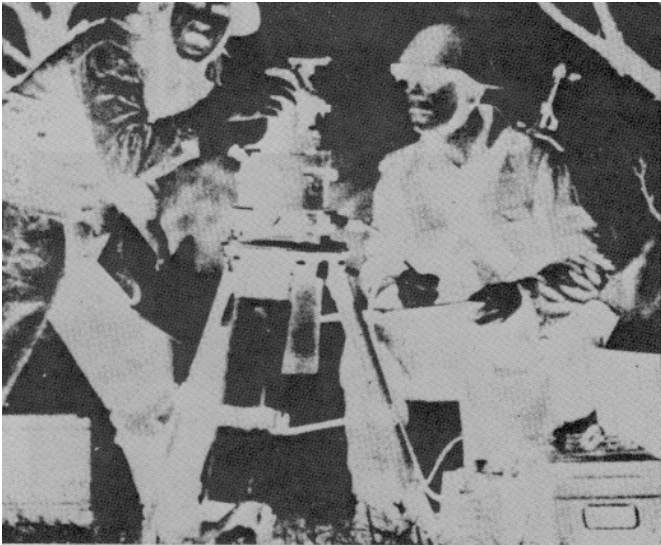
- The current employment of artillery as compared to how it was employed in World War II.
- The use of state-of-the-art technology in developing systems.
- The use of massive quantities of artillery, especially in the breakthrough sector.

Historical precedence is certainly a pillar of the Soviet artillery doctrine. The Soviets — as much as anyone else — are creatures of habit and tend to perpetuate those principles and techniques that have worked well in the past. Therefore, it may appear reasonable to assume that if massing hub-to-hub worked well for them 30 years ago, they may continue the technique. The danger in this assumption is that it is based on the belief that the Soviet artillery doctrine has been static and impermeable to

technology that has changed the face of the battlefield. Although many doctrinal principles are still viable, many of the old techniques are no longer healthy.

Similarly, any belief that the Soviets will mass hub-to-hub because of the simplistic nature of their doctrinal and equipment development is equally dangerous. At one time, the subjective terms "simple," "unsophisticated," and "elementary" had a place in describing many elements of the Soviet field artillery system. Today, however, the Soviet artillery system bears the imprint of advances in state-of-the-art that no longer make these descriptive adjectives totally applicable. The introduction of self-propelled artillery weapons, artillery radars, laser rangefinders, and improved communications equipment have increased the sophistication of the Soviet field artillery system.

Additionally, the Soviet doctrinal requirement for massive amounts of artillery support may lead to a perception that the artillery weapons will be forced into hub-to-hub positioning because of space constraints. Undeniably, the Soviets will employ massive amounts of artillery in critical areas on the battlefield; i.e., Soviet doctrine calls for densities of up to 100 tubes per kilometer of front in a breakthrough sector. The distinction which must be made is



**Soviet artillery gyrocompass (gyrotheodolite).**

that it is the *fires* of the artillery weapons, and not the weapons themselves, that are to be concentrated at the point of breakthrough.

There is a more cogent argument that the Soviets are not limited solely to the hub-to-hub massing technique, but have the capability to mass at the fire direction center. This assessment is based on the adequacy of their command and control system to provide tactical fire direction, the adequacy of their technical fire direction procedures to accurately deliver timely fires, and the adequacy of their survey to provide a common grid and direction.

Before discussing the Soviet command and control, fire direction, and survey systems, it is necessary to provide a brief note on the type, function, and location of the various activities within a firing battery. The battery consists of two basic elements: the command observation post (COP) and the battery position.

- The battery COP, like the artillery battalion or regiment COP, is collocated with, or is adjacent to, the headquarters of the maneuver unit it is supporting. The COP consists of the artillery unit command element (tactical fire direction control) and the unit's primary fire direction element (technical fire direction control).

- The battery position consists of the firing elements and a separate but smaller fire direction element.

### **Command and control**

The Soviet field artillery command and control system provides a flexible and extensive system for exercising tactical fire direction throughout the various artillery

echelons. The flexibility of the system is provided by redundant lines of radio and wire communications. The command and control system begins at each artillery battery COP. The battery COP is linked by communications to any of the battery's lateral or forward observation posts and to the battery position. Additionally, each battery COP has communications with the battalion COP which also can communicate directly with the various battery positions. The effect of this communication network is twofold: any battery COP can, with the battalion's permission, talk to the other batteries in the battalion, or the battalion COP can communicate directly with any or all of its battery COPs or its battery positions. An artillery regiment COP can be expected to have the same capability to talk to subordinate battalion COPs or talk directly to the gun crews.

### **Fire direction**

The Soviet technical fire direction procedures provide a capability to deliver accurate and timely fires. Two aspects of their fire direction procedures facilitate massing. First of all, most technical fire direction computations are accomplished by the battery at either the battery COP or the battery position, though there is a capability to compute technical fire data at the battalion. The technical fire direction element at the COP computes data for missions initiated by either the battery observers or the supported unit. The separate fire direction element at the battery position computes technical data for missions generated by higher headquarters. Secondly, the Soviets have traditionally used the axial and small angle-T computation procedures.<sup>1</sup> These procedures allow an adequate method of computing technical fire direction data considering the density of artillery available and the relatively narrow zones of the maneuver forces which the artillery is supporting. Additionally, there are indications that the Soviets may now be using the target grid method for computing technical fire direction.

### **Survey**

The Soviet survey support is capable of locating and orienting artillery units on a common grid. The importance of the capability to tie-in the artillery system components so that two or more artillery units can mass their fires on a target is not lost on the Soviets.

The Soviets use traditional means such as theodolites, tellurometers, and aiming circles to extend common grid and direction. Theodolites such as the T-20 or T-30 which provide fourth- and fifth-order survey accuracy are the types intended for battalion and possibly battery level

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<sup>1</sup> The axial and angle-T method of computational uses the angle formed by the observer/target line and the gun/target line to compute technical fire direction data.

survey. The PAB-2 aiming circle used in some battery survey has a precise elevation scale which can be read to one meter and can be extrapolated to 0.5 meter. Additionally, the Soviets have fielded a number of topographic vehicles which can be used to less accurately tie-in artillery units in mobile situations. The quality of their survey capability is summed up by intelligence analysts:

*The accuracy standard for Warsaw Pact army and division-level artillery survey is . . . the same as for US Army Corps and division artillery-level survey. The number of survey teams (sections) is also comparable. Likewise, the quantity and caliber of equipment employed are essentially the same. In short, a Soviet army and a US corps (and their divisional-level survey team) perform about the same total amount of survey, to the same degree of accuracy, in about the same length of time.*<sup>2</sup>

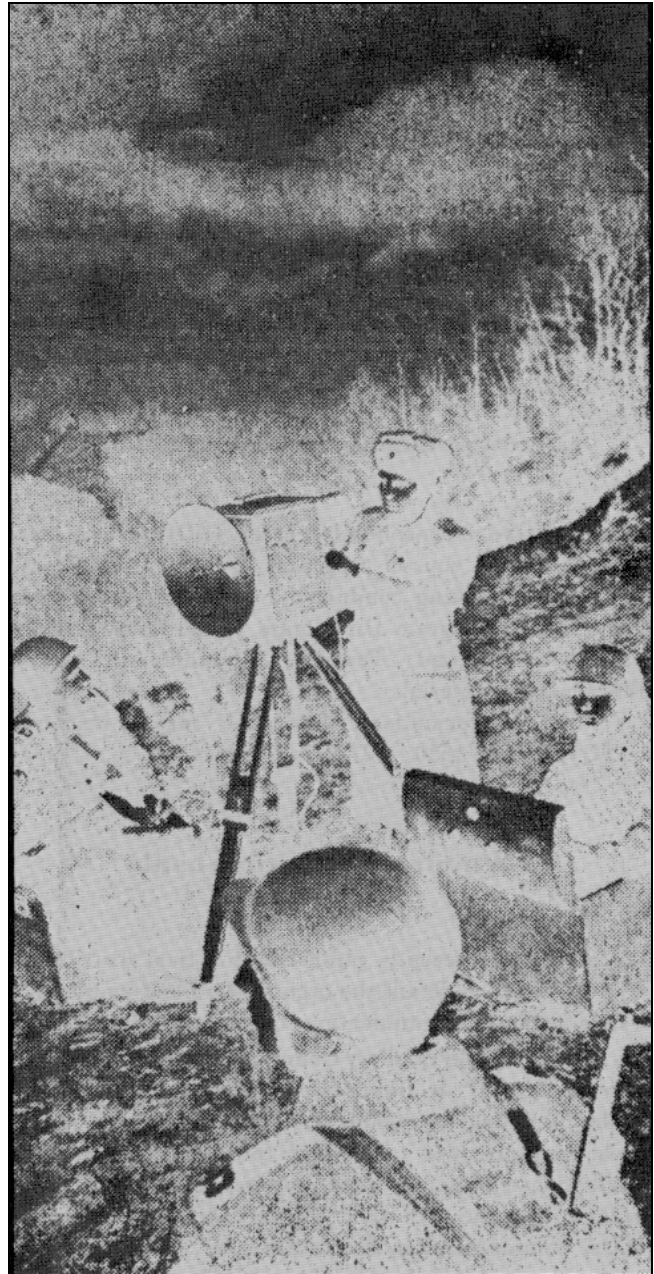
The existing Soviet artillery command and control system, technical fire direction procedures, and survey capability reflect a very real capability to mass at the fire direction center. The Soviets should be expected to exercise this capability because it offers a more timely, efficient and survivable option than massing at the tubes. Additionally, Soviet writers in the past several years have indicated that further improvements to their massing capability are possible through the adoption of automated data processing. Marshall of Artillery K. B. Kazabov stated:

*. . . commanders and staffs find it more and more difficult to process all required information on the situation as required . . . therefore, it is necessary to introduce widely to the troops new technical means of control (electronic computers).*<sup>3</sup>

Marshall Kazabov views an "overall automation of control process" as one that will:

- Process, correlate, identify, and prioritize target acquisition data.
- Maintain information on the location, status of firing units, and ammunition availability.
- Distribute the assets (artillery units) to obtain maximum effect and efficiency against targets.
- Provide both technical and tactical fire direction.

Any assessment of the Soviet field artillery system which is limited to the hub-to-hub massing techniques based on an interpretation of the historical performance or simplistic flavor of the Soviet field artillery system or on the density of their artillery on the battlefield is not valid. It is not valid because the Soviets have developed a command and control system, technical fire direction procedures, and a survey capability that allow massing at the fire direction center. ☒



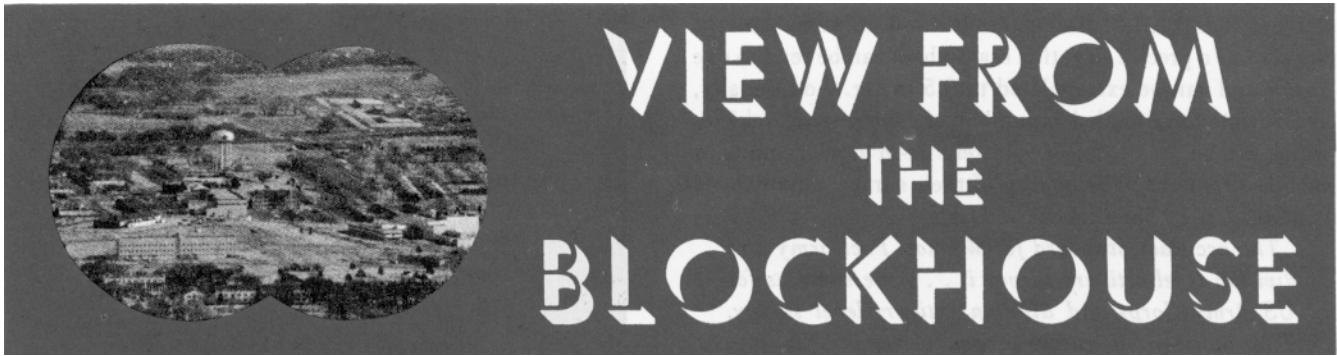
Soviet microwave distance measuring device.

**CPT Darrell W. Daugherty, ML, is the Threats Requirement Director in the Directorate of Combat Developments, USAFAS. A 1968 graduate of St. Louis University, he served as an infantry officer in Vietnam with the 173d Airborne Brigade and later transferred to Military Intelligence. He has served as the div arty S2 and G2 staff officer in the 101st Airborne Division.**

<sup>2</sup> John C. McCormack, Thomas H. Selecman, and LTC John E. Baker, (C) *Gun and Howitzer Systems (Current and Projected) Eurasian Communist Countries—Volume I*, (U) (Defense Intelligence Agency, 1977), p. I-329.

<sup>3</sup> K. B. Kazabov, *Artillery and Rockets* (Moscow: Military Press of the Ministry of Defense USSR, 1968), p. 346.

## Notes from the School



### Correspondence courses consolidated

Administrative consolidation of TRADOC service school correspondence course programs is on schedule. Administration is being conducted by the Army Correspondence Course Program Directorate of the Army Training Support Center, and "Team B-1" handles all Field Artillery course material.

For further information, "Team B-1" may be reached at AUTOVON 927-4530/4727.

### Winning the invisible battle

USAFAS has recently published for field distribution, TC 6-10-1, which details the organization and employment of field artillery communications on the modern battlefield. It is entitled "Field Artillery Communications, Winning the Invisible Battle." It discusses problems of communicating on the battlefield to include the enemy electronic warfare threat and provides techniques for using current communications equipment to support recent changes in field artillery doctrine. All field artillery officers and senior NCOs, communication/electronics staff officers, and FA communications chiefs should study this TC.

A section of the TC is devoted to the enemy electronic warfare threat and key employment techniques to enhance communications effectiveness of the forward observer, the fire support officer, the battery, and the field artillery battalion (in direct and general support roles). Another section provides guidance in the area of division artillery and FA group communications support. Major points of coverage in this section include:

- Establishment of a div arty signal center by the division signal battalion.
- Guidance on "offset" operation which permits the div arty CP to diffuse its electromagnetic signature or to displace independent of the div arty signal center.

- Communication support associated with the FA group executing division zone missions.
- Communication support of div arty and the FA group during displacement.

The TC also addresses procedures and techniques for enhancing survivability of communication and contains a section on training tips.

The intelligent employment of all available means of communication, rather than overdependence on one method, will provide more reliable communication and less "visibility" to the enemy, and that is the secret of winning the invisible battle.

### FIST training update

The Fire Support Team (FIST) concept was approved by DA on 27 June 1977.

Since then, a multitude of actions have taken place to get this concept and its supporting MOS 13F into high gear. MILPERCEN directed the major commands to identify personnel who will be reclassified to MOS 13F. All personnel to be reclassified will have the MOS action accomplished by their military personnel office with an effective date of 21 March 1978. Orders will be prepared reassigning personnel to the appropriate supporting field artillery unit. TOE changes were published in the September 1977 consolidated TOE changes. MTOE changes will be required shortly.

A major area of concern for USAFAS is training. Several actions to assist units in the transition period have taken place. A 13F "track" was developed for the Basic Noncommissioned Officers Course, offered at eight NCO academies in conjunction with the 13E track. The 13F BNCOC will train selected soldiers in skill level 3 tasks required of a E-6 13F or a soldier who is occupying a 13F E-6 slot.

Since the first school-trained 13F will not complete the 5-week AIT until April 78, a transition package has been

## View From The Blockhouse

prepared to help units train prospective 13Fs in the skill level 1 and 2 tasks. The training package contains instructor guides in the sequence in which they are to be presented. Tasks have been clustered in the areas of communications, map reading, observed fire, and fire support planning and coordination. The instruction is performance-oriented and relies heavily on TEC lessons and practical exercises. This package was shipped to using Active Army division artilleries, divisional battalions and separate battalions and batteries on 14 September 77. A package for Reserve Components is being prepared.

A FIST workshop is now being developed for fire support officers and maneuver battalion S3s. The workshop will be held at Fort Sill in late November or early December for CONUS-based units. In January, a mobile training team will be sent to Europe, Korea, and Hawaii to conduct workshops for units located there. (Major E. F. Kedzierski, DCRDT)

### **FM distribution dates set**

Increased emphasis has been placed on supporting unit level training with appropriate literature. In a continuing effort to "get the word out," USAFAS will be publishing 27 training publications in the first six months of 1978.

FM 6-20, Fire Support in Combined Arms Operations, and ARTEP 6-307, Field Artillery Target Acquisition Battery, should be in worldwide distribution by January.

### **March-April 1978**

The following publications are expected to be in the field in the March-April 1978 time frame:

FM 6-141-1, Target Analysis (Nonnuclear)  
(C) FM 6-141-2, Target Analysis (Nonnuclear) (U)  
FM 6-161, FA Radars  
TC 6-20-9, Cannon Battery Defense  
TC 6-20-10, Fire Support Team (FIST)  
TC 6-40-4, Fire For Effect (Revision)  
FM 6-21G 1/2, Soldier's Manual for Pershing Electronic Materiel Specialist  
FM 6-21G3, Soldier's Manual for Pershing Electronic Materiel Specialist  
FM 6-21G-CM, Commanders Manual for 21G  
FM 6-21G1/2, (Job Book)  
SQT 13F/2-4, Fire Support Specialist

### **June-July 1978**

These 11 manuals are scheduled for publication in the June-July 1978 time frame:

FM 6-50, The Field Artillery Cannon Battery (Revision)  
FM 6-42, Field Artillery Battalion, Lance  
(C) FM 6-42-1, Field Artillery Battalion, Lance (U)  
FM 6-15, Field Artillery Meteorology  
TC 6-100, Combined Arms Team Effectiveness (Revision)  
ARTEP 6-595, Lance  
FM 6-13W5, Field Artillery Target Acquisition Senior Sergeant  
FM 6-13W-CM, Commanders Manual for 13W  
FM 6-13Y5, Field Artillery Cannon/Missile Senior Sergeant  
FM 6-13Y-CM, Commanders Manual for 13Y  
SQT 21G/2-4, Pershing Electronic Maintenance Specialist

### **After June 1978**

Major publications on the horizon for the second half of 1978 include:

FM 6-21, The Cannon Battalion  
FM 6-22, The Division Artillery Field Artillery Brigade and Field Artillery Section (Corps)  
C1, FM 6-20, Fire Support in Combined Arms Operations

### **A note on FM 6-20**

If you have a correction or suggested improvement for FM 6-20, it should be submitted on a DA Form 2028 to Commandant, USAFAS, ATTN: ATSF-TD-TM, Fort Sill, OK 73503, as soon as possible. C1 to FM 6-20 will be going to press in July 1978, so comments should be received NLT March 1978. (LT Dennis M. Seely, Training Media Team, DTD.)

### **How effective is the maintenance manager?**

In January and May 1977, officers of the Field Artillery Advanced Course Class 1-77 were administered a "pretest" as part of their resident instruction on firing battery procedures and logistics management. The purpose of the test was twofold: to provide students an opportunity to validate blocks of instruction, and to measure the student's entry level skills based on his past experience and education. The results provided some interesting insights into the experience level of a cross section of FA junior officers — especially in the area of maintenance and logistics management.

The test scenario placed the student in the role of a new battery commander. The object was to test his ability to identify problems or incorrect procedures and recommend corrective action.

## View From The Blockhouse

The test was given to 238 students. The greatest expertise was in publications management with a 69 percent validation rate. Although the lowest validation rate was in firing battery operations, it is not a true reflection of the students' overall expertise in that area.

Comparison of the test results in the accompanying table seems to point to a general lack of expertise in the areas of basic and advanced logistical and maintenance management skills. The weakest areas were repair parts management, planning of scheduled maintenance activities, and supply accountability.

### Test composition and results

	Percent validated	Grade average of nonvalidating students
<b>Firing battery operations*</b>		
Alternate methods of laying, firing battery terms and commands, artillery ammunition	10 .....	73
Artillery safety	26 .....	66
<b>Logistics management**</b>		
Publications Management	69 .....	55
Maintenance forms and logbook records	18 .....	57
Repair parts	14 .....	31
Control and use of tools and test equipment	26 .....	29
Planning scheduled maintenance activities	27 .....	18
Supply accountability	12 .....	24

\*A grade of 85% required to validate.

\*\*A grade of 80% required to validate.

These results are consistent with problems identified by commanders and point out a need for more instruction and emphasis in the areas of maintenance and supply management. Resident instruction will not provide the complete solution as it can present only established procedures and recommend various management techniques. Actual *application* of these procedures and techniques must be reinforced by local commands.

To provide this essential unit emphasis, USAFAS has developed an exportable diagnostic/evaluation package to assist commanders in evaluating the expertise of their maintenance management personnel.

The package is assembled in the six sections of the table to provide the commander with an accurate assessment of his personnel and allow flexible application based on available time and his mission.

This "test" package is a diagnostic tool — an aid to pinpoint problem areas, not a solution. The solution still depends on emphasis through command policy and management.

## Consolidation of Missile Instruction at USAFAS

There is a new look in guided missile instruction at Fort Sill. Pershing, Lance, and Honest John instruction formerly presented to advanced individual training missile crewmen by the Training Center has been moved to the Guided Missile Division (GMD) of the Weapons Department. This consolidation of training will improve the overall quality of field artillery missilemen.

Some of the major advantages of this consolidation are that the field now has a single point of contact for all training matters relating to guided missiles and rockets, standardization of missile training under a single manager, better use of limited personnel and equipment assets, and a smoothing out of the peak demands for missile training equipment.

The merger resulted in some important savings in personnel overhead as well as a savings of about \$3,000,000 worth of equipment. This equipment is being made available to missile units in the field.

The enlarged GMD will be responsible for 13 separate courses of instruction and will train all missilemen, both US and allied, from private through officer ranks. Drill sergeants, in their distinctive hats, are now a common sight in the GMD compounds as they supervise the numerous missile crewmen in their training.

## New gunnery film

The Gunnery Department has produced a new TV tape for the Senior Field Artillery Command Designee Course conducted at Fort Sill. This 34-minute film is an overview of the latest changes in the gunnery system pertaining to observed fire and fire direction procedures. This presentation can also be used effectively by FA units to update their own personnel. Units in CONUS can request the film "Commander's Update" by sending 34 minutes of blank cassette tape (1/2 or 3/4 inch) and TRADOC Form 517-R to Training and Audiovisual Support Center, ATTN:ATZR-FETV, Fort Sill, Oklahoma 73503. Forces overseas should submit their requests to Training Support Center, Fort Eustis, VA, 23604. (Major Johnson)

**Lance training device to be fielded soon**

A device to help train gunners in sighting and laying, to cross train Lance missile crewmen (MOS 15D), and to prepare troops for skill qualification tests (SQT) will soon be fielded.

Weapons Department, with the help of Fort Sill's Training Aids Service Center, has designed a portable Lance sighting and laying (S&L) training device for issue to each Lance firing platoon and each service battery.

This relatively simple device can be used for gunner's sight unit (GSU) instruction and should greatly improve battery training programs. It can be used for boresighting and laying procedures, checks and adjustments, and as a maintenance stand. This S&L training device is an effective substitute for the main missile assemblage during periods when the launcher or assemblage are not available for training.

During inclement weather, gunner's proficiency can be maintained by establishing an indoor training program with this device. The S&L training device can also be used to enhance MOS proficiency in preparing for the SQT.

Each 15D, including those in service batteries, will have sufficient equipment to gain and maintain proficiency with the GSU — a must for the SQT — when the S&L training device is issued. Delivery will be made as soon as possible.

**SQT update**

A schedule for distribution of Soldier's Manuals and record testing of SQTs for career management field 13 was listed in the March-April 1977 issue of the *Journal*.

Two additional MOSs are under development at Fort Sill, with the following administrative schedule.

<i>MOS</i>	<i>Soldier's Manual distribution schedule</i>	<i>SQT Active Army</i>
21G (Pershing Electronic Specialist)	Jul 78	Jan 79
26B (Weapons Support Radar Repairer)	Jul 79	Jan 80

**FA Surveyors SQTs**

There are several items of equipment now being fielded for use by field artillery survey teams. Included are the SR-56 hand-held calculator with appropriate survey forms, the lightweight azimuth gyro survey instrument, and the DM-60 electronic

distance-measuring survey equipment.

Because issue of these items will be completed or ongoing during April 1978 (when the survey MOS will be tested) questions concerning these items of equipment are included in both the written and hands-on components of the SQT's.

**Field Artillery SQTs**

In April 1978, soldiers in career management field 13 will begin to take their SQTs for record. This is the culmination of several years of intense writing and trial testing by a small group of subject matter experts in the Directorate of Training Developments.

There was Army-wide trial testing, but Fort Sill, being the center of Field Artillery expertise, bore the brunt of the process to validate the SQTs.

Several other Army branches had similar validation programs, but the Field Artillery, with its myriad of MOSs, expanded the scope of SQT validation by testing the complete SQT system. By trial testing not only test content, but also administrative details required for worldwide record testing, the Field Artillery school has become the acknowledged leader in SQT development.

Initial reaction to the SQTs is highly favorable with the tests being considered very challenging.

The Skill Qualification Test as an integral part of the training system will enable the Field Artillery to remain the premier branch of the Army.

**FATASOC**

Upon graduation from the Officer Basic Course (OBC), lieutenants now go to one of three "tracks," depending on his first unit assignment — either the cannon track, a missile course, or the Field Artillery Target Acquisition and Survey Officer Course (FATASOC). When the OBC was realigned into its present follow-on track format, FATASOC became an MOS-producing (13D) track. However, since the purpose of FATASOC is to qualify officers in the field of target acquisition, reconnaissance, and survey, any officer slated for, or in, an assignment requiring target acquisition related skills can attend FATASOC. FATASOC also better qualifies officers for target acquisition battery (TAB) commands and div arty staff duties as a Counterfire Officer in the div arty tactical operations center (TOC).

It is desirable that officers being considered for div arty TAB command attend FATASOC. Those officers on orders to a div arty who have an indication that they will be assigned duties in the TOC or possible TAB command should seek MILPERCEN approval to attend FATASOC en route to their new assignment.

## View From The Blockhouse

### **Sound ranging tape**

Recently the School developed a 20-minute television tape titled, "Field Artillery Sound Ranging Briefing," (2E/041-061-0628B). The program is in color on a 3/4-inch cassette. The original purpose of the tape was to brief senior officers on the improvements made in the sound ranging systems organic to the newly reorganized target acquisition battery (TAB). When the TAB was field-tested by the 82d Airborne Division Artillery, it was determined by ARTEP standards that the sound ranging systems and the reorganized TAB would be highly effective on today's battlefield. The system was also tested by the School Commandant and was found to be greatly improved over the old system and highly suitable to meet the modern threat. The commandant recommended that sound ranging be supported, as it is a viable concept and has an important role now and in the future in both target acquisition and the cuing of our other targeting systems, particularly radars.

Copies of the tape were recently mailed to all div artys, FA groups, and corps artilleries.

### **New target acquisition MOS**

By the end of FY 78, 16 div arty target acquisition batteries (TAB) and a separate TAB at Fort Sill will have been activated. The activation of these units has created a demand for Target Acquisition Specialists, 17C. This new MOS was created by combining the fields of sound ranging, flash ranging, searchlight, and combat surveillance into a single MOS. To meet this demand for 17Cs, a six-week, self-paced target acquisition specialist course was established in the Counterfire Department. The first class began 15 October 1976.

On 8 August 1977, two students, PVT Jerry L. Rice and PVT Michael P. Hamm, completed the course at the same time (because of self-pacing), so they share the honor of being the "500th Graduate" of this course.

This course is designed to provide enlisted personnel with a working knowledge of sound and flash ranging techniques; the installation, operation, and operator maintenance of sound and flash equipment; the use of FADAC for sound and flash operations; and the organization and duty functions of the processing section personnel assigned to the div arty TOC. Instruction is given through the use of programmed texts, slide/audio shows, TEC programs, video tapes, and practical exercises. Not all the 17C tasks are taught in this course — survey and meteorology will be taught through on-the-job training at the unit. The scheduled student input in FY 77 and FY

78 is more than 1,800.

An eight-week NCO reclassification course (17C) is also being conducted by the Counterfire Department. These NCOs will receive the same instruction as the level 1 course and, in addition, will receive instruction in training management, planning, employment of target acquisition systems, and target production activities in the div arty TOC. This instruction is reinforced by sound and flash ranging field exercises.

Four NCO classes have graduated, and the fifth class is presently in session. Upon completion of the 17C reclassification program in July 1978, approximately 300 new 17C NCOs will have graduated and joined their units. As in the case of the 17C10 level 1 students, the NCOs are scheduled by MILPERCEN to arrive at their new unit about the time the unit is activated.

### **FMs being revised**

An extensive effort is being made to bring target acquisition field manuals up-to-date. The purpose of the revision is to insure that the content of each manual is compatible with contemporary tactical doctrine and that the systems, data, and techniques presented are current. To this end, much valuable comment has been contributed from throughout the Army, Active and Reserve Component alike. The following table provides a tentative distribution schedule for the new manuals.

<u>FM</u>	<u>Short title</u>	<u>Expect issue</u>
6-2	Survey	Jun 78
6-15	Ballistic Meteorology	Jun 78
6-16	Ballistic Met Ref Tables	Late 79
6-121	Target Acquisition	Mar 78
6-122	Sound/Flash Ranging	Early 79
6-161	Radar	Mar 78
6-300	Ephemeris	Dec 77

### **Artillery monograph available**

Word from the School library indicates it is being bombarded by requests for the monograph on the Field Artillery in Vietnam.

The monograph may be obtained for \$3.10 from the Superintendent of Documents, US Government Printing Office, Washington, DC 20402. The title is "Vietnam Studies, Field Artillery, 1954-1973" and the stock number is 008-020-00556-8. Units may request copies using DA Form 17.



# EPMS

**W**hat do you know about the new Enlisted Personnel Management System (EPMS)? Do you really understand what EPMS is all about?

This question has been asked of many officers. Most are well informed, but some are confused about EPMS and do not understand where they fit into the picture. Either they lack sufficient knowledge of the subject or they perceive EPMS as strictly an enlisted matter. Years have been spent developing a system which benefits the individual soldier and, at the same time, enhances the professional status of the Field Artillery and entire Army. EPMS is a good program, but its success depends largely on the active participation of the officer corps.

## Evolution

The old personnel management system served well for a number of years, but times have changed and the Army is changing with them. It was recognized that to have a truly professional force we would have to develop a meaningful system for the management, training, and evaluation of our enlisted soldiers. An EPMS Task Force was formed to work on this problem. They spent 18 months seeking the counsel, ideas, and opinions from about 20,000 soldiers to develop the framework for EPMS.

During group interviews, statements like these were frequently heard:

"I'm in a dead-end MOS."

"I'm an E9—been in the Army 27 years. AIT was the last formal school that I had the opportunity to attend."

"I can't get promoted as long as I stay in my MOS, and the Army won't let me reclassify into a new MOS."

"I'm a deep-sea diver, and the Army sent me to NCOES in a transportation MOS. It just doesn't make sense."

Unfortunately many of these are valid comments. They describe some real world problems soldiers had with the old enlisted personnel and education system. Clearly, a better system was needed if we hoped to maintain a volunteer Army of qualified, professional soldiers. A system that was not people-oriented, as well as mission-oriented, was just not going to work.

Personnel management subsystems were the causes of much dissatisfaction and many problems. These subsystems (training, evaluation, classification, and promotion) tended to operate independently and were not mutually supportive. Soldiers were promoted and *then* evaluated to determine their ability to perform in that grade. In other instances, soldiers, who had been performing well in a job for several years, were then sent to school to learn the same job. A review of situations like these caused the objectives of EPMS to come into focus.

- Every soldier needed logical job progression and a meaningful, challenging job at every level from grade E1 through grade E9.
- A system of career-long training had to be developed.
- Fair and reasonable promotion opportunity had to be developed.

In general, the attitude of the enlisted corps was that officers already had those elements built into their personnel system — why wasn't there the same concern for enlisted personnel?

## Getting There From Here

In 1972 the Army adopted a program to group military occupational specialties (MOSs) that were related, were manageable from a personnel and manpower standpoint, and provided visible and logical progression from grade E1 to E9. These groupings were called career management fields (CMFs).

The next move was to further refine the career management fields to achieve the objectives of EPMS and provide a total system for enlisted professional development. It takes at least a year to develop a prototype CMF. First, information in data banks and soldier opinion surveys are studied. Tasks and duties performed at each grade in the MOS are analyzed. Soldiers in the MOS are interviewed to gain further insight into the tasks they perform and their problems, attitudes, and recommendations. Do meaningful jobs exist at each grade level? Should the MOS be consolidated or merged with another MOS at the grade where the problem exists? What effect will new equipment have on the soldier's job? Is the reenlistment rate low? If so, why?

# WHAT IS IT ALL ABOUT?

Each MOS is carefully examined, and several prototype career fields are developed. The prototypes are then analyzed and the most feasible receive further study.

### CMF Development

The prototype CMFs are studied by a group of qualified soldiers, experienced in the MOS involved. The end product is the EPMS recommended career management field.

Each CMF is then coordinated with the training and field commands and the DA staff and is then presented to a steering committee of general officers and the Sergeant Major of the Army. Any issues which may still exist within a CMF are ironed out, decisions are made, and the CMF is approved or disapproved.

Developing a CMF is a lengthy, painstaking process involving a lot of highly qualified, conscientious people, but this is what it takes for a soldier to be able to say, "I can get there from here."

Merging of some MOSs at the leader and supervisory levels became necessary, because some were "dead-end" MOSs; CMF 11, maneuver combat arms, is an example. A very large share of the promotions to E9 and command sergeant major selections were coming from a relatively few of the MOSs in the career field. Soldiers in other MOSs were stymied. To correct this, all E9 jobs in CMF 11 were consolidated into a single MOS. The results were increased competition, more equitable opportunity for promotion, a variety of assignment opportunities, and more broadly experienced enlisted supervisors.

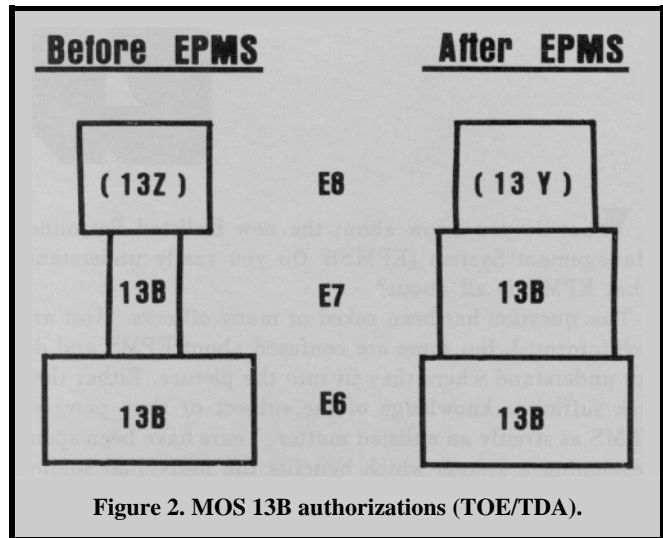
Is there a conflict between more generalization under EPMS and increased specialization under the Officer Personnel Management System (OPMS)? The answer lies in perspective. Before EPMS and OPMS, enlisted soldiers and officers were at opposite ends of a spectrum. Some enlisted soldiers were too specialized, and some officers were overly generalized. Under EPMS and OPMS, the two are now moving toward the center of this spectrum to provide a more balanced, responsive force. EPMS was not an outgrowth of OPMS. The systems were developed separately.

### Promotion Opportunity

Promotions are a prime motivator in career development. Soldiers tend to avoid an MOS in which there is little chance for advancement.

- E7 — Chief of firing battery**
- E6 — Section chief**
- E5 — Gunner**
- E4 — Assistant gunner**

**Figure 1. MOS 13B job progression.**



**Figure 2. MOS 13B authorizations (TOE/TDA).**

What causes promotion bottlenecks, and how can they be resolved? MOS 13B, cannon crewman, is a good example. Job progression was logical and visible (figure 1), but there was a promotion bottleneck in going from grades E6 and E7 (figure 2), which caused many soldiers to move to other MOSs to get promoted. To understand this, one had to look at the job positions found in the authorization (MTOE/TDA) documents. The number of positions available (authorizations) determine how many soldiers can be promoted in a specific MOS.

The left column of figure 2 shows the worldwide profile of job positions at grades E6, E7, and E8 within the career field. There were not enough 13B positions at E7 to support adequate promotion opportunity within the MOS. The underlying cause was the basic organization of the field artillery battery where there were seven E6s — six chiefs of section and one ammunition sergeant — but only one E7, chief of firing battery. Seven NCOs were competing for promotion to one position. Solving this problem involved reconfiguring battery organization, evaluating job positions, and upgrading the jobs which justified a higher grade. The MOS bottleneck was broken by creating a second E7 position in each firing battery (see "The New Gunnery Sergeant," September-October 1976 *Journal*).

### Slower Promotions?

Since 1968, there has been increasing pressure from Congress and Department of Defense to halt grade creep and bring the grade structure into alignment with budgetary constraints. Some people interpret this as a forerunner to slower promotions and maybe even a promotion freeze. This is not true.

Grades E4 through E9 are commonly referred to as the "Top Six" of the enlisted grade structure. Figure 3 depicts the Top Six as a percent of the total number of soldiers. The

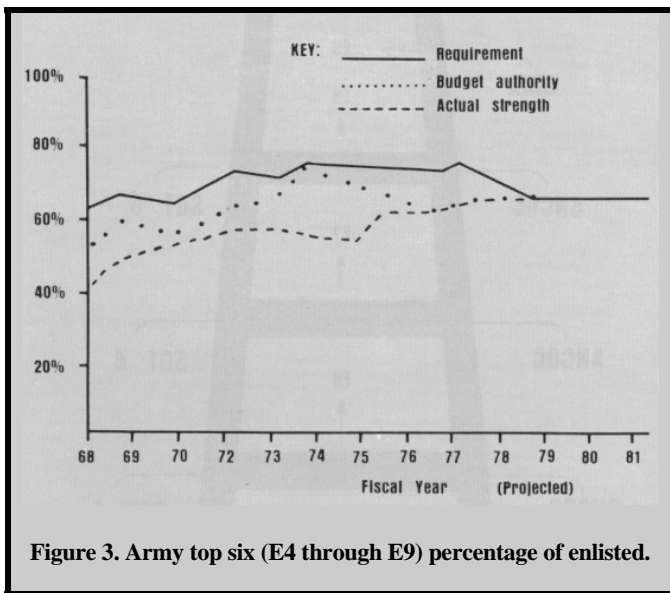


Figure 3. Army top six (E4 through E9) percentage of enlisted.

solid line represents the Army's requirement (required force) for combat organization (total authorized enlisted strength as determined by totaling all of the TOE and TDA documents for the entire Army). The dotted line represents the Congressional budgetary authorization for the Top Six; in other words, the number of Top Six soldiers for which Congress will pay. The dashed line represents the percentage of soldiers who actually held one of the Top Six ranks. When a unit commander looks at his authorization document (solid line), he perceives an NCO shortage. In reality, the Army does not have the money to promote the number of soldiers stated in these documents (dotted line). At first glance it would appear that this would cause a general slowdown or promotion freeze. Prior to FY 75 we rarely spent all of the money Congress authorized for promotion into the Top Six (dashed line). The EPMS Task Force was given the mission to restudy our grade structure and to bring what the Army says it needs down to a level that Congress will fund. At the same time, EPMS is trying to adjust CMFs and MOSs so that every soldier has a greater opportunity for promotion. By 1978 the Army expects these three lines to be in close alignment. As EPMS is fully implemented and promotion bottlenecks are reduced, more soldiers will have better opportunities for promotion. Commanders may not be authorized as high a grade structure as before, but the Army will be better able to fill by grade what is authorized. The commander will have a more realistic picture of his organization and what he will have available to perform his mission.

It might appear that EPMS has provided a means of insuring that the Army will have a soldier in the proper grade for each requirement. This is not entirely true.

Authorizations drive promotions, but authorizations don't stand still very long. They are changed to meet requirements. The authorization for a given MOS will fluctuate as the Army's force structure is changed. A good example of this was the decision to go to a 16-division force. Adjustments had to be made in a large number of MOSs to allow for this expansion. As a result, commanders experienced grade shortages in some MOSs and overages in others. To correct this, soldiers were transferred (reclassified) from overage to shortage MOSs.

Since the Army bases promotions on future projections, this will minimize the shortage problem. The success of this program will depend on the timely submission of force structure changes. The personnel system must have time to react.

### EPMS—Leader's/Commander's Responsibility

"He is one of my best NCOs, I can't understand why he wasn't promoted." More often than not we blame the system when a deserving soldier is not promoted on time. Well, it will continue to happen until officers learn how to get their soldiers promoted. They *must* understand EPMS and assume their role in managing and developing enlisted careers.

### Skill Level

Skill level — that's the key — the glue that holds EPMS together. There are five skill levels associated with an MOS. The skill level is depicted in the fourth character of the enlisted MOS code — 13B20, 82C30, 13E40, etc. Figure 4 depicts the new relationship between grade and skill level that is standard for all MOSs.

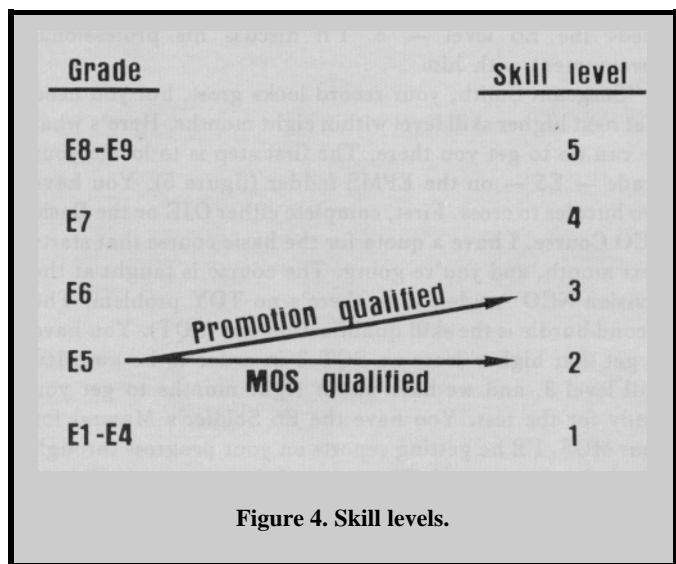


Figure 4. Skill levels.

Under EPMS, skill level reflects the skills typically required for successful performance at the grade with which the skill level is associated. A soldier must possess the skill level of the next higher grade for promotion to that grade. For example, a SGT/SP5 must hold skill level 3 — 13B30 — to compete for grade E6. This provides a stimulus for professional development and precludes a soldier from being promoted beyond his current capabilities.

### Getting the Skill Level — Training

There are two ways to complete the training requirement for the next higher skill level:

- By learning the higher skills while serving on the job, called on-the-job experience (OJE).
- By completing the designated school course (NCOES). The route used is not important, but completing the training requirement is.

### Counseling — EPMS

Sergeant Smith has arrived in his new unit. The commander is reviewing a printout of SGT Smith's record:

- Single.
- Second enlistment.
- Three years and two months of service.
- Grade E5.
- Six months in grade.
- Previous commander appointed him to corporal.
- Filled an E5 slot.

This Sergeant Smith must be a front-runner, and it's nice to get good men. MOS 13B20 — What! With maximum waivers on time in grade and time in service, Smith could start competing for E6 in about 10 months. But first he needs the E6 level — 3. I'll discuss his professional development with him . . .

"Sergeant Smith, your record looks great, but you need that next higher skill level within eight months. Here's what we can do to get you there. The first step is to locate your grade — E5 — on the EPMS ladder (figure 5). You have two hurdles to cross. First, complete either OJE or the Basic NCO Course. I have a quota for the basic course that starts next month, and you're going. The course is taught at the division NCO Academy, so there's no TDY problem. The second hurdle is the skill qualification test (SQT). You have to get that higher score on SQT 3 in order to be awarded skill level 3, and we have about eight months to get you ready for the test. You have the E6 Soldier's Manual for your MOS. I'll be getting reports on your progress through the chain of command. The unit training program will help you gain proficiency in some of those critical skills; in others, it will take some effort on your part."

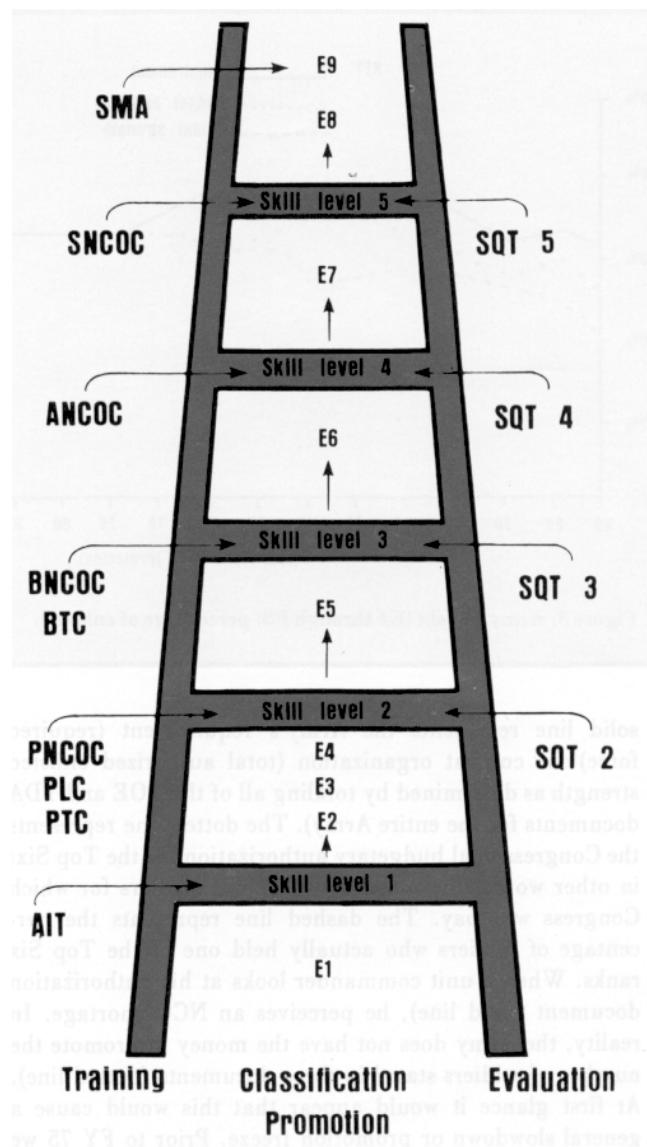
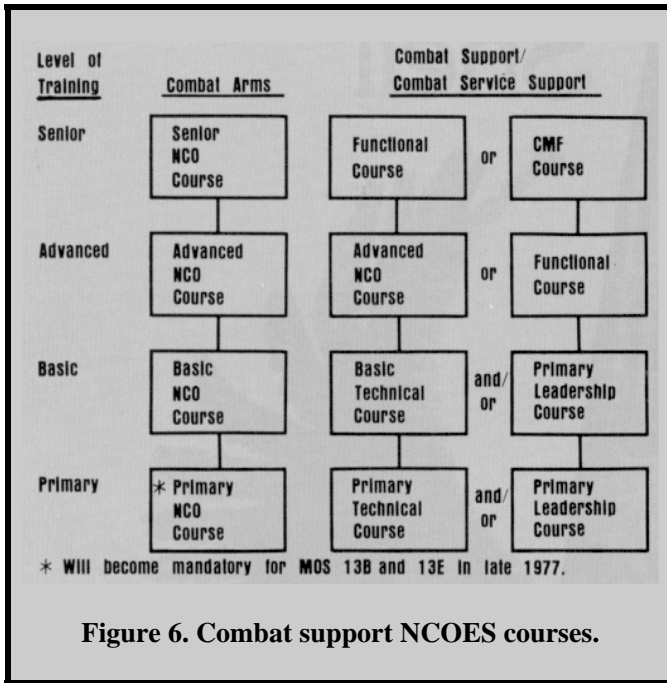


Figure 5. EPMS ladder.

### Training and Evaluation

Refer to figure 5 again and review the significant features of the EPMS ladder. AIT normally results in the award of skill level 1. The primary, basic, advance, and senior courses teach the skills of the next higher grade levels — the E4 attends the primary level to learn E5 duties, the E5 attends the basic level to learn E6 duties, etc. Each soldier takes the SQT of the next higher level. When the training and SQT requirements are successfully completed, the higher skill level is awarded. The USA Sergeants Major Academy (USASMA) will continue to be the top level of NCO training. The successive levels of training are the



cornerstones for maintaining and increasing the proficiency and expertise of the NCO corps. But OJE is an equal and totally acceptable route to the development of professional qualifications.

A number of new course names such as Primary Technical Course (PTC), Primary Leadership Course (PLC), and Basic Technical Course (BTC) are entering our training vocabulary. What are they? How do they fit into the NCO Educational System (NCOES) under EPMS? Essentially these are new, more descriptive names for the Combat Support NCOES courses (figure 6). Not every support MOS will have a course available at every level of training. Availability will depend on the technical requirements of each job. For example, MOS 13B, cannon crewman, will have both a primary (PNCOC) and basic (BNCOC) course at the lower levels and some type of course at the advanced and senior levels. MOS 15E, Pershing missile crewman, will have a primary course, advanced and senior level courses, but no basic course.

OJE is the route to a higher skill level when there is no formal school at a specific level of training or if the soldier does not attend the school course.

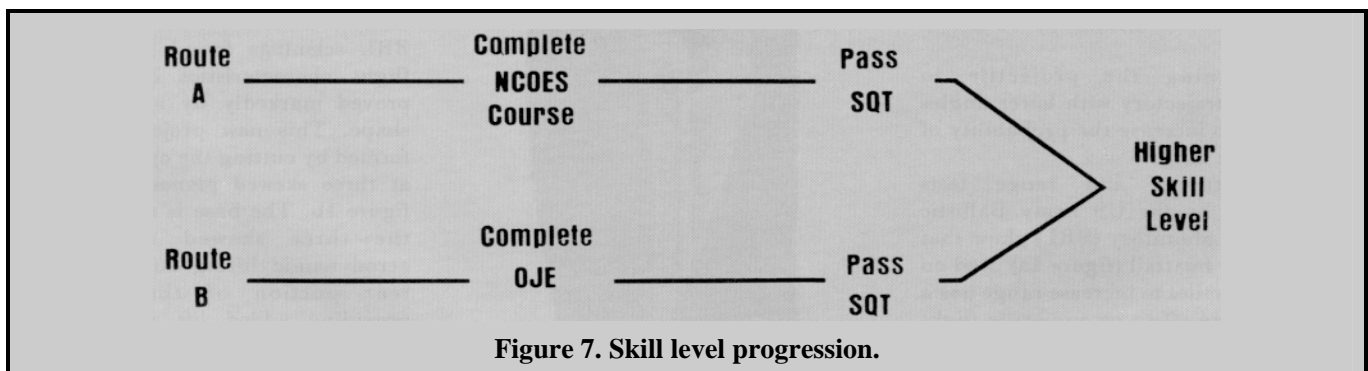
Successful completion of OJE is judged by the commander. The prerequisites are a minimum of six months service for award of skill levels 2 and 3 and 12 months service for award of skill levels 4 and 5 in the soldier's primary MOS at the current or next higher grade. OJE service does not have to be continuous. Part could be completed in one unit and the remainder in another. Of course, the soldier must also pass the SQT.

To insure that OJE and school courses are given equal weight, promotion boards will be given very specific guidance on this point. It is a real-world fact that the OJE route will require more individual application and initiative.

Additional information concerning EPMS and the Field Artillery will soon be available. MG Donald R. Keith, USAFAS Commandant, recently prepared two TV tapes: "EPMS and the Field Artillery Soldier" and "Field Artillery Training Management." The first explains EPMS, Soldier's Manuals, and SQTs to the individual soldier. The second discusses the use of new training tools by Field Artillery officers and NCOs in the management and conduct of training. These tapes are currently being reproduced and will be available this year.

No one doubts the complexity of the personnel management business. In the past, many commanders were confused and somewhat mystified as to where they fit into the picture. Times have changed. The success of EPMS depends on the commander's understanding and involvement in the system. Under EPMS the role of the co/mmander has been well defined. The key is knowing how to assist the soldier in obtaining the next higher skill level. For the soldier this means greater proficiency, job satisfaction, and promotion. For the commander this means a better soldier, a better unit, and increased combat readiness. That's what EPMS is all about. ☒

**Information for this article was furnished by the United States Army Military Personnel Center.**



# Super Shell



by Anders F. Platou

Efforts have been made through research and development to maximize firepower and thereby improve our odds for victory against a numerically superior opponent. The performance of artillery projectiles with ballistic trajectories can be improved by:

- Increasing the projectile length so that it can carry a greater payload without destabilizing the projectile motion. (The projectile length is limited by the gyroscopic stability factor.)

- Designing the projectile to provide a trajectory with lower angles of attack to increase the probability of hitting the target.

Wind tunnel and range tests conducted by the US Army Ballistic Research Laboratory (BRL) show that the conical boattail (figure 1a) used on most projectiles to increase range has a very adverse effect on projectile flight stability. The stability can be

maintained only by shortening the projectile length which reduces the payload.

Projectile spin causes the conical boattail to develop large aerodynamic forces and moments — called the Magnus forces and moments — at transonic velocities. A large Magnus moment may lead to serious flight instabilities which, in turn, will cause the projectile to fall far short of its intended target.

After determining the poor flight characteristics of the conical boattail, BRL scientists found that projectile flight characteristics could be improved markedly by a new boattail shape. This new projectile shape is formed by cutting the cylindrical body at three skewed planes as shown in figure 1b. The base is triangular and the three skewed planes form aerodynamic lifting surfaces on the rear portion of the projectile, providing added lift and increased flight stability.

Skewing the surface retains the spin and reduces the Magnus forces and moments generated on the projectile. With the reduced Magnus forces and moments, the center of gravity of the projectile can be moved forward, increasing flight stability. However, lightweight materials must be used in the rear portion of the longer projectile so that it will not weigh more than the shorter, conical boattail projectile.

The new shape also permits the air to flow much more efficiently over the boattail, reducing viscous or drag losses. Also, portions of the main body cylinder extend to the base, thereby increasing the projectile wheelbase (ratio of projectile length to diameter) and reducing gun tube balloting (projectile wobble while in gun tube).

The new boattail configuration (figure 1b) has lower drag and can be longer and still maintain good flight stability, compared with a similar projectile with a conical boattail. For example, the M549 projectile (figure 1a) is 5.7 calibers long; the new projectile can be 6.2 calibers long.

Another projectile shape — the corkscrew — is created by meshing the skewed triangular boattail with a skewed triangular nose (figure 2). This shape may be useful for certain military applications requiring a long projectile.

The streamlined corkscrew projectile has very low drag and is extremely long. So far, corkscrews up to 8 calibers long have been tested on the BRL Aerodynamics Range. From these flights, it is estimated that corkscrew projectiles up to 11 calibers can be flown successfully. The pointed nose would have to be blunted for military field conditions, but this should not increase the drag or lower the flight stability appreciably.

Conventional projectiles are limited to 6-caliber lengths and have a maximum volume equal to approximately  $3d^3$  ( $d$  is the projectile diameter). The corkscrew, if flyable in 11-caliber lengths, will have a volume

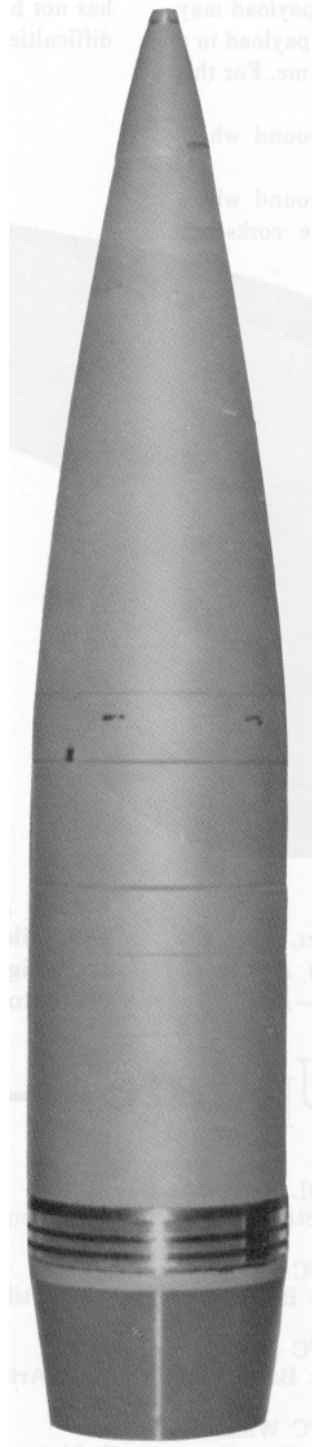


Figure 1a. Standard M549 projectile.

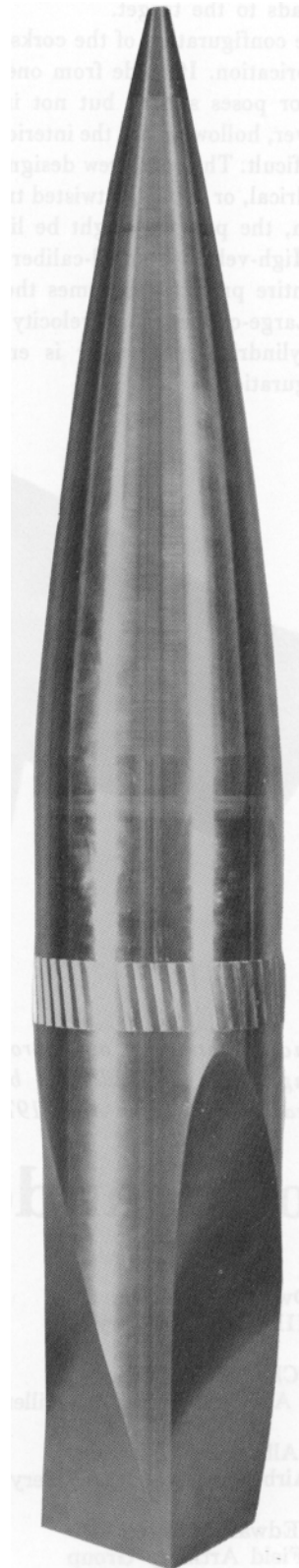


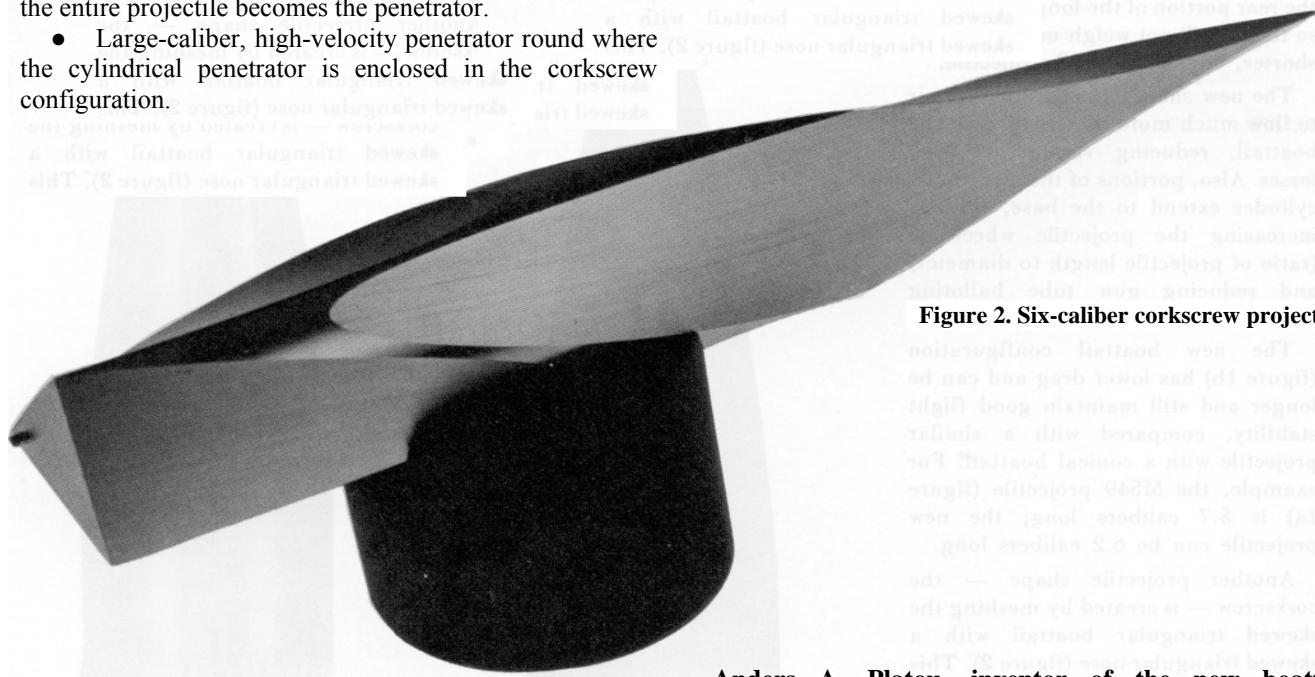
Figure 1b. Triangular boattail M549 projectile.

of over  $4d^3$ , making it possible to deliver larger and heavier payloads to the target.

The configuration of the corkscrew may cause problems in fabrication. If made from one homogeneous piece, the exterior poses special but not insurmountable problems; however, hollowing out the interior to accept a payload may be difficult. The corkscrew design confines the payload to a cylindrical, or at best, a twisted triangular volume. For this reason, the payload might be limited to a:

- High-velocity, small-caliber penetrator round where the entire projectile becomes the penetrator.
- Large-caliber, high-velocity penetrator round where the cylindrical penetrator is enclosed in the corkscrew configuration.

The triangular boattail is expected to become the projectile of the future since its aerodynamic properties are far superior to those of the conical boattail. Projectiles of all sizes will have better flight performance. The corkscrew projectile, with its superior aerodynamics and long length, has not been tried as a military projectile and fabrication difficulties may limit its use. ❌



**Figure 2. Six-caliber corkscrew projectile.**

*For more information on improved projectiles, see "Extending Range of Artillery," by LTG (Ret) Arthur G. Trudeau in the March-April 1977 Journal. —Ed.*

**Anders A. Platou, inventor of the new boattail projectile, is an aerospace engineer with the Launch and Flight Division, US Army Ballistic Research Laboratory, Aberdeen Proving Ground, MD.**

## Commanders Update

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BG Dwight L. Wilson  
CG, III Corps Artillery

COL Charles E. Teeter  
101st Airborne Division Artillery

COL Albert E. Wolfgang  
82d Airborne Division Artillery

COL Edward J. Stein Jr.  
41st Field Artillery Group

COL George M. Krausz  
75th Field Artillery Group

COL Robert L. Ray  
528th Artillery Support Group

LTC Fred E. Gantzler  
1st Battalion, 7th Field Artillery

LTC John E. Robbins  
1st Battalion, 15th Field Artillery

LTC William M. Breit  
1st Battalion, 21st Field Artillery

LTC James E. McSlarrow  
3d Battalion, 21st Field Artillery

LTC Peter D. Heimdahl  
2d Battalion, 34th Field Artillery

LTC Creighton W. Abrams  
2d Battalion, 39th Field Artillery

LTC John K. Holsonback  
2d Battalion, 42d Field Artillery

LTC David S. Jackson  
6th Battalion, 80th Field Artillery

LTC Charles O. Haines  
2d Battalion, 81st Field Artillery



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Monument to US Army Artillery School, Carlisle Barracks, PA, 1777-1781.

by MAJ John E. Felch Jr.

When a modern Redleg hears the phrase "Artillery School," his thoughts immediately wander to "Blockhouse, Signal Mountain" and Fort Sill. However, during the War of American Independence, the Redleg's home was a small Pennsylvania town nestled in the fruitful Cumberland Valley. Today, Carlisle Barracks, PA, conjures visions of general's stars as the location of the US Army War College, but in 1777 it was a key element of the Army's ordnance production department.

Carlisle is the home of the Army's second oldest military post, established 30 May 1757 by COL John Stanwix and his mixed force of British and Provincial troops. The post initially served as a supply depot and armory for the British and was continued as such by the Continental Army of General Washington. These early functions drew a sizable force of skilled civilian craftsmen to an area rich in the natural resources necessary for the production of military supplies. A fine road system was developed from the frontier at Pittsburgh to the capital at Philadelphia, providing for the rapid movement of supplies. Thus, Carlisle evolved into a key strategic location for the Continental Army.

artillerymen and concentrate their efforts on the four "line" artillery regiments which were created by Congress at the same time. Flower's Regiment, however, played a significant role in the history of American artillery. The specific functions of the production company at Carlisle are well explained in General Washington's letter of instruction to Colonel Flower dated 16 January 1777.

Even though General Washington favored York as the site of the new installation, Congress preferred and eventually dictated Carlisle as the location. Carlisle already had the manpower and raw materials to do the job, and its location was near enough to the war activity so that speedy delivery of supplies could be assured. At the same time it was remote enough to guarantee the safety of the facility. These assets applied almost as well to nearby York. The deciding factor was probably the political influence in Congress of two Carlisle residents, John Armstrong and James Wilson, a signer of the Declaration of Independence.

The "Public Works," as the principal activity was called, was opened in April 1777 at Carlisle under the command of MAJ Charles Lukens. The entire installation was known then as Washingtonburg. Although Major Lukens' efforts

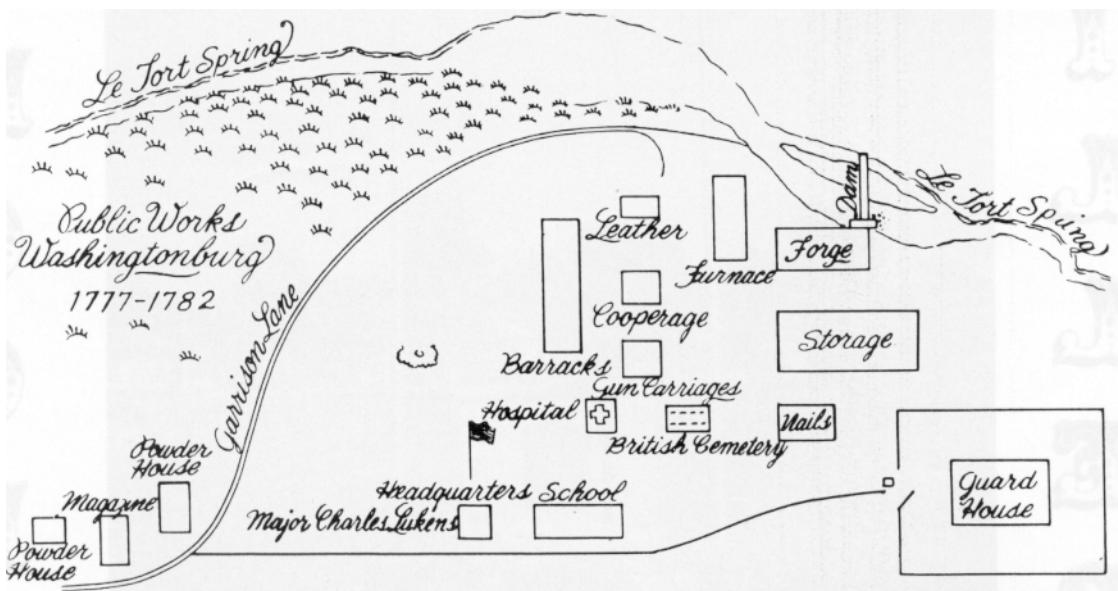


Figure 1. Ground plan of Public Works at Washingtonburg near Carlisle, 1777-1782.

The Continental Congress resolved that "elaboratories" [laboratories] and magazines of military equipment be established at Carlisle. COL Benjamin Flower was appointed Commander of the Regiment of Artificers on 16 January 1777. His command was to include three companies for ordnance production located at Springfield, MA, Philadelphia, PA, and Carlisle, and one company for the repair of cannon in the field. Artificers were craftsmen skilled in the arts of casting cannon, boring guns, preparing ammunition and repairing muskets. These "maintenance and manufacturing" duties led many historians to dismiss Flower's Regiment from the ranks of

were supervised by Colonel Flower, it was Lukens who shaped the history of the new facility. The ground plan in figure 1 shows the many activities at Washingtonburg, including the one which is of interest to us — the "School." The Artillery School and Laboratory was commanded by CPT Isaac Coren (variously spelled Curren or Coran). What more logical place for General Washington to train his artillery officers in their technical skills than at this brand new production facility? Very little information is available about the first school of the United States Army to tell us of the activities and curriculum of the students. We do know that the faculty consisted of Captain Coren as Commander

or Commandant, Captain-Lieutenant Craig commanding the Artificer Detachment and SGT Samuel Blackwood and Jonathan Fetchet, who both probably served in administrative support rolls. (It is interesting to note the entire staff was composed of leaders except for that one poor chap curiously named Fetchet [fetch-it].)

The rank of captain-lieutenant came from the English Army, as did many of the Continental Army traditions. An

*Sir: The Honorable Continental Congress having resolved to erect a magazine, laboratories and founderies for casting cannon, etc., at York Town (York) in the State of Pennsylvania, you are hereby directed to repair thither and erect or provide such building as shall be necessary for carrying on the preparation of fixed ammunition of every species. An air furnace to be erected there to hold three thousand weights of fluxed metal. A mill for the purpose of boring cannon, etc. after they are case. Shops sufficient for forty carpenters, forty blacksmiths and twenty wheelwrights. Turners, tinmen, in proportion to the demand the laboratory shall have for them. Also twelve harness makers to make spare harness single and double.*

*The artificers above mentioned are to consult with the founder about the size of the cannon and they are to make spare carriages for them, the wheels, checks, limbers, etc. The founder to be instructed to cast six pounders first, three pounders and howitzers next and after there are about sixty of these cast he is to cast twelve pounders.*

*There are to be sixty persons in the laboratory enlisted for the war consisting of one Captain, who is to be Captain Coren, one Captain-Lieutenant, four Lieutenants, six sergeants, six corporals, six bombardiers, one fife, one drum with twenty-eight matrosses, these persons to be enlisted as artillery men although they are at present to be employed in the laboratory.*

*Exclusive of the above artificers we shall want a company of artificers enlisted during the war to be attached to artillery in the field.*

*After the buildings are prepared in York Town part of the branches in Philadelphia are to be removed there. —*

*"Writings of George Washington," Vol. VII, p. 20.*

artillery company was usually commanded by a very senior captain whose position carried all the prestige and privileges, but not the title, of major. A high technical knowledge was required of artillery commanders. In fact, Redlegs at all levels of the Continental Army were paid more for their technical knowledge than their counterparts in the cavalry and infantry. A very senior lieutenant, titled "captain-lieutenant," assisted the artillery company commander. Officers of this rank served in other branches also, assuming responsibilities of greater magnitude than normally would be given a lieutenant, but less than that reserved for captains. In the artillery, this rank structure supported the tactics of the era as artillery normally was employed in small groups rather than entire companies.

The charter of the first artillery school came from a Congressional Resolution in February 1777: ". . . that Captain Isaac Coren, commanding the Artillery School and Laboratory at Carlisle, receive \$25 monthly additional pay for teaching the laboratory art to such officers of the artillery as shall be sent to him; that \$2,000 be sent to him to pay his company and recruit it to 100 men according to the wishes of General Washington."

It was not until February 1778 that General Washington selected the first class for the artillery school. The group included Captains Isaac Craig and Francis Procter, Captain-Lieutenant Parker, and Lieutenants Cooper and Parker — the first competitive selection for military schooling. Not much is known about these officers, since even their first names could not be obtained from the school records. By examination of the "Register of Officers of the Continental Army" and a process of elimination, one can find the surnames and ranks of the artillery officers. Most of them came from either Pennsylvania or Massachusetts, which is not unusual since these commonwealths made major contributions to the early artillery. None of the group reached a position of high military responsibility, as only two attained the rank of major. All but one, however, remained in the service until 1783.

Captain Coren was commissioned in September 1775 and first served in Knox's Massachusetts Regiment of Continental Artillery. A later assignment was the supervision of an ammunition-fixing laboratory in the old courthouse of downtown Carlisle. Here he was quite independent and could do things his own way; so he resented the interference of the Post Commander, Major Lukens, at his new assignment at Washingtonburg. After a year of conflict between these two, the first students arrived. Captain Coren's attitude evidently rubbed off on the students, as we find a letter from General Horatio Gates, President of the Board of War, dated March 1778, admonishing the students. The General noted that even though Captain Coren may not have been "communicative" enough, they (the students) might not have been attentive enough, and they seemed to have acquired the opinion that they were above "engaging in the manual practice of their work."

Other problems, revolving around pay, plagued the school, but none of these problems became serious.

Our deepest insight into the activities of the school comes from another letter from General Gates to the students dated April 1778.

*War Office, April 28, 1778.*

*Gentlemen:*

*. . . No person, in our Opinion, by merely viewing a complex Machine, altho' he should attend to its parts never so minutely, either in the whole or by Detail, could at once produce, of his own manufacture, a similar one, Practice must complete what speculation only begins.*

*The Knowledge you have gained, it is expected, of the Laboratory Art, as well as your Experience in Life, must convince you of the Truth of these general positions . . .*

*The time you have been at Carlisle was one Argument with the Board, added to their anxiety to have the Laboratory Art more generally known, which induced them to write to Captain Coren on the subject, and we shall be happy to hear, on your return to Camp, as we no doubt you shall that the knowledge you have gained by your Residence at Carlisle is equal to the Expectation formed, when the matter of sending you there was adopted. —*

*"Pennsylvania Archives," 2nd Series, Vol. XI, page 192.*

Apparently the practice or application of the artillery art was the primary method of instruction. It is interesting to note that this method is still heavily used in our service schools today. The tone of General Gates' letter seems to be one of accomplishment, challenge, and expectation, possibly written upon the graduation of the first class.

In tying all the pieces together, we can see that the first school in the American Army taught a three-month application course in the art of artillery to captains and lieutenants — not at all unlike our present Field Artillery Officers Basic Course. The principal difference is that the first artillery school emphasized construction and repair of cannon, whereas its modern counterpart concentrates more on the employment of artillery in support of the combined arms team.

No reference to the school can be found beyond these brief glimpses of the first class. We do know that Captain Coren was cashiered from military service on 30 June 1780 "for appointing lieutenants to his company and ordering them to be obeyed as such, and for signing a false order for rations by drawing for four subalterns when he had but one



**Captain Craig's Company of Artillery — 1976.**

in his company." The school itself most probably continued to function through the summer of 1781. By this time, Major Lukens (retired at his own request 30 August 1780) had been replaced by LTC Thomas Forrest, and the Public Works had dwindled to practically nothing through mass discharges in the postwar reduction-in-force and discontent among the few remaining artificers. It is likely that the school ceased operations during this period for lack of support from the Public Works, probably with the resignation of Lieutenant Colonel Forrest on 7 October 1781. By May 1784 all functions of the Continental Army had ended except for a few scattered guards.

Captain Isaac Craig, one of the original school staff as the Commander of the Artificer Detachment, was selected as a member of the first class, having been appointed Captain in the 4th (Pennsylvania) Continental Artillery on 3 March 1777. After graduation, Captain Craig was again assigned at Carlisle as the Commander of a Company of Artillery. In May 1780 Craig's Company was redeployed to Fort Pitt, where it remained for the remainder of the war. The Company's mission in its new home was to provide artillery support for the western department against Tory and Indian attacks. Isaac Craig was one of the two more distinguished students, reaching the rank of major on 7 October 1781 and serving until 17 June 1783.

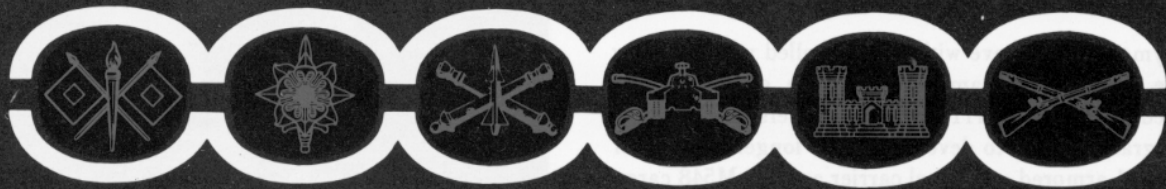
For the bicentennial year, Captain Craig's Company of Artillery was reconstituted at Carlisle Barracks and has put on shows and demonstrations of Revolutionary War artillery techniques for over 90,000 spectators throughout central Pennsylvania.

In spite of its brief and rather obscure history, the Artillery School is remembered today with an impressive monument at Carlisle Barracks. Two flags of the Revolution era are raised each day in commemoration of those soldiers.

We, too, as members of today's Field Artillery, should recall with pride the early traditions of technical competence and education established by the faculty and students of the first Artillery School! ☒

**MAJ John E. Felch Jr. is currently serving with the Staff and Faculty of the US Army War College as a senior systems analyst.**

*with our comrades in arms*



## Two hooks haul better and faster

Movement of artillery by helicopter should be faster and safer as a result of recent tests with the modernized CH-47C/D "Chinook" at Fort Campbell, KY. The concept tested is that external loads will be more stable in flight when suspended or anchored from two points.

The Chinook helicopter has two cargo hooks situated 13 feet apart in addition to the standard cargo hook. The test confirmed the concept as valid in that pilots were able to fly loads faster when suspended from two points. The pilots also said that these loads oscillated less, requiring fewer corrections which reduced pilot fatigue.

During the test, loads were rigged with weight equally distributed to both cargo hooks. The Army Airborne and Communications-Electronics Board conducted the tests.



**A modernized CH-47C/D helicopter uses two external cargo hooks to test fly a 155-mm howitzer.**

## System manager program established

A total system management concept for the life-cycle development of Army weapon systems has been implemented by the Training and Doctrine Command with the establishment of TRADOC System Managers (TSM) for 16 systems.

The TSM concept institutes cradle-to-grave responsibility for development of weapon systems including tanks, aircraft, artillery, and communications. Coordination of doctrine, tactics, logistics, training, personnel, and testing of new systems will begin early in their development.

Each manager will be a colonel who will be assisted by at least three officers — a trainer, a logistician, and a personnel specialist.

Here are some of the TSMs established to date:

<i>Weapon System</i>	<i>TSM Location</i>
Division Air Defense Gun	Fort Bliss
Roland	Fort Bliss
Patriot	Fort Bliss
XM-1 Tank	Fort Knox
Advanced Attack Helicopter	Fort Rucker
Tactical Operations System	Fort Leavenworth
Remotely Piloted Vehicle	Fort Sill
Tactical Fire Direction System	Fort Sill
General Support Rocket System	Fort Sill
Fighting Vehicle Systems	Fort Benning
Improved TOW Vehicle	Fort Benning
Utility Tactical Transport Aircraft System	Fort Benning

When the TSM program is fully organized, it will provide management for 30 systems. Fort Sill will have five more, including Pershing II, Copperhead, 8-inch, 155-mm, and Firefinder.

## With Our Comrades In Arms

### Stretch to double payload of M113A1

Artillerymen on the move with self-propelled weapons may soon be getting their ammunition from elongated and improved types of the M113A1 armored personnel carrier.

A program leading to development of longer versions of the M113A1 armored personnel carrier and the M548 cargo carrier is being conducted by the Army Tank Automotive Research and Development Command (TARADCOM). The program is part of an effort to modernize these vehicles and includes improvements in suspension systems, engine cooling, and engine horsepower.

Efforts to "stretch" the M113A1 began last year when a study concluded that an approximate 26-inch extension of the cargo compartments would double the cargo volume and swim payload capability of the vehicles in comparison with the standard size.

Two stretched test versions of the M113A1 and one extended M548 test rig are being prepared by TARADCOM and a civilian contractor. All three vehicles are expected to be completed by October when they will receive extensive tests and evaluation.

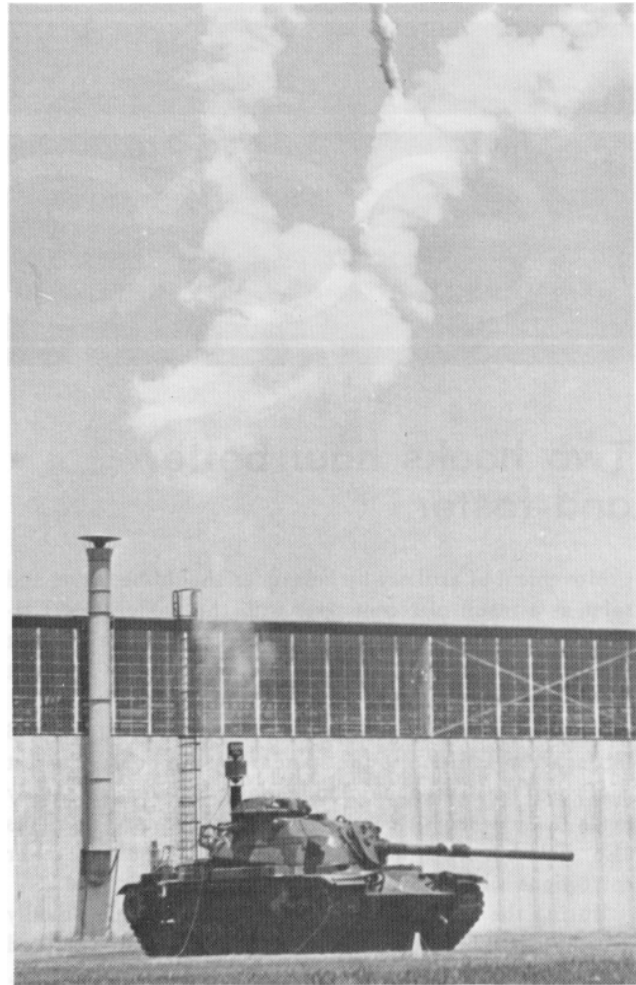
In addition to being longer, the stretched versions will feature an extra set of road wheels for added support. Instead of the standard 210-horsepower diesel engine used on present M113 vehicles, the test rigs are being equipped with a turbocharged version of that engine, rated at 300 horsepower. An improved transmission featuring hydrostatic steering is also being installed.

The vehicles are being considered for use in several roles but primarily for supplying ammunition to self-propelled artillery or combat tanks, according to TARADCOM officials.

After completion of evaluation around year's end, the Army will decide whether to develop one or both of the stretched vehicle concepts.



**M113A1 normal version, left and stretched version, right.**



**Test tank launching a thermoflare**

### Antitank missile defense in the works

An experimental, automated combat vehicle system to detect and defend against a launched antitank guided missile has been developed after a two-year effort by Army Tank-Automotive Research and Development Command (TARADCOM).

A model of the system, built by Vought Corporation, was installed in an M60 tank and successfully operated during a demonstration in which simulated missiles were fired at the tank.

The model, referred to as the automatic defense system, is the first attempt to provide a combat vehicle with a built-in capability to automatically defend itself against incoming guided missiles.

The time required for an antitank missile to travel from a launch site to a target vehicle usually ranges from 8 to 14 seconds — too little time for the crew of the vehicle to make

decisions necessary for evasive action. The new system can detect a missile as soon as it has been launched and, in less than two seconds, can start countermeasures to deflect it from the target vehicle.

The system uses an omnidirectional optical sensing device mounted on the tank. When a missile is launched, this sensing unit immediately picks up infrared energy emitted by the missile. The energy is then converted into an electrical signal and fed into a computer inside the vehicle. The computer interprets this signal and simultaneously displays the information on a panel in front of the tank commander and activates a warning system alerting the crew that the vehicle has been fired upon.

The computer also activates one of two countermeasure devices mounted on the outside of the tank. One of these — intended for use against missiles that are optically guided or flown along a laser beam to their targets — is a smoke dispenser that can launch shielding smoke to hide the tank from the enemy gunner's view.

The other countermeasure device is a flare launcher for use against thermal-seeking missiles. If a thermal-seeking missile were to be fired, the flare launcher, after receiving a signal from the computer, would shoot thermoflares — which produce higher levels of heat energy than a tank does — to attract the missile away from the vehicle.

Work is not far enough along on the concept to determine a deployment schedule at this time.

## More smoke—less enjoyment for 31st Infantry

Soldiers of the 6th Battalion, 31st Infantry, 7th Infantry Division, are fighting their way through a smoke cloud in a Combat Developments Experiment Command project at Fort Hunter Liggett, CA.

The Tank versus Infantry in a Smoke Environment experiment pits armored vehicles against light infantry forces in both defensive and offensive operations. All confrontations are conducted in a moderate-to-heavy smoke screen dispersed by helicopters and ground smoke generators.

The experiment is designed to test the effects of smoke on the performance of infantrymen armed with light antitank weapons in defense against armored attack.

## 40-mm practice round OK in tests

Results of operational testing of a training round for the 40-mm grenade launcher have demonstrated that the XM781 cartridge is safe for troop use.

The tests, conducted by the Infantry Board, confirmed that the training round met the criteria of being ballistically similar to the HE round, that it releases a smoke cloud upon impact, and that it is sufficiently durable and reliable for training use.

The XM781 consists of a 40-mm cartridge case with a .38 caliber propulsion system and a fuzeless plastic projectile. It will be portable for training use when packaged in the standard bandoleer.

## Improvements many in new antenna

A new VHF whip antenna for military vehicles is in production and scheduled for distribution to the field about November 1978. Designated the AS-2731/GRC, the new antenna replaces the AS-1729/VRC and is only 5.5 feet long compared to 10 feet for the current antenna.

Tiedown requirements and breakage will be minimized with the new antenna which is compatible with VHF radios in the 30- to 80-megahertz range. The lower silhouette of the AS-2731/GRC reduces probability of battle damage, exposure to the enemy, and damage from striking low overhead obstructions. Communications can be maintained during vehicle movement since tiedown is eliminated.

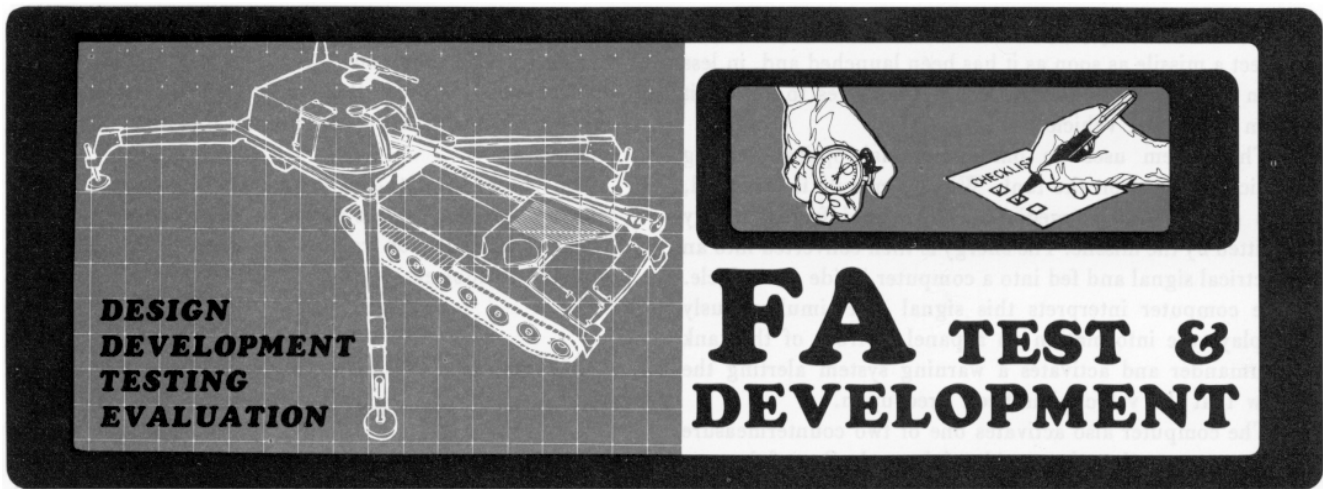
Manual tuning is improved by elimination of internal gears and locating the tuning shaft concentric with the rotary solenoid. Alignment of the switch assembly has been simplified, and sequential band locations afford manual tuning ease. Switching current is required on only one control line instead of the previous six.

Distribution of the new antenna is planned on a one-for-one replacement basis with the first 5,000 scheduled for USAREUR. Final field testing is being conducted and testing units will be permitted to keep the antenna.

## Armor increases crew size

A recently approved recommendation to add a fifth crew member to existing tank crews is considered one of the most significant of 83 recommendations by the Army Tank Forces Management Study Group according to a recent DA message. The fifth man will be trained as a totally integrated member of the tank crew and will learn all aspects of the tank to which he is assigned.

Additional tankers will be assigned to selected units in Europe and FORSCOM for evaluation of the new program. The additional man is expected to provide an instant replacement for any casualties in a tank crew.



## FIST vehicle concept evaluated

A concept evaluation test of an interim fire support team (FIST) vehicle has been conducted jointly by the Field Artillery Board and the Tactics and Combined Arms Department, USAFAS. The M113A1 was designated as the test vehicle, and locally applied modifications were investigated during field exercises. These modifications were aimed at finding the most effective configuration for FIST operation.

The communications network was optimal when the FIST chief monitored the company command net and the DS artillery battalion fire direction net, while the FIST sergeant monitored the company fire control net and the battalion or company mortar fire direction net.

Storage space was a problem in the standard M113A1. To correct this, several modifications were made. An aluminum storage/battery box was built allowing easy access to service the batteries, as well as providing compartments for FIST supplies. Two aluminum mapboards provided appropriate places for mounting a long range planning map and a situation map. Other modifications included a seat capable of up and down positioning for the FIST chief and a hatch attachment which allows the TC hatch to lay flat on the top of the M113A1. This gives the FIST chief a 6400-mil observation capability.

All units should now have a copy of the test report which includes pictures and drawings of conceptual modifications. If you did not receive a copy, contact:

Commandant                      AUTOVON: 639-3974/5609  
 USAFAS  
 ATTN: ATSF-CA-RA  
 Fort Sill, OK 73503

## New shell tested

The Field Artillery Board recently conducted an operational test of the M692/M731 Artillery Delivered Antipersonnel Mine (ADAM). The M692/M731 is an area denial munition fired from 155-mm howitzers; it contains 36 submunitions and is designed to be fired with standard propelling charges and the M577 time fuze. The antipersonnel submunition uses trip wires as a triggering mechanism, any one of which, upon being activated, fires a detonator which propels the kill mechanism into the air. Upon reaching a suitable height, it detonates, throwing lethal fragments in all directions. The M692/M731 incorporates two different factory-preset, self-destruct delay times; one of short and one of long duration.

The purposes of this operational test were:

- To insure that artillery fire units can accurately emplace a minefield of a specified density and size using minefield design established by the US Army Engineer School.
- To verify employment tables and firing tables.
- To validate adaptations of standard gunnery techniques worked out by the Field Artillery School.

The test was conducted using registration and transfer procedures to determine if submunitions would form satisfactory patterns in the target area. Average fire direction center and M109A1 howitzer sections were used in all firings. One hundred ninety-eight rounds containing inert submunitions were fired during the Fort Sill test. Survey teams located each submunition in the impact area to determine each round's effects pattern. The results of this test are currently being reviewed by the Field Artillery School.



## GSRs contracts awarded

The Army Missile Research and Development Command has awarded competitive contracts to Boeing Aerospace Co., Seattle, WA, and Vought Corp., Dallas, TX, for development of the Army's new General Support Rocket System (GSRs). The Army solicited bids from 31 sources.

Boeing received approximately \$34 million and Vought approximately \$30 million to design, build, test, and demonstrate free flight artillery rocket systems of their own design.

Following a competitive 29-month program of fabrication and testing, the Army will select one contractor for final qualifications and initial production.

COL Barrie P. Masters, GSRs Project Manager at Redstone Arsenal, said the contract awards "... are the culmination of two and half years of program planning, proving system feasibility, and teamwork.

"A lot of people have done an outstanding job," Colonel Masters said, praising the close cooperation and efforts of both government and contractor agencies.

The Army plans to field GSRs in the early 1980s.

GSRs will be a low-cost, rugged, reliable artillery

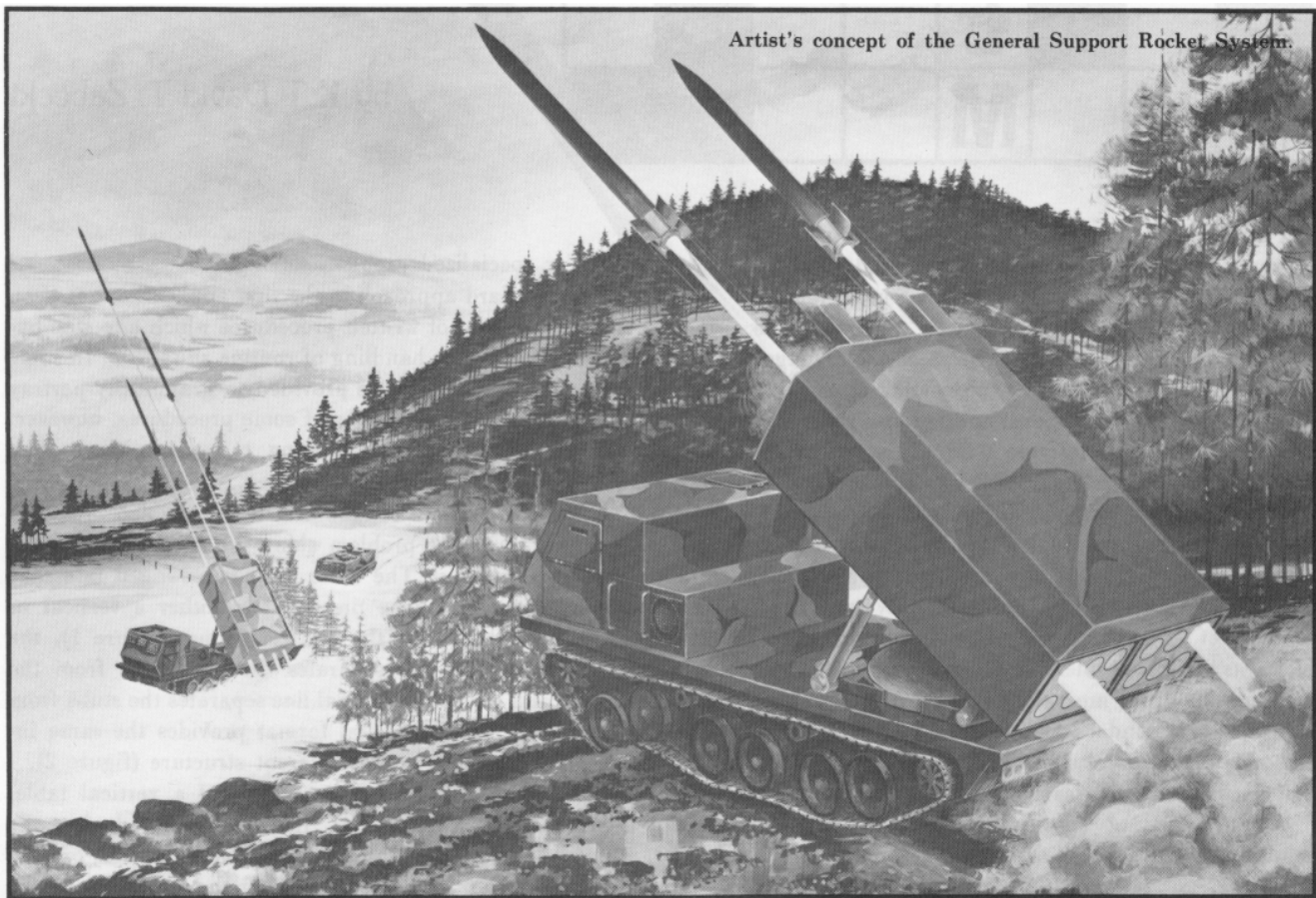
rocket system that can be emplaced quickly and deliver a high volume of fire. The system will be mounted on a highly mobile, full-tracked vehicle that will carry 12 rockets which can be fired singly or in rapid ripples.

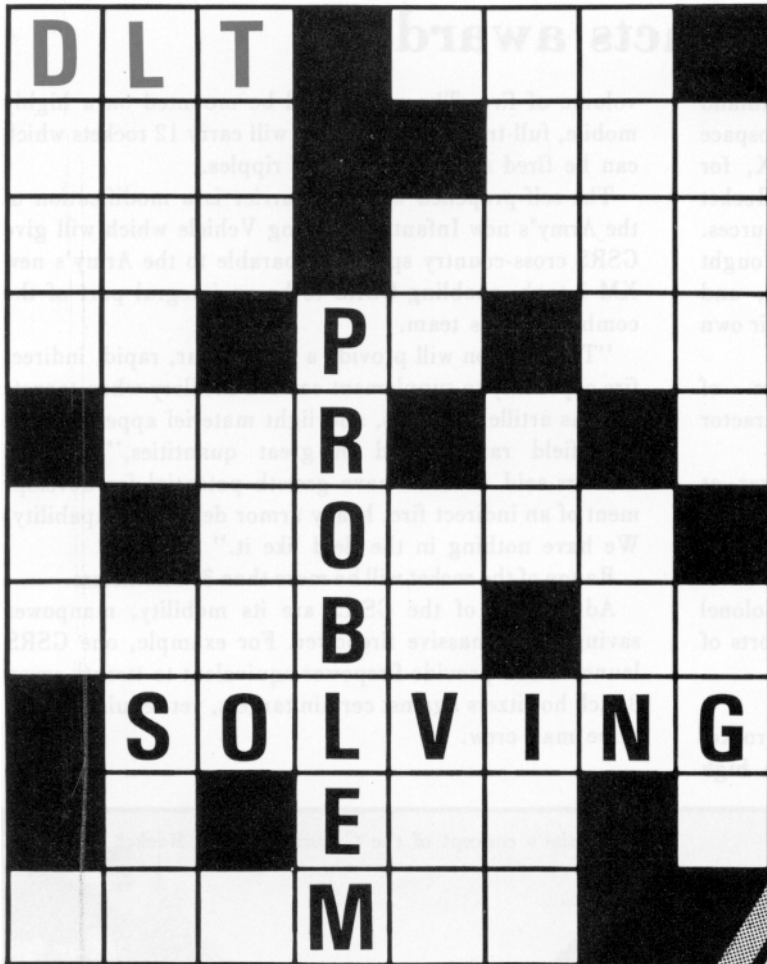
The self-propelled weapons carrier is a modification of the Army's new Infantry Fighting Vehicle which will give GSRs cross-country speed comparable to the Army's new XM-1 tank, enabling GSRs to be an integral part of the combined arms team.

"This weapon will provide a nonnuclear, rapid, indirect fire capability to supplement cannon artillery when targets such as artillery, troops, and light materiel appear on the battlefield rapidly and in great quantities," Colonel Masters said. "It will have growth potential for development of an indirect fire, heavy armor defeating capability. We have nothing in the field like it."

Range of the rocket will be more than 30 kilometers.

Advantages of the GSRs are its mobility, manpower savings, and massive firepower. For example, one GSRs launcher can provide firepower equivalent to twenty-seven 8-inch howitzers against certain targets, yet requires only a three man crew.

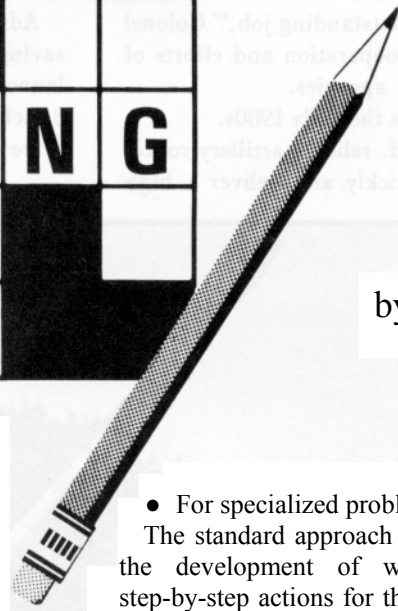




## A Management Tool For Field Artillery:

# The Decision Logic Table

by 1LT David T. Zabecki



The Decision Logic Table (DLT) is a simple, yet powerful, tool that can be used by Field Artillery supervisors in accomplishing the most important of all managerial functions, decision making. The decision-making process is one in which the manager defines the problem, analyzes the existing conditions, draws the logical conclusions, and initiates the appropriate action. The main requirement for this process is an understanding of the relationships among the various elements of the problem. The relationships will become more complex as the problem becomes more complicated, but the more of these the manager can identify and evaluate, the better his decision will be. What is needed is a method of structuring the relationships of the various elements of the problem in such a way that the proper combination of the most significant elements is considered.

DLTs are a standard tool in computer system design. In the daily operation of a Field Artillery organization, DLTs can be used in two ways:

- For providing specific guidance for standardized administrative or operational procedures that involve many variables.

- For specialized problem solving.

The standard approach to the first application has been the development of written procedures which cite step-by-step actions for the handling of routine situations. In some cases, a flow chart will be provided to graphically portray the process. The complexity of some procedures, however, makes it difficult and confusing to present them in a narrative or a flow chart format.

The DLT uses a tabular format which requires organization of the problem along the specific line of the problem definition. The table itself is arranged into four quadrants and may be presented in either a vertical or horizontal format. In the vertical format (figure 1), the heavy horizontal line separates the conditions from the actions and the heavy vertical line separates the stubs from the entries. The horizontal format provides the same information in a somewhat different structure (figure 2).

The conditions, in the upper half of a vertical table, represent "IF" statements. Each condition depicts the status of a given bit of information. Conditions may express a relationship to other conditions, or they may require the

<b>Condition stub (IF)</b>	<b>Rules</b>
	<b>Condition entry (IF)</b>
<b>Action stub (THEN)</b>	<b>Action entry (THEN)</b>

Figure 1. Decision Logic Table construction, vertical format.

<b>condition stub (IF)</b>	<b>Action stub (THEN)</b>
<b>R u l e s</b>	<b>Condition entry (IF)</b>
	<b>Action entry (THEN)</b>

Figure 2. Decision Logic Table construction, horizontal format.

presence or absence of a specific value. They are usually arranged in the table with the most general first and the most specific last.

The actions, in the lower half of a vertical table are "THEN" statements. Actions are responses to specific combinations of conditions. Each must be performed in the order in which it appears in the table, and a given action must be completed before the next action can be accomplished.

The stubs, in the left quadrants, are the beginnings of statements. The upper left quadrant contains the condition stubs, and the lower left quadrant contains the action stubs. The statements began in the stubs are completed in the

entry quadrants on the right side of the table. The upper right quadrant contains the condition entries, and the lower right quadrant contains the action entries.

The right quadrants of the table are further divided into columns. Each column represents a rule which is composed of a unique combination of conditions and the subsequent required actions. Each rule represents a unique path through a flow chart.

DLTs are further classified by the manner in which information is presented in the entry quadrants of the table. An extended entry table is one in which the beginning (IF portion) of the statement is written in the stub and the end (THEN portion) of the statement is written out in the entry. A limited entry table is one in which the entire written portion of the statement is presented in the stub and the completion of the statement in the entry is accomplished through the use of symbols. A condition entry may be a simple yes (Y) or no (N) or it may be a symbol which expresses a value or numerical relationship between variables (>, =, ≤, ≠, etc.). An (X) in an action entry indicates that the action stated in the stub is to be accomplished. A blank space in either the action or the condition entry indicates that the statement does not apply. Tables 1 and 2 are DLT representations of the misfire procedure flow charts from FM 6-50. These tables are in the limited entry, vertical format. Table 1, for example, shows misfire procedures for semifixed ammunition (cold tube), which has six rules to cover all possible combinations of conditions and appropriate actions.

- Rule 1 had only one condition, no misfire, in which case the resulting action is that the weapon is clear.
- Rule 2 has two conditions, a misfire, which requires an

Table 1. Misfire procedures: semifixed ammunition, cold tube.

	Misfire procedures: semifixed ammunition, cold tube	Rules					
		1	2	3	4	5	6
Condition	Misfire?	N	Y	Y	Y	Y	Y
Condition	Fires on two reattempts?		Y	N	N	N	N
Condition	Primer dented?			Y	Y	N	N
Condition	Fires?			Y	N	Y	N
Action	Attempt to fire two more times		X	X	X	X	X
Action	Wait two minutes			X	X	X	X
Action	Open breech, check primer			X	X	X	X
Action	Fix firing mechanism					X	X
Action	Replace cartridge case			X	X		
Action	Attempt to fire again			X	X	X	X
Action	Weapon clear	X	X	X		X	
Action	Misfire				X		X

Legend: X = to be accomplished.

blank = does not apply.

N = no.

Y = yes.

**Table 2. Misfire procedures: separate-loading ammunition, hot tube.**

	Misfire procedures: separate-loading ammunition, hot tube	Rules						
		1	2	3	4	5	6	7
	Misfire?	N	Y	Y	Y	Y	Y	Y
	Fires on two reattempts?		Y	N	N	N	N	N
	Primer fired?			N	N	Y	Y	Y
	Round fired within 5 minutes of chambering?			Y	N			
	Combat emergency?					N	Y	Y
	Round fires with new primer?						Y	N
Actions	Attempt to fire two more times		X	X	X	X	X	X
	Wait two minutes			X	X	X	X	X
	Remove and inspect primer			X	X	X	X	X
	Repair/replace faulty primer/firing mechanism			X	X			
	Fire within 5 minutes of chambering			X	X			
	Insert new primer and attempt to fire						X	X
	Weapon clear	X	X	X				X
	Evacuate personnel				X	X		X
	Notify EOD for removal of projo if not removed within 5 minutes				X	X		X

**Legend: X = to be accomplished.**  
**blank = does not apply.**  
**N = no.**  
**Y = yes.**

attempt to fire the weapon two more times, and the fact that the weapon fires on the reattempts, which again results in a clear weapon.

- Rule 3, has four conditions. The first condition is the misfire, which requires the two reattempts to fire. The second condition is the fact that the weapon does *not* fire on the two reattempts which requires two actions: waiting two minutes and opening the breech and checking the primer. Condition three is the fact that the primer is dented, which requires two more actions: replacing the cartridge case and reattempting to fire. Condition four is the fact that the weapon fires on the reattempt, which results in the weapon being clear.

- The flow for rules 4, 5, and 6 are similar to that for rule 3.

Table 3 is a DLT representation of the "When to Register" decision from the flow chart in FM 6-40-5. This table is in the extended entry, horizontal format, and has four rules. In rule 1, if the fire direction officer (FDO) has confidence in the weapon location, *and* he has confidence in the meteorological (met) data, *and* he has confidence in the muzzle velocities (MV), then he will shoot met plus VE. In rule 2, if the FDO does not have confidence in the weapon location, *or* the met, *or* the MV, and registering is worth the possibly enhanced vulnerability, then the FDO will register

**Table 3. When to register.**

	Conditions	Actions			
		IF the FDO	and	and	THEN the FDO will
Rules	1	has confidence in weapon location	has confidence in the met data	has confidence in the MV	shoot met + VE
	2	does not have confidence in any of the conditions stated in rule 1	registering is worth the vulnerability		register and shoot registration corrections
	3		registering is not worth the increased vulnerability	the unit is firing in an observed fire situation	adjust fire
	4			the unit is not firing in an observed fire situation	fire best available data

and shoot the registration corrections.

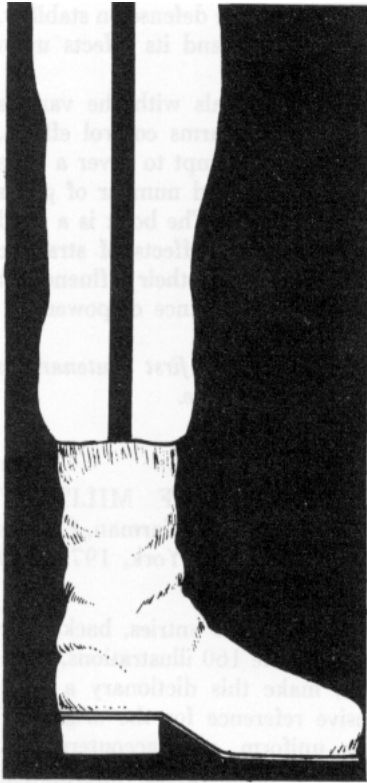
The DLT technique has several significant advantages. The problem and all of its elements can be presented in a systematic and precise manner with a minimum of unnecessary written description which may lend itself to misinterpretation. The logical sequence of defining the problem assures completeness by revealing omissions and forces the clarification of ambiguities. Alternatives, exceptions, and meaningful relationships among variables are displayed graphically. And finally, the common ground rules used in the table formulation improve communication between the interested parties.

The DLT seems to have only one limitation. Although DLTs are easier to construct than comparable flow charts and have a decided advantage in the expression of the more complex situations, the flow chart is better able to express the *total sequence* of events. The misfire procedures are good examples of this; however, they were presented here for comparison purposes because they are readily referenced.

The Decision Logic Table has a high potential for Field Artillery applications. They can be developed and issued as supplements to unit SOPs. In cases where the narrative would be excessively long or confusing, the DLT can serve as the main portion of the SOP. DLTs are applicable to administrative practices, such as report preparation and distribution; technical procedures, such as fire direction and observed fires; and operational procedures, such as staff studies and the commander's estimate of the situation.

The scope of the Decision Logic Table is only limited by the ability of the individual supervisor to define the problem and identify the relevant conditions of the situation.





# Redleg Review

In preparation for more than a decade, this work crowns the writing achievements of the two Dupuys that include more than 50 books and hundreds of other publications in the field of military affairs.

The Encyclopedia of Military History provides a comprehensive, reliable, and authoritative study of military affairs from 3500 BC to today. —Ed.

**THE PARTISANS OF EUROPE IN THE SECOND WORLD WAR**, by Kenneth Macksey, Stein and Day, New York, 1975, 258 pages, \$12.50.

Perhaps the most striking characteristic of Kenneth Macksey's book is the separation of fact from fiction in the contemporary view of the European (and Asian) partisan in action during WWII. All too often, the Hollywood image of the freedom-loving, sacrificial hero hides the reality of disjointed, ill-trained, ill-equipped, ill-organized, and ill-led citizen soldiers. To this end, the book is a rousing success.

But, unless you're a dedicated partisan "aficionado," the book is only for serious students of irregular warfare.

Activity of irregular bands during WWI was limited because of a very stabilized situation in Europe. However, Africa, Asia, and, most notably, Russia provided a start point of guerrilla activity. The famed T. E. Lawrence initially organized roving bands of Arabs and trained them to fight as an effective battle force against the Turks. Concurrent with the action, the Bolshevik Revolution was to eventually establish a communist government in Russia, a country already battle hardened by the brutalities of conventional warfare.

The concept of partisan warfare went into a general decline between the world wars with one striking exception; that being the Germans. For as Europe was soon to learn, the German infantrymen,

superbly equipped, trained and led, proved to be the toughest antiguerrilla fighters during the war.

Macksey takes into account the full spectrum of partisan activities — not only military actions, but also political.

It is interesting to note that the successes or failures of the partisans worked in reverse proportions to German military operations. On the whole, when German strength was greatest during the early stages of the war, partisan activity caused virtually no damage. The only partisan successes occurred when German strength was weakest.

But what are the partisans? Macksey states that almost all countries had activity of sorts. The most aggressive partisans were the Poles, Russians, and Yugoslavs who all shared a common hatred of the Germans. But their efforts, though valiant, did not bring about large scale damage. Without arms, radios, and most importantly training, they were ineffective as a military force. Their contributions were mostly of interest to intelligence (provided, of course, their information could be counted on as secure). History illuminates a lack of security that led to partisan disasters.

Where did the partisan go? — mainly back to his home to add weight to whatever political faction was in power. His actions were primarily a forerunner to today's modern partisan, who is better known as the terrorist. The author sees little difference.

I feel the serious student of partisan warfare will benefit greatly from reading such an unbiased account.

*CPT Jankowski is currently serving as Commander of Battery B, 1st Battalion, 79th Field Artillery, Fort Ord, CA.*

**FIELD ARTILLERY BATTALIONS OF THE U. S. ARMY (Volume 1)** by James A. Sawicki, Centaur Publications, Dumfries, VA, 1977, 646 pages, \$24.95.

**THE ENCYCLOPEDIA OF MILITARY HISTORY**, R. Ernest Dupuy and Trevor N. Dupuy, Harper & Row, New York, 1977, 1464 pages, \$25.00.

The father and son team of Dupuys has produced a most comprehensive one-volume study of military facts in this revision to their 1970 effort. This edition adds the Indo-China wars, including the US involvement, and the Middle East wars. It also corrects errors contained in the earlier edition.

The Dupuy encyclopedia contains 21 chapters organized on a system of historic eras. Within each chapter there are separate sections for key nations or geographical regions of the period. Each chapter begins with an essay capsulizing pertinent military factors of the era. Additional essays are provided about isolated weapons or tactics that had a major influence on the period. The bulk of each chapter is devoted to battles or campaigns, each report being short and to the point, and providing specific dates, names, places and numbers.

"Complete" is the best adjective to describe this work which contains 120 pages of indexes and bibliographies. There are indexes of battles and sieges, another for wars, and yet another general listing of names and event all completely cross referenced.

## Redleg Review

Mr. Jim Sawicki has compiled a long needed reference relating to the honors and lineages of the Field Artillery. In Field Artillery Battalions of the U.S. Army, we finally have each battalion's record of service, to include its campaign streamers and decorations as well as drawings and descriptions of its coat of arms and distinctive insignia.

The shortcomings include use of black and white drawings when color is such an important part of crests and coats of arms; absence of reference to caliber of weapons assigned the battalions; and, the lack of any narrative, though including such information would have tripled the size of the book.

Among the data presented by Sawicki is the fact that on 1 January 1941 there were only 38 separate battalions of Field Artillery. By 31 December 1944 this number had reached **696**. Although the maximum number of Field Artillery battalions in Active Federal service at any one time never exceeded 700, more than 1,000 of them existed at one time or another between 1941 and 1959. Many of these units' stories are contained in this book.

While much of the information in Volume I is enlightening, the most interesting data is the reasoning behind the design of unit crests such as the one for the 110th Artillery where the half garland of oak leaves on the crest represents a large oak grove in which the unit armory stood.

Summary: an invaluable reference work too long in coming. —Ed.

**SPITFIRE AT WAR**, by Alfred Rice, published by Ian Allen, Ltd., 1974, 160 pages, \$7.95.

**SPITFIRE AT WAR** is the story of one of the most successful aircraft designed. Best known for its part in the Battle of Britain, the Spitfire achieved lasting fame when it was flown by "the few" who did "so much" for "so many."

Over 22,000 of the superb little fighters were built, and they were used by the Royal Air Force for 18 years. For their first nine years, they were seldom surpassed as air superiority vehicles, the role for which they were created. Before they were retired from service, however, they had performed almost every conceivable role for a fighter: air superiority, air defense, reconnaissance, dive bombing, training, and even used as forward observer platforms for naval

gunfire. Over 24 major modifications were eventually made to the original specifications; yet the last model was clearly recognizable as a Spitfire, a testament to the soundness of the basic design.

**SPITFIRE AT WAR** is entertaining reading for a person interested in World War II aircraft. Various chapters were written by engineers, maintenance technicians, and pilots who served with the aircraft. Another was written by a German pilot who tells what it was like to be engaged by a Spitfire in aerial combat. The book contains 230 photographs which add realism to the narrative and make an appealing as well as entertaining addition.

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

**DYNAMICS OF THE NUCLEAR BALANCE** (Revised Edition), by Albert Legault and George Lindsey, Cornell University Press, Ithaca, NY, 1976, 283 pages, \$14.50.

This book is a good basic introductory text to the inventories of strategic nuclear weapons, their employment in possible future warfare, and their current use in deterrence.

The first chapter is concerned with nuclear explosives. The reader who has a basic knowledge of nuclear weapons and their use can skip this chapter. The layman, however, will find a clear concise description of the basic physics of nuclear weapons and a basic vocabulary with which to tackle subsequent chapters and arguments.

Chapters two through five, deal with offensive strategic missiles, ballistic missile defense, the ballistic missile submarine, antisubmarine defense, strategic bombers, and air defense to include their employment and the relative strengths of the two superpowers in each weapon category.

The authors define deterrence, the logic behind it, and how it has been used in the past to stabilize superpower relationships. The options available in civil defense and the options between massive retaliation and selective targeting options are also discussed.

Also presented is a theoretical model of deterrence, including the classic cases of invulnerable missiles, vulnerable missiles, very vulnerable missiles, dangers of MIRVs (multiple independently targetable

reentry vehicles), stable and unstable deterrence, the effects of antimissile defense on stability, and disarmament and its effects upon stability.

One chapter deals with the various disarmament and arms control efforts.

The authors attempt to cover a wide field within a limited number of pages and do a good job. The book is a good introduction to the effects of strategic nuclear weapons and their influence on the international balance of power.

*Michael N. Ray is a first lieutenant in the US Army Reserve.*

**A DICTIONARY OF MILITARY UNIFORM**, by W. Y. Carman, Charles Scribner's Sons, New York, 1977, 140 pages, \$12.50.

More than 1,500 entries, backed by an array of some 160 illustrations, some in color, make this dictionary a comprehensive reference for the origins of military uniform and accouterments.

While the book carries information and pictures of military uniforms from many nations, it is primarily based on the British evolution of the uniform since the 17th century when national armies of the Western World began to adopt uniforms as such.

Definitions are provided in the dictionary for each garment, badge, decoration, hat, helmet, boot, etc., as well as background information on the origin and evolution of many pieces of uniform and how they were made and worn. Since much of the US military uniform is based on the British, those interested in the history of the American uniform will be able to trace many items back to their beginnings.

For example, one reads that the British infantry adopted half-boots in 1823 when shoes were discontinued and that the men were expected to wear them on either foot alternately for even wear; or that the "butternut" uniforms of the Confederate armies during the Civil War were so called because of a dye derived from boiled nut shells and iron-oxide.

The author of the dictionary is retired from his post as Deputy Director of the British National Army Museum, London, and is the author of six additional works on uniforms and firearms.

The dictionary is recommended for both history and military buffs as a reference work. The author notes that the dictionary is more limited than an encyclopedia, but it includes sufficient information on which to base a great amount of research. —Asst. Ed.

# 1977 REDLEG REFERENCE

The following is a list of *Journal* articles and "View From The Blockhouse" items for calendar year 1977 and the issue in which the material was published. The letters VB indicate items from "View From The Blockhouse."

## Air Operations/Support

Air Assault Artillery, Jan-Feb.

## Ammunition/Fuzes

Extending Range of Artillery, Mar-Apr.

New 8-inch Charge In Production, Jan-Feb (VB).

## Communications/Electronics

C2S2, Jul-Aug.

Field Artillery Applications For Remote Sensors, Jan-Feb.

Winning The Invisible Battle, Nov-Dec (VB).

## Counterfire

Availability of Survey Material, Mar-Apr (VB).

Better Gear For TABS, Jul-Aug (VB).

Evaluating the ARTEP, Jul-Aug (VB).

FMs Being Revised, Nov-Dec (VB).

MALOR Is Now Firefinder, Jan-Feb (VB).

National Guard TABS Activated, Sep-Oct (VB).

SIAGL Is Coming, Sep-Oct (VB).

Sound Ranging Makes Comeback, Jul-Aug (VB).

Sound Ranging Tape, Nov-Dec (VB).

SR-56 Power Problem, Jul-Aug (VB).

Survey Form Status, Sep-Oct (VB).

The TAB and the ARTEP, Jul-Aug.

Training Device Designed For Radar Crewmen, Jul-Aug (VB).

USAREUR TAB Activations, Sep-Oct (VB).

What's Happening In Survey?, Jan-Feb (VB).

## Doctrine

FIST Moves On, Jan-Feb (VB).

XCOM, Jan-Feb (VB).

## Equipment

Fire Control Calculator, Jul-Aug.

Firefinder Fielding, Mar-Apr (VB).

Graphical Firing Table Availability, Jan-Feb (VB).

Major PIP For M109, Mar-Apr (VB).

Modified Tube, M114A2, 155-mm (Photo), Sep-Oct (VB).

New FADAC Tapes For Lance, Jul-Aug (VB).

Pocket FDC, Jul-Aug.

Slammer, Sep-Oct.

TACFIRE To Be Issued, Jan-Feb (VB).

Upkeep of LWSS (Lightweight Screening Systems), Jan-Feb (VB).

We Need An MRL (Multiple Rocket Launcher), Jan-Feb.

## Foreign

Outpost Of Democracy, May-Jun.

Soviet Artillery Massing Capability, Nov-Dec.

## Gunnery

Charge Selection Criteria Refined, Mar-Apr (VB).

EFC Factors For M109A1 SP Howitzers, Sep-Oct (VB).

Fire Direction, Nov-Dec.

FADAC Tape Status, Sep-Oct, (VB).

Fire Direction Film Available, Jul-Aug (VB).

M119 Prop Charges Fixed For M109A1s, Jul-Aug (VB).

New Change For FM 6-40-5, Jul-Aug (VB).

New Gunnery Film, Nov-Dec (VB).

Request All Available! Why Not Minimum Required? Mar-Apr.

Simplified Smoke, Sep-Oct.

The MFDT (Massed Fire Distribution Technique) Works! May-Jun.

Which Weapon For Close Support - A New Look, Mar-Apr.

## History

Artillery Monograph Available, Nov-Dec (VB).

Colonial Cannon, South Carolina Artillery, 1670-1813, Sep-Oct (VB).

The Field Artillery In Vietnam, Part VI, Jan-Feb.

The Field Artillery In Vietnam, Part VII, Mar-Apr.

The First Artillery School, Nov-Dec.

USMC Artillery, 1900-1941, Jul-Aug.

Winning The West, Chapter 6, Jan-Feb.

## Maintenance

Improved Maintenance Program For M109, May-Jun (VB).

The Master Mechanic, Nov-Dec.

## Organization

Battalion Tactical Trains, Jan-Feb.

Field Artillery Brigade, May-Jun.

The Cavalry FIST, Jul-Aug.

USAFAS Reorganization, Jul-Aug.

## Personnel

EPMS And The Field Artillery, May-Jun.

EPMS - What Is It All About?, Nov-Dec.

New Target Acquisition MOS, Nov-Dec (VB).

What Happened To The FA Mechanic?, May-Jun (VB).

## Research and Development

HELBAT 6, Jul-Aug.

L118 Test (Photo), Jan-Feb (VB).

## Tactics/Strategy

GS In The Defense, Sep-Oct.

Interoperability, Jul-Aug.

Limited Defense Option, Part I, Jan-Feb.

Limited Defense Option, Part II, Mar-Apr.

Limited Defense Option, Part III, May-Jun.

Survivable, Affordable and Lonely, Nov-Dec.

The Nuclear Package, Nov-Dec.

## Training

AFTCON IV, Sep-Oct.

Aids To Training - The FA Viewpoint, Sep-Oct.

All American Redlegs, Jan-Feb.

Commanders' Refresher Course, Mar-Apr (VB).

Consolidation of Missile Instruction At USAFAS, Nov-Dec (VB).

Correspondence Courses Move, Mar-Apr (VB).

Do You Really Understand the ARTEP?, Sep-Oct.

FADAC Job Aid Prepared, Jul-Aug (VB).

FADAC Qualification Program, Mar-Apr (VB).

FA Surveyors SQTs, Nov-Dec (VB).

FATASOC, Nov-Dec (VB).

Field Artillery SQTs, Nov-Dec (VB).

FIREX '76, Mar-Apr.

FIST Training Update, Nov-Dec (VB).

Honest John FD Instruction Eliminated, Jan-Feb (VB).

How Effective Is The Maintenance Manager?, Nov-Dec (VB).

I'd Rather Do It Myself, Jul-Aug.

Lance Training Device To Be Fielded Soon, Nov-Dec (VB).

M31 Training Tape Available, Jul-Aug (VB).

New Training For FOs, May-Jun (VB).

Note For Reserve Components, Jan-Feb (VB).

One-On-One With The Guard, Sep-Oct.

Operations Intelligence Training Available, May-Jun (VB).

SQT Clarification, Mar-Apr (VB).

SQT For Reserve Components, Mar-Apr (VB).

SQT Update, Nov-Dec (VB).

Thank You!, May-Jun (VB).

The Conventional/Nuclear ARTEP, Sep-Oct.

The Forward Observer-How Effective Is He?, Jul-Aug.

The GS Battalion ARTEP, Mar-Apr.

Train As You Will Fight - At Night, Jul-Aug.

## Other

A Management Tool For Field Artillery, The Decision Logic Table, Nov-Dec.

Correspondence Courses Consolidated, Nov-Dec (VB).

FAOAC Opinion Survey, Jul-Aug.

Firepower And Punch, Mar-Apr.

FM Distribution Dates Set, Nov-Dec (VB).

Getting To The GDP On Time, Sep-Oct.

Leadership Talent Search, Sep-Oct.

Noise - An Enemy Within, Jul-Aug.

Snow Hall Holds Double Ceremony, Sep-Oct (VB).

South Dakota Half Section, Jan-Feb.

Towed Armored Cannon, Mar-Apr.